



<i>COUNCIL AGENDA</i>	
Date: <u>May 26, 2026</u>	Item: <u>1113</u>
May 27, 2026 SP	8.3



DISTRICT OF WEST VANCOUVER
750 17TH STREET, WEST VANCOUVER BC V7V 3T3

COUNCIL REPORT

Date:	May 5, 2026
From:	Erik Wilhelm, Senior Community Planner
Subject:	Proposed Heritage Alteration Permit for 4798 The Highway

RECOMMENDATION

THAT proposed “Heritage Alteration Permit 24-090” be considered at the June 22, 2026, Council meeting scheduled for 6 p.m. in the Municipal Hall Council Chamber and via electronic communication facilities, and that notice of the scheduled consideration be given in compliance with the Development Procedures Bylaw.

1.0 Purpose

To present to Council a proposed Heritage Alteration Permit that would permit a new 2-storey residence at 4798 The Highway.

2.0 Legislation/Bylaw/Policy

Part 15 of the *Local Government Act* regulates municipal powers with respect to “Heritage Conservation” and more specifically, ‘Heritage Alteration Permits’. As the site is located within a heritage conservation area, a heritage alteration permit must be issued prior to development activities.

The subject property, and surrounding area in Lower Caulfeild, is zoned Single Family Dwelling Zone 3 (RS3).

The *Development Procedures Bylaw* requires that Heritage Alteration Permits (within the Lower Caulfeild Heritage Conservation Area) that include new dwellings must be considered and approved by Council.

3.0 Council Strategic Objective(s)/Official Community Plan

The *Official Community Plan (OCP)*, among other policy directions, aims to respect community character and protect heritage assets throughout the District. The OCP includes the following applicable ‘heritage policy’ directions:

Policy 2.1.10: Support the Lower Caulfeild Heritage Conservation Area by reviewing proposals against neighbourhood built-form guidelines.

The OCP designates a portion of Lower Caulfeild as the “Lower Caulfeild Heritage Conservation Area” (Figure 1; with the location of 4798 The Highway shown). Accordingly, new residences, amongst other

development activities, must be reviewed against applicable heritage conservation area guidelines. Additionally, the site is located within the Wildfire Hazard Development Permit Area which requires compliance with relevant guidelines for construction of a new dwelling.



Figure 1 – Lower Caulfeild Heritage Conservation Area

4.0 Financial Implications

Not Applicable.

5.0 Background

5.1 Previous Decisions

Council, at its November 3, 2025, regular meeting, passed the following resolution:

THAT proposed Heritage Alteration Permit 24-090 be considered at the December 1, 2025 Council meeting scheduled for 6 p.m. in the Municipal Hall Council Chamber and via electronic communication facilities, and that notice of the scheduled consideration be given in compliance with the Development Procedures Bylaw.

The applicant subsequently withdrew the application in order to conduct further community engagement and revisions to the application.

5.2 History

The subject site, 4798 The Highway, was formed by subdivision in 1904 as part of one of the original subdivisions in the Lower Caulfeild area. Since 1986, the site formed part of a larger residential site that consisted of 3 lots owned by one owner (Figure 2).



Figure 2 - Aerial map showing historical 3-lot residential site

The existing residence to the south, at 4796 The Highway, straddles the existing lot lines of that site and has a legally non-conforming setback adjacent to the subject site¹ (Figure 2).

In 2021, the 3 lots were put up for sale. The two lots to the south (4796 The Highway) were purchased in late 2021 (with the existing house straddling the lot lines) and the subject site (4798 The Highway) was purchased² in 2022 as a separate site with a small detached residence located onsite. Later in 2022, the Director of Planning, Development and Environment Services approved a Heritage Alteration Permit (HAP) Exemption to allow limited hedge removal in an easement area on the eastern side of the subject site (Figure 3). The easement was originally registered on the lands in 1989 to provide legal access to the lands to the south. Subsequent to the HAP Exemption issuance, the owner of 4796 The Highway constructed a driveway with gravel, installed a gravel area on their site and removed additional trees and landscaping. This work was done without authorization.

¹ The nearest corner of the existing residence south of the site (at 4796 The Highway) is located 1.4 ft. from the property line adjacent to 4798 The Highway.

² By the applicant of Heritage Alteration Permit application described herein.

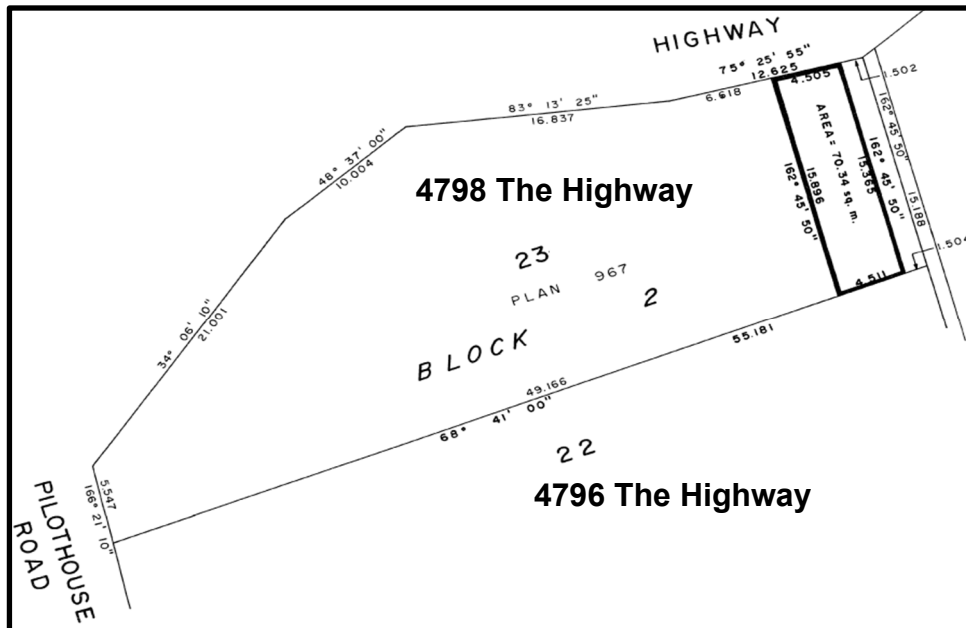


Figure 3 – Easement Area

6.0 Analysis

6.1 Site and Context

The subject property is generally flat, 876.6 m² (9,435.5 sq. ft.) and zoned RS3. There is a cluster of coniferous trees on the western portion of the site, deciduous trees on the northern portion of the site and a centrally located gravel area. As previously described, there is a gravel driveway located on the eastern portion of the site within the easement area (see Figure 4). There is a small standalone residence located on the property in the northwest corner which is proposed for removal. This small structure was used by the previous owner as accessory accommodation (Figure 5)³.

³ The small existing residence onsite is located 8.4 ft. from the front lot line adjacent to The Highway and does not have any identified heritage value.



Figure 4 – Aerial image of the subject site and immediate area



Figure 5 – Photograph of small residence located on the subject site

6.2 Previous Proposal

The previous proposal included a two-storey residence, with a contemporary architecture, as seen in Figure 6. The proposal required a 2.63 m (8.62 ft.) front yard setback variance to allow for the proposed size and siting of the dwelling (see Figure 7).



Figure 6 – Rendering of Previous Proposal

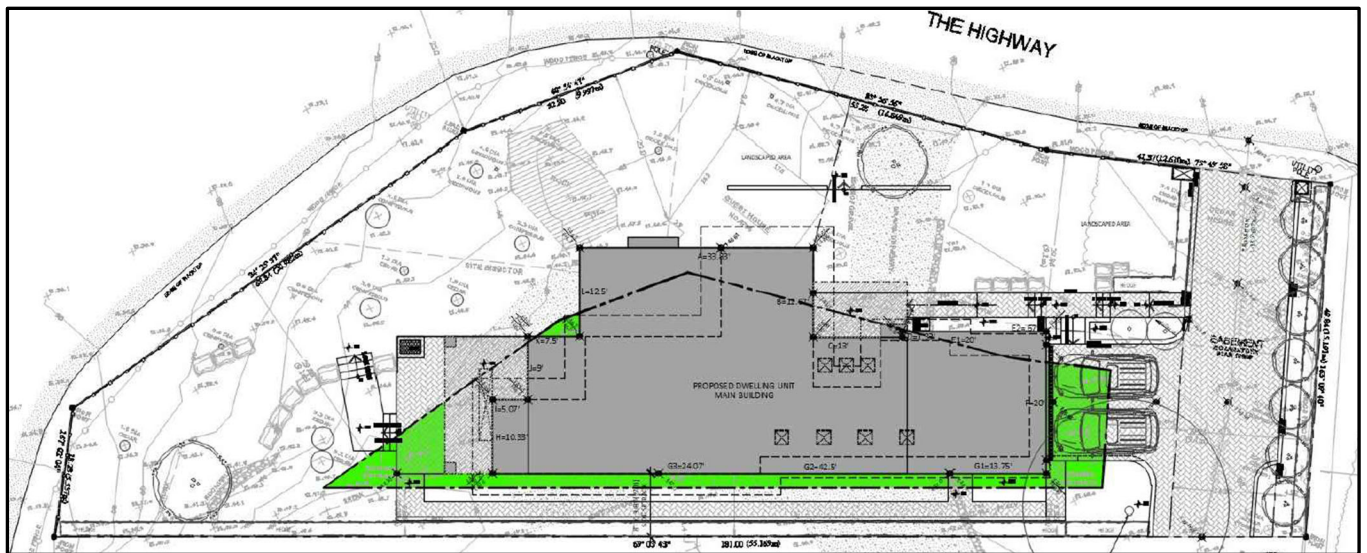


Figure 7 – Site plan of Previous Proposal (showing front yard setback variances required and unused building envelope)

6.4 Revised Proposal

The revised proposal includes generally the same massing (two-storey detached residence, without a basement or secondary suite), with a refined design consistent with West Coast modern architecture. The revisions made are intended to address key neighbourhood concerns and better align with Zoning Bylaw setbacks and the Lower Caulfeild Heritage Conservation Area guidelines. Revisions include a reduced floor area⁴, adjusted siting, and refined material and landscaping selections to address neighbourhood concerns (Figures 8, 9 and 10).

⁴ From 3,229 sq. ft. to 3,074 sq ft. (gross floor area including the two-car garage).



Figure 8 – Rendering of proposed/ revised dwelling (viewed from The Highway [street])

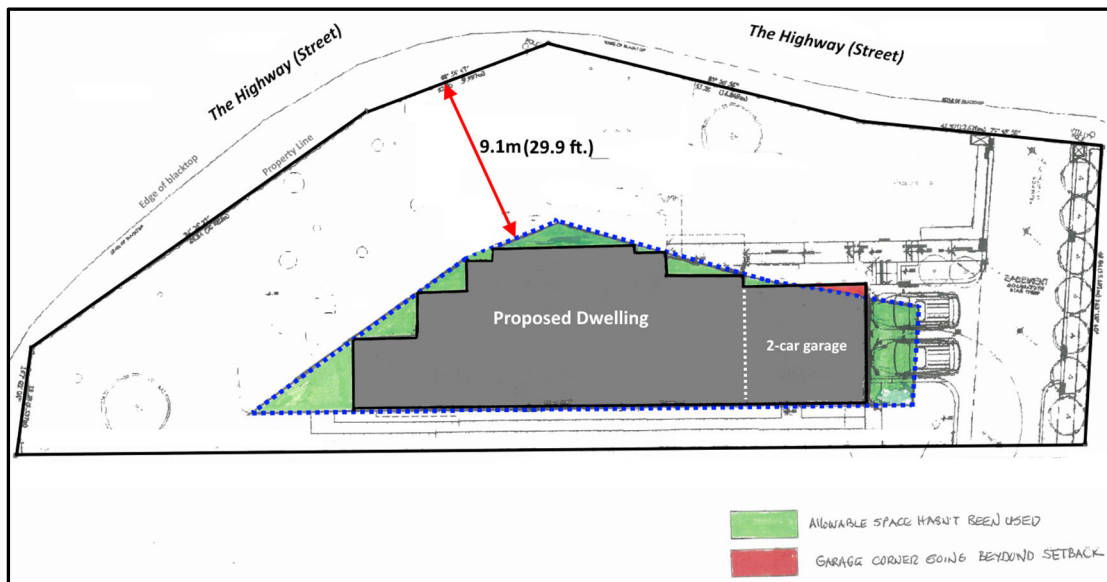


Figure 9 – Site plan (Allowable building envelope in dotted blue)



Figure 10 – Rendering of rear of property (viewed from neighbouring property 4796 The Highway)

Proposed Heritage Alteration Permit (HAP) 24-090 (**Appendix A**) includes conceptual renderings, a site plan, landscape plans, elevation sketches, and floor plans. While HAPs typically include finalized and detailed plans to ensure accuracy, the inclusion of conceptual plans is considered acceptable by staff in this case. As a condition of HAP 24-090, detailed plans would be required to be submitted at the building permit stage (including finalized floor plans, elevations, site plan, and landscape plans) to the satisfaction of the Director and Planning, Development and Environment Services (in substantial compliance with the conceptual plans included with HAP24-090).

The proposed HAP will ensure general compliance with the Zoning Bylaw setback requirements, while permitting a reduction in the front yard setback for the garage on the east side of the dwelling to a maximum of 0.76 m (2.5 ft.). Finally, HAP24-090 will ensure, at the building permit stage, that proposed tree removal complies with the wildfire hazard assessment report included as part of the permit, and that all final building materials and landscape plant species adhere to applicable wildfire hazard guidelines.

6.3 Lower Caulfeild Heritage Conservation Area Guidelines

Staff have reviewed the revised proposal and have concluded that the proposal meets the intent of the Lower Caulfeild Heritage Conservation Area Guidelines and addresses key considerations raised by local residents.

6.4 Wildfire Hazard Development Permit Area Guidelines

The site is within the Wildfire Hazard Development Permit Area (DPA) which requires 'fire-smart' measures that include fire-resistant building materials, increased spacing from easily combustible vegetation, and resilient landscaping. The applicant submitted the required arborist and wildfire hazard management reports responding to both the Lower

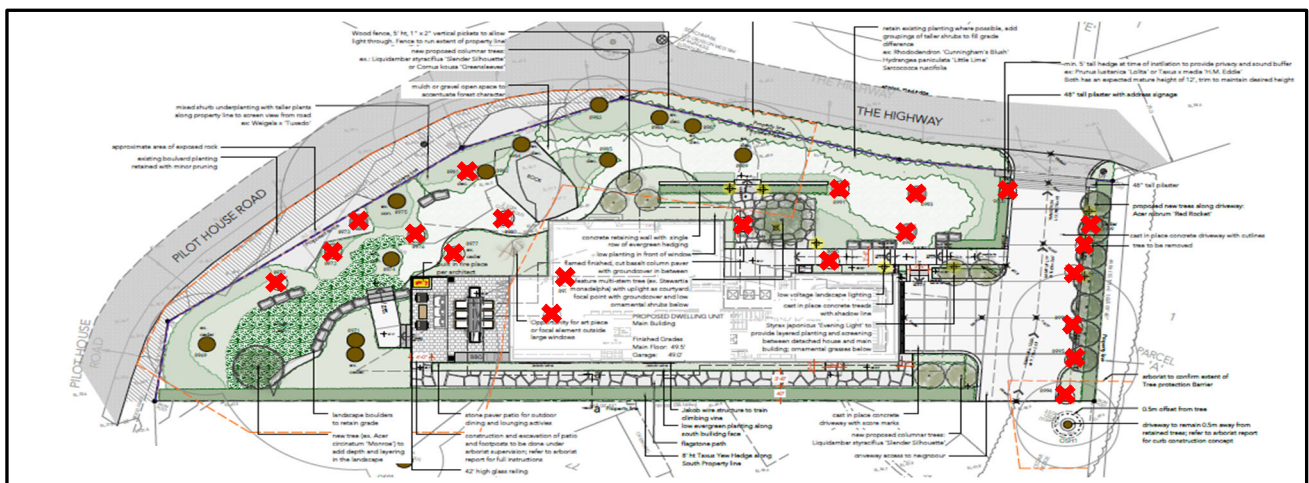


Figure 11 – Tree Management Plan (establishing only tree removal and retention)

Caulfeild guidelines that encourage the preservation of mature landscape features and in compliance with the wildfire hazard guidelines. Proposed HAP 24-090 (**Appendix A**) requires development activities to comply with the wildfire hazard report and necessitates tree removal as indicated in Figure 11⁵. The trees to be retained are shown (in brown circles) along with trees and hedging to be planted as part of proposed development activities.

6.5 Climate Change & Sustainability

In compliance with the District's Building Bylaw No. 5340, 2025, the new residence will be required to obtain Step 5 of BC Energy Step Code (or Step 4 with Zero Carbon Step Code Level EL-3). In addition, each vehicle parking stall located in the garage will be required to provide a Level 2 (240 volt) electric vehicle charger.

6.6 Public Engagement and Outreach

Public Engagement

1. Prior to formal application submission⁶, the applicant held a preliminary public consultation meeting on May 15, 2024, to gather initial feedback from the public. In response to neighbourhood feedback, the applicant revised the proposal to remove a previously proposed two-storey coach house⁷.
2. Following formal submission of the Heritage Alteration Permit application, the applicant held another public information meeting on January 8, 2025⁸. In response to neighbourhood concerns received from the meeting and staff feedback, the applicant further revised the proposal.
3. On March 9, 2026, the applicant hosted a "design workshop meeting" at St. Francis-in-the-Wood Church to receive neighbourhood feedback and make further changes to the proposal. This meeting was attended by 12 participants including neighbouring residents, a representative from the North Shore Heritage Preservation Society, and the applicant. The feedback from the meeting resulted in design changes seen in the current/revised proposal.
4. Finally, on Tuesday, April 28, 2026, the applicant hosted an on-site "overview and feedback meeting". The informal meeting was attended by 13 participants, including neighbouring residents, a representative from the North Shore Heritage Preservation Society, the applicant, and planning staff. Revised plans were available for review, and the proposed siting of the dwelling was marked on the ground with rope to

⁵ The trees shown to be removed on the eastern edge of the site were already removed as part of construction needed for the shared driveway.

⁶ In compliance with the Preliminary Development Proposal and Public Consultation Policy.

⁷ The previous coach house was to include renovation of the existing building onsite and be located near the driveway entrance next to The Highway.

⁸ In compliance with the Development Procedures Bylaw.

illustrate its relationship to the legal property boundaries. Helium balloons strung with line were also used to demonstrate the height of the proposed two-storey dwelling. Feedback from attendees was generally positive, with minor suggestions related to landscaping and vegetation retention. While the revised proposal includes a small variance for the garage on the east side of the dwelling, participants expressed support for this adjustment to allow for a functional and usable two-car garage.

Notification

If Council sets the date for consideration of the application, notice will be mailed, or otherwise delivered, to all owners and occupants within the Lower Caulfeild Heritage Conservation Area in compliance with the Development Procedures Bylaw. The notice will provide residents information about how to provide feedback directly to Council prior to consideration of the permit on June 22, 2026.

Website

In alignment with current practise, a description of the proposal and current project plans are available online and should the proposal advance, particulars about the proposal's advancement will be posted on the website.

7.0 Options

7.1 Recommended Option

Set the date for consideration of the proposed heritage alteration permit and direct staff to give public notice of the scheduled consideration.

7.2 Considered Options

At the time of consideration of this report, Council may:

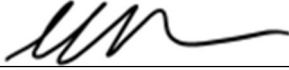
- a) Set the date for consideration of the proposed heritage alteration permit on different date (to be specified) and direct staff to give public notice of the scheduled consideration;
- b) defer consideration of the proposal pending the receipt of additional information (to be specified) to assist in the consideration of the application; or
- c) reject the application.

8.0 Conclusion

In staff's opinion, the revised proposal for 4798 The Highway is consistent with relevant guidelines from the Lower Caulfeild Heritage Conservation Area and exhibits a scale, form, and landscaping that complement the local area. The proposal provides design that would allow for a new dwelling to be built on this constrained lot while responding to neighbourhood comments. The proposal also incorporates wildfire resilient materials and landscaping that are consistent with the Wildfire Hazard DPA guidelines.

Author: 

Erik Wilhelm, Senior Community Planner

Concurrence: 

Michelle McGuire, Senior Manager of Current Planning and Urban Design

Appendices:
A - Proposed Heritage Alteration Permit 24-090

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District of West Vancouver

Proposed Heritage Alteration Permit No. 24-090

CURRENT OWNERS: Frank and Nessa Saniuk

THIS HERITAGE ALTERATION PERMIT APPLIES TO:

CIVIC ADDRESS: 4798 The Highway

LEGAL DESCRIPTION: PID No. 002-453-223
 LOT 23 BLOCK 2 DISTRICT LOT 811 PLAN 967
 (the 'LANDS')

1. This Heritage Alteration Permit:
 - (a) imposes requirements and conditions for the development of the Lands, which are designated by the Official Community Plan to be located in the Lower Caulfeild Heritage Conservation Area to provide for the protection of the special heritage character of the Lower Caulfeild Area and subject to Guidelines HE6 specified in the Official Community Plan;
 - (b) is issued subject to the Owner's compliance with all of the Bylaws of the District applicable to the Lands, except as varied or supplemented by this Permit;
 - (c) allows for construction of a new single-family dwelling on the Lands;
 - (d) allows for Zoning Variance as generally shown in **Schedule A** and specifically for a front yard setback variance from 9.1 m to 8.34 m; however, this variance is limited to the eastern portion of the dwelling to provide for a two-car garage; and
 - (e) also serves as a Wildfire Hazard Development Permit which imposes requirements and conditions for the development of the Lands, which are designated by the Official Community Plan to be located in the Wildfire Hazard Development Permit Area to control the combustible elements of both buildings and landscape in order to minimize the potential for the spread of fire and the resultant destruction of property and threat to life and subject to Guidelines NE1 specified in the Official Community Plan.

2. The following requirements and conditions shall apply to the Lands:
 - 2.1 Site development, including all buildings, structures, on-site parking, driveways, on-site and off-site landscaping shall take place in substantial compliance with the conceptual plans attached as **Schedule A**.
 - 2.2 All building materials, and landscaping (hardscaping and softscaping) shall substantially comply with the recommendations and conditions with the Wildfire Hazard DP Area Assessment Report attached as **Schedule B**.
 - 2.3 The Qualified Professional that completed the wildfire hazard assessment shall be required to complete a post-completion inspection to ensure all conditions in **Schedule B** have been met prior to occupancy.
 - 2.4 No mechanical equipment is permitted to be located within the south lot line setback area or anywhere south of the proposed residence seen in **Schedule A**.

- 2.5 This heritage alteration permit allows all proposed tree removals as seen in the Tree Management Plan attached as **Schedule C** and no further tree permits are required. The planned tree removal must be completed under the supervision of a certified arborist and may only be conducted upon issuance of a building permit for the proposed dwelling shown in **Schedule A**.
3. Prior to commencing site work or Building Permit issuance, whichever occurs first, the Owner must:
 - 3.1 Provide finalized and detailed development plans, including but not limited to finalized floor plans, elevations, site plan, and landscape plans, that substantially comply with the conceptual drawings shown in **Schedule A**, to the Director of Planning, Development and Environment Services (or designate) ["the Director"]. Approval of the finalized and detailed development plans, to allow for building permit issuance, is at the sole discretion of the Director acting reasonably.
 - 3.2 Provide confirmation, from a Qualified Professional, that the proposed building materials and landscaping substantially comply with **Schedule B**.
 - 3.3 Install protective tree fencing, to the satisfaction of the District Environmental Protection Officer (or designate).
 - 3.4 Provide and implement a plan for traffic management during construction, to the satisfaction of the Senior Manager of Climate, Environment & Land Development.
 - 3.5 Submit a "Sediment and Erosion Plan" to the District's Land Development Technician for approval, and the owner shall be responsible for maintaining, repairing and implementing the sediment control measures.
4. Prior to Building Permit issuance, the following must be provided:
 - 4.1 Engineering civil drawings detailing works to ensure installation of a new 150mm storm service at the southwest terminus of the property and a new storm main along Pilot House Road from the LANDS to the existing catch basin on the south side of the road across from 4796 The Highway. The existing catch basin and outlet culvert are to be upgraded to handle the additional capacity. The engineering civil drawings must be submitted for acceptance, and security provided for the due and proper completion of the engineering works, all to the satisfaction of the Senior Manager of Climate, Environment & Land Development.
 - 4.2 A landscape cost estimate, for the landscape works outlined in **Schedule A**, to the Director of Planning, Development and Environment Services (or designate).
 - 4.3 Security in the amount of \$5,000 to the District in the form of cheque for the due and proper completion of the measures to protect development from the risks of wildfire hazard set forth in Section 2 of this Development Permit (the "Wildfire Protection Measures"). The security amount of \$5,000 must be maintained upon completion of the Wildfire Protection Measures and not prior to the date on which the District Environmental Protection Officer authorizes in writing the release of the security.
 - 4.4 A Landscaping Deposit, for the monetary amount determined in section 4.2 of this Heritage Alteration Permit, shall be provided to the District in the form of

cash or an unconditional, irrevocable auto-renewing letter of credit issued by a Canadian chartered bank or credit union and:

- (a) a minimum 20% of the initial value of the Landscaping Deposit shall be retained by the District for one year after installation of the landscaping, as a warranty deposit to ensure successful installation of the landscaping; and
- (b) the initial value of the Landscaping Deposit may only be reduced to the warranty level and the warranty shall only be released when the registered member of the BSCLA for the project provides a field report to the District confirming successful installation of the on-site landscaping in accordance with Schedule B to this Heritage Alteration Permit.

4.5 A lighting plan must be submitted and approved by the Director of Planning, Development and Environment (or designate).

5.0 This Heritage Alteration Permit lapses if the work authorized herein is not commenced within 24 months of the date this permit is issued.

THE COUNCIL OF WEST VANCOUVER APPROVED THIS HERITAGE ALTERATION PERMIT BY RESOLUTION PASSED ON

MAYOR

CORPORATE OFFICER

THE REQUIREMENTS AND CONDITIONS UPON WHICH THIS PERMIT IS ISSUED ARE ACKNOWLEDGED AND AGREED TO BY THE CURRENT OWNER. IT IS UNDERSTOOD:

- THAT OTHER PERMITS / APPROVALS MAY BE REQUIRED INCLUDING PERMITS / APPROVALS FOR BUILDING CONSTRUCTION, SOIL AND ROCK REMOVAL OR DEPOSIT, AND BOULEVARD WORKS; AND
- THE DEVELOPMENT MUST ATTAIN REQUIREMENTS OF THE BC BUILDING CODE AND ANY VARIANCES TO THE ZONING BYLAW ARE THE RESPONSIBILITY OF THE OWNER AND MUST BE RECTIFIED AT THE BUILDING PERMIT STAGE.

FOR THE PURPOSES OF SECTION 5, THIS PERMIT IS ISSUED ON

Schedules:

- A - Conceptual development plans for 4798 The Highway
- B - Wildfire Hazard DP Area Assessment Report from Diamond Head (dated August 23, 2024)
- C - Tree Management Plan from Diamond Head (dated August 23, 2024)

Conceptual Plans - 4798 The Highway

Schedule A



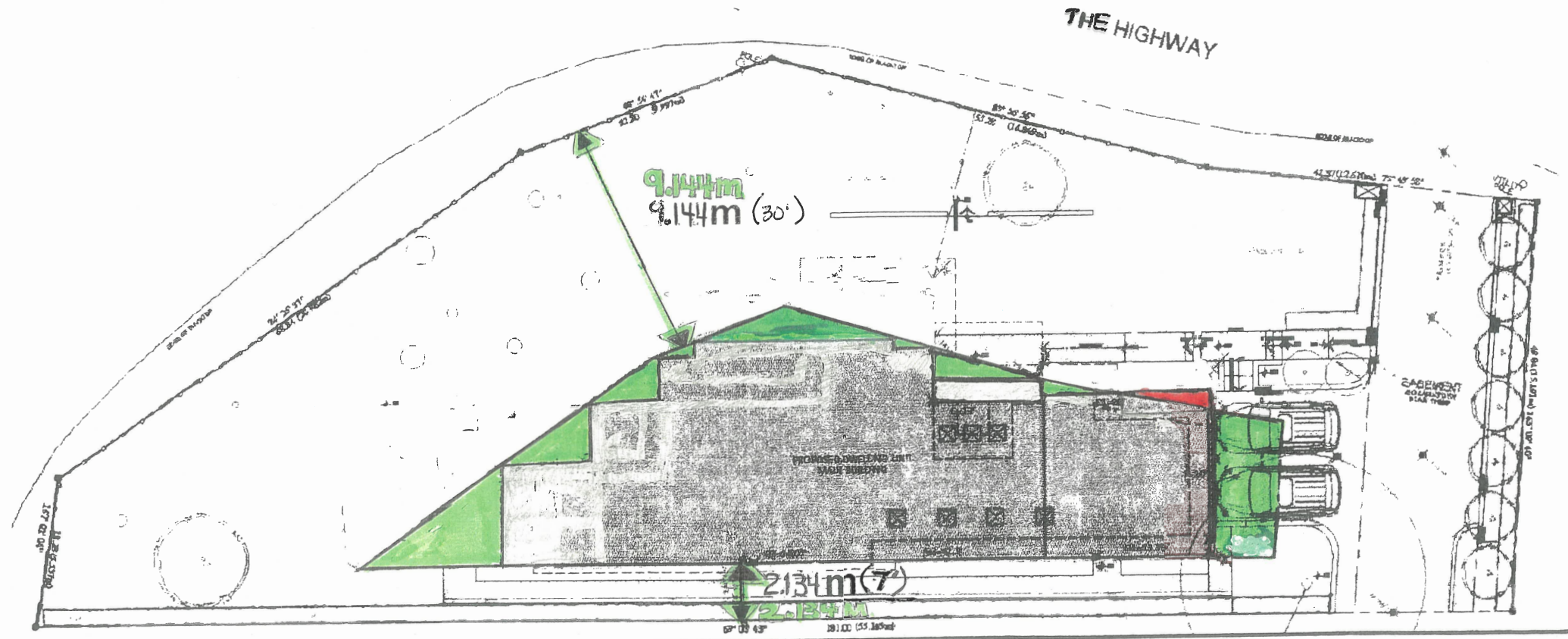
Rendering of residence (viewed from the street)





Rendering of residence (when viewed from southern neighbour)

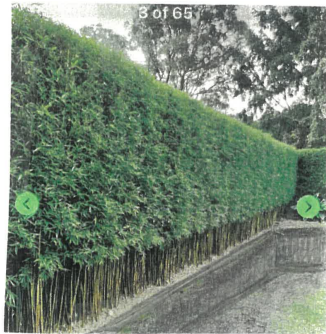
NEW REVISED PLAN - VARIANCE FOR DOUBLE GARAGE and UNUSED BUILDING ENVELOPE

Site Plan



-  ALLOWABLE SPACE HASN'T BEEN USED
-  GARAGE CORNER GOING BEYOND SETBACK

Conceptual Landscape Plan (siting of residence determined by site plan)



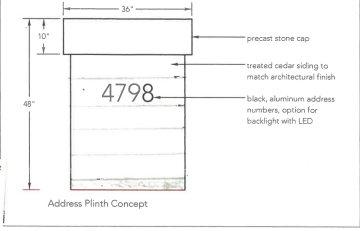
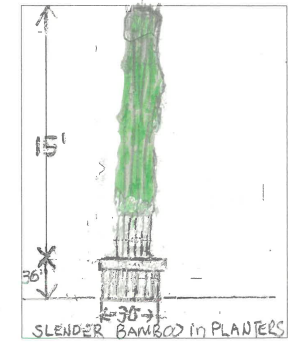
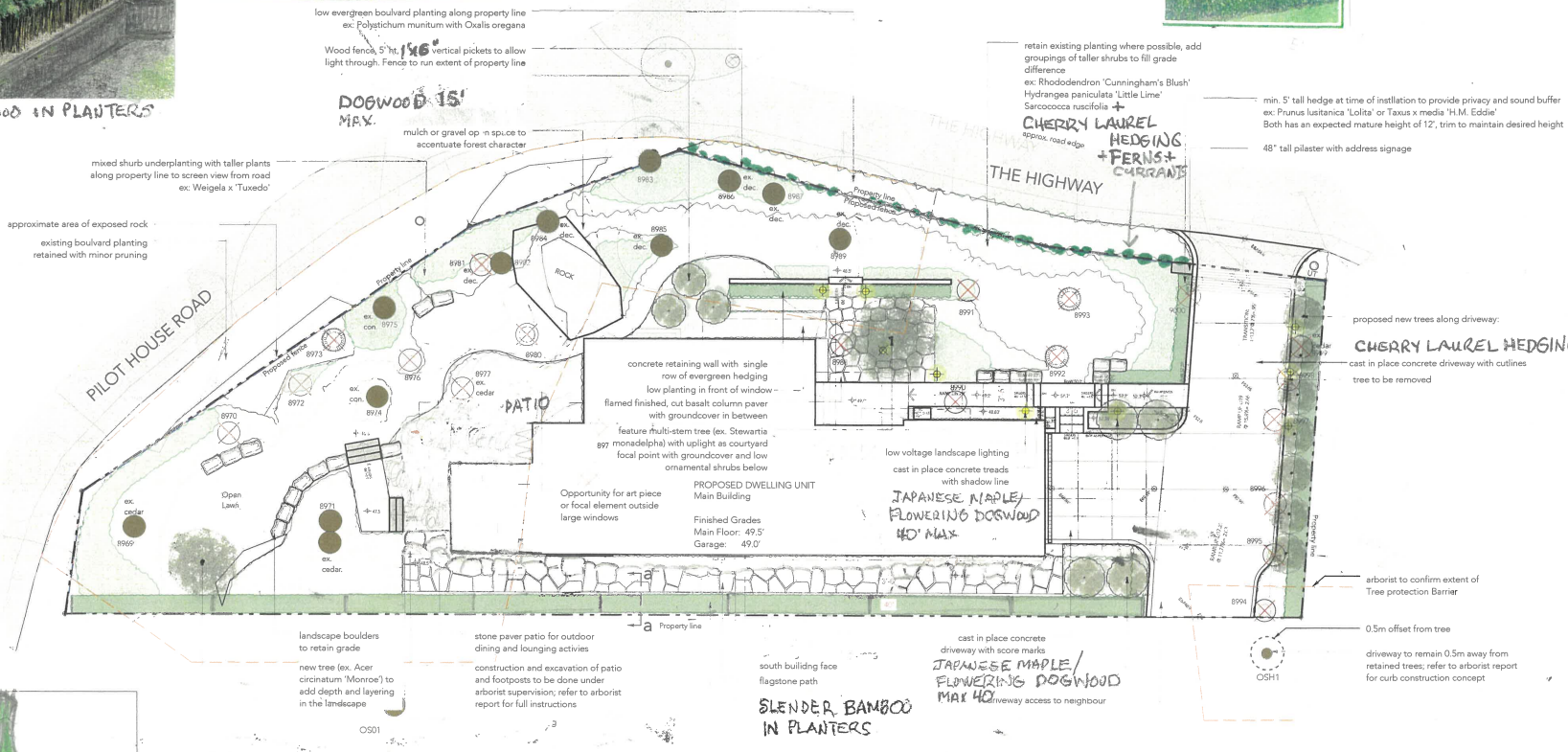
SLENDER BAMBOO IN PLANTERS



DOGWOOD 15' MAX.

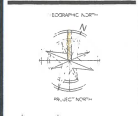


CHERRY LAUREL



Legend

- Trees retained
- Tree to be removed
- Proposed trees
- Property line
- Setback line
- Proposed fence line
- Tree Protection Barrier
- Overhang
- Tall planting
- Medium tall planting
- Low planting
- Mulch or gravel
- Lawn
- Landscape lighting
- Stone Boulder
- Cut basalt column paver



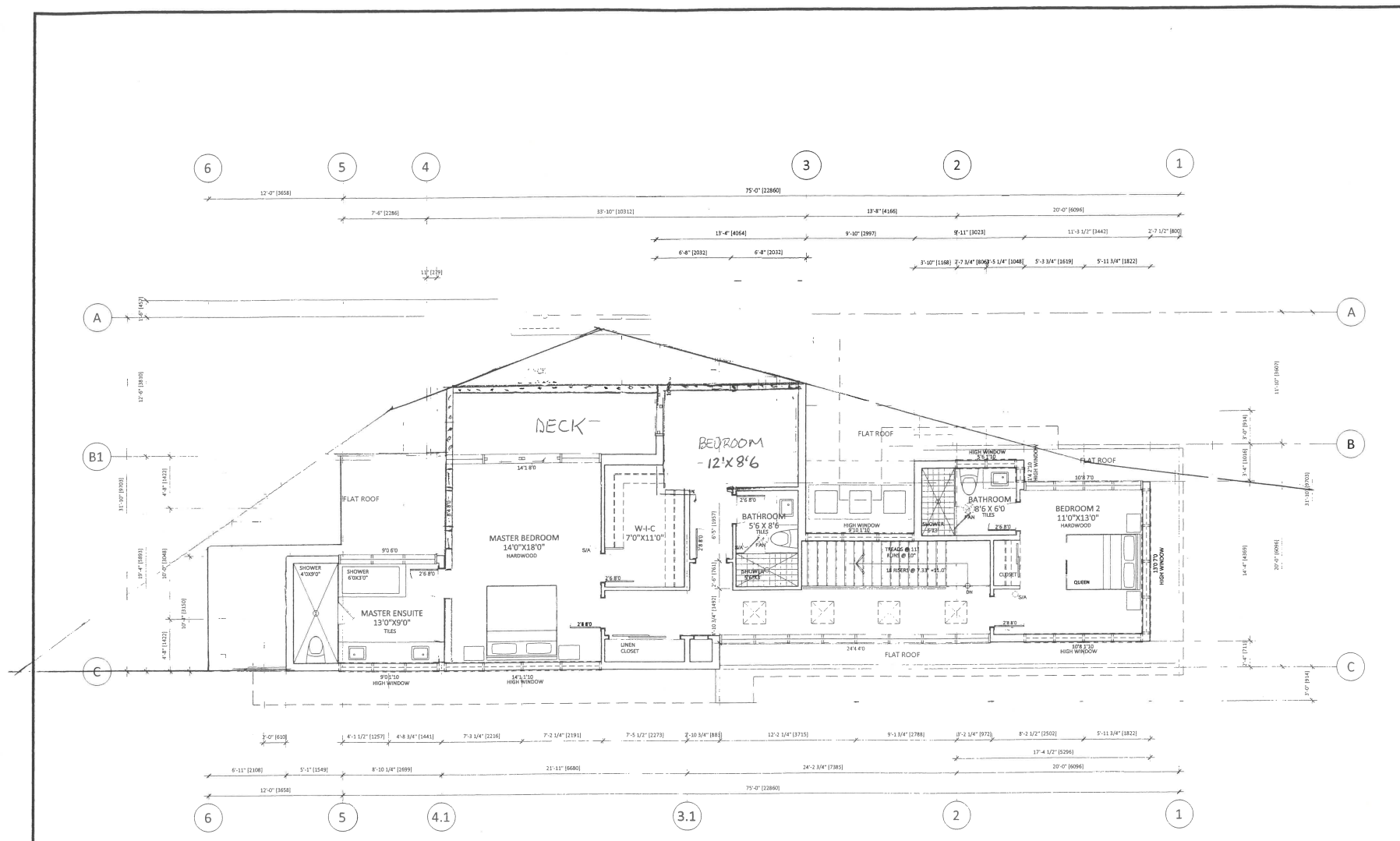
No.	Date	Revision

No.	Date	Issues

Project
Saniuk Residence
4798 The Highway
West Vancouver, B.C.

Drawing Title
LANDSCAPE CONCEPTUAL PLAN

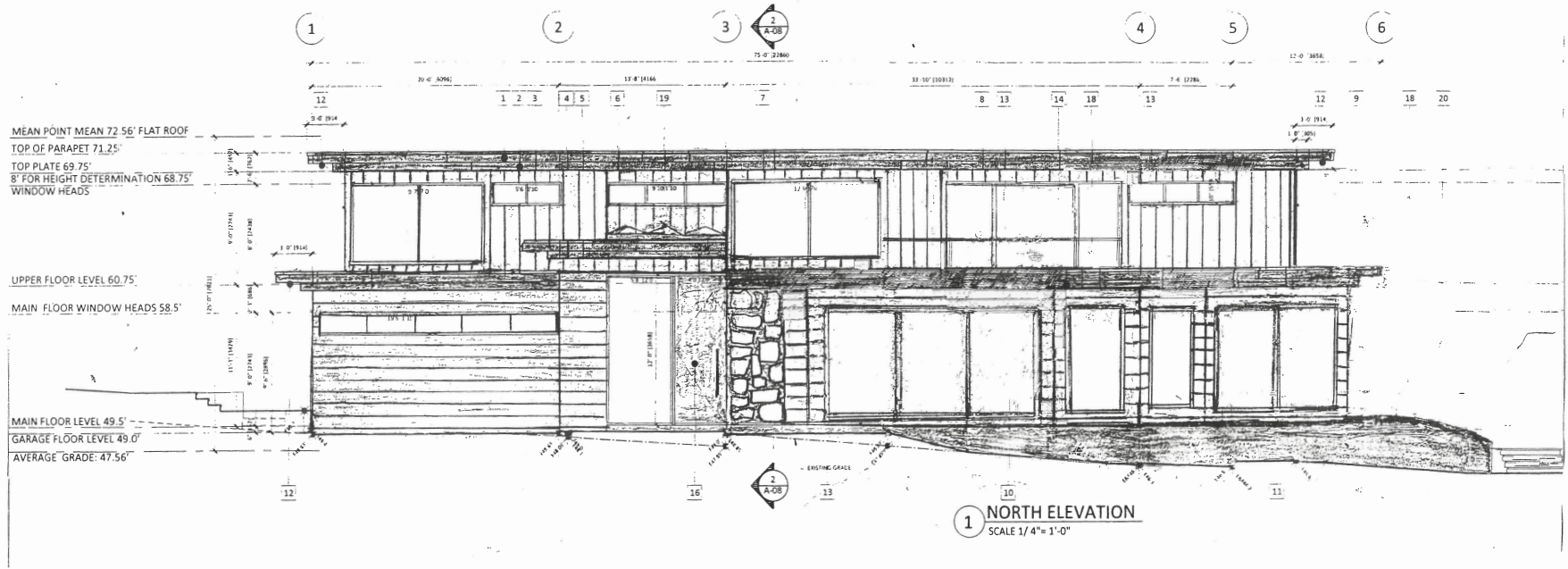
Drawn	Job No.
AVI/JV	
Checked	Date
16 T	October, 2025
Scale	Drawing No.
1/8" = 1'	
Plot Size 36"x24"	L-01



1 UPPER FLOOR PLAN
 SCALE 1/4" = 1'-0"
 RESIDENCE

1272 SQFT =
 118.21 m²

0' 1' 3' 5' 10'
 NOTE:
 ALL ROOF, FLOOR AND WALL ASSEMBLIES,
 WINDOWS, GLASS DOORS AND DOORS



Wildfire Hazard DP Area Assessment Report

4798 The Highway
West Vancouver, BC

August 23, 2024



Submitted to:

Didar Badiei
1765 Bellevue Ave,
West Vancouver, BC
V7V 1A8

Email: didar@designmarque.com



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The following Diamond Head Consulting staff conducted the on-site tree inventory and prepared or reviewed the report.

All general and professional liability insurance and staff accreditations are provided below for reference.

Project Staff:



Riley Spear
ISA Certified Arborist (PN-9691A)
ISA Tree Risk Assessment Qualified (TRAQ)
Registered Forester in Training (FIT #6553)



Michael Coulthard
Registered Professional Biologist (1338)
Registered Professional Forester (3772)
ISA Tree Risk Assessment Qualified (TRAQ)



Please contact us if there are any questions or concerns about the contents of this report.

Contact Information:

Phone: 604-733-4886
Fax: 604-733-4879
Email: mike@diamondheadconsulting.com or riley@diamondheadconsulting.com
Website: www.diamondheadconsulting.com

Insurance Information:

WCB: # 657906 AQ (003)
General Liability: Northbridge General Insurance Corporation - Policy #P04061262,
\$10,000,000
Errors and Omissions: Lloyds Underwriters – Policy #18601123, \$2,000,000

Summary of Report

- The nearest intact forest is approximately 150m to the west of the proposed new building in Lighthouse Park. This forest was assessed to have a **moderate fire behavior risk** rating applying methods from the 2020 Wildfire Threat Assessment Guide and Worksheets¹.
- Future structural hazard of the proposed development using the FireSmart Homeowners Manual² found the new development would likely have a **low overall wildfire risk rating** if the recommendations for building and landscaping are followed.
- Landscaping requirements from within this report must be followed. Ensure that no conifer species or long grasses with a mature height greater than 30cm are installed in new landscaping. This includes hedges of cedar, cypress, or yew species. Fencing within 1.5 m of any structures must be made of ignition resistant materials.
- Ensure the exterior building materials including roofs and decks are ignition resistant or non-combustible and meet the requirements from within this report. “Ignition-resistant” and “non-combustible” have the same meaning in the National Fire Protection Association (NFPA) 1144 standard.

¹ Ministry of Forests, Lands, Natural Resource Operations, and Rural Development BC, BC Wildfire Service. 2020, June 4. 2020 Wildfire Threat Assessment Guide and Worksheets (version 4). Available at: <https://www2.gov.bc.ca/assets/gov/public-safety-and-emergency-services/wildfire-status/prevention/fire-fuel-management/fuels-management/2020-wildfire-threat-assesment-guide-final.pdf>

² Partners in Protection Association. 2019. FireSmart Begins at Home Manual. Available at: https://www2.gov.bc.ca/assets/gov/public-safety-and-emergency-services/wildfire-status/prevention/prevention-home-community/bcws_homeowner_firesmart_manual.pdf

1.0 Introduction

Diamond Head Consulting Ltd. (DHC) was retained to prepare an assessment of wildfire interface risks and mitigation measures for the proposed development at 4798 The Highway in West Vancouver, BC. This project includes one residential lot located within the District of West (DWV) Vancouver Wildfire Hazard Development Permit Area. The overall objective of this report is to assess the potential wildfire threat and provide recommendations and tools to reduce this threat to the development site. This assessment report is meant to be submitted as a part of the Wildfire Development Permit application. It must be prepared and signed by a qualified professional. Specific goals for this assessment are:

- To assess and describe fuels by strata (surface, ladder, and crown), type (FBP), composition, quantity, and distribution.
- To provide a risk assessment for the proposed development based on adjacent fuels, building design and materials, landscaping, setbacks, and site-specific concerns.
- To discuss all factors that contribute to wildfire hazard.
- To provide photographs, mapping, and plans as needed to show vegetation, proposed site changes, and current site conditions.

1.1 Site Planning Documents Reviewed

Diamond Head Consulting was provided with the following documentation from the client that provides the basis for all comments and recommendations:

- Topographic Survey Plan of Lot 23, Block 2, District Lot 811, Plan 967, by Hobbs, Winter, and McDonald B.C. Land Surveyors, dated August 10, 2022
- Site Plan of Lot 23, Block 2, District Lot 811, by Design Marque, dated July 24, 2024
- Tree Management Plan for Lot 23, Block 2, District Lot 811, by Diamond Head Consulting, dated August 2, 2024
- Arborist report for Lot 23, Block 2, District Lot 811, by Diamond Head Consulting, dated August 2, 2024

Any changes to these site plans should be provided to Diamond Head Consulting so that this wildfire report can be updated accordingly.

DHC has also prepared a separate arborist report and tree management plan for this proposed development. All DHC prepared plans have been developed concurrently and are consistent with each other.

1.2 Policy Considerations for Wildfire Threat Mitigation

The District’s Wildfire Hazard Report Requirements were developed based on the recommendations of the Community Wildfire Protection Plan. The objective of the guidelines, described in Schedule II of the Official Community Plan, is to proactively minimize the risk from wildfire. Guidelines are provided for buildings and structures and landscaping to reduce wildfire risk. This assessment report considers both NFPA standards and Canadian FireSmart standards to assess fire hazard in the surrounding forests and guide recommendations for the design and construction of buildings and accessory structures. Recommendations in this report translate the OCP guidelines into standards tailored to the development site that will achieve the purposes of the DPA to the extent practicable. No home in the interface can be completely free of risk. The application of the DP guidelines will reduce risk relative to standard development patterns.



Figure 1. Location of the subject site – 4798 The Highway, DWV.

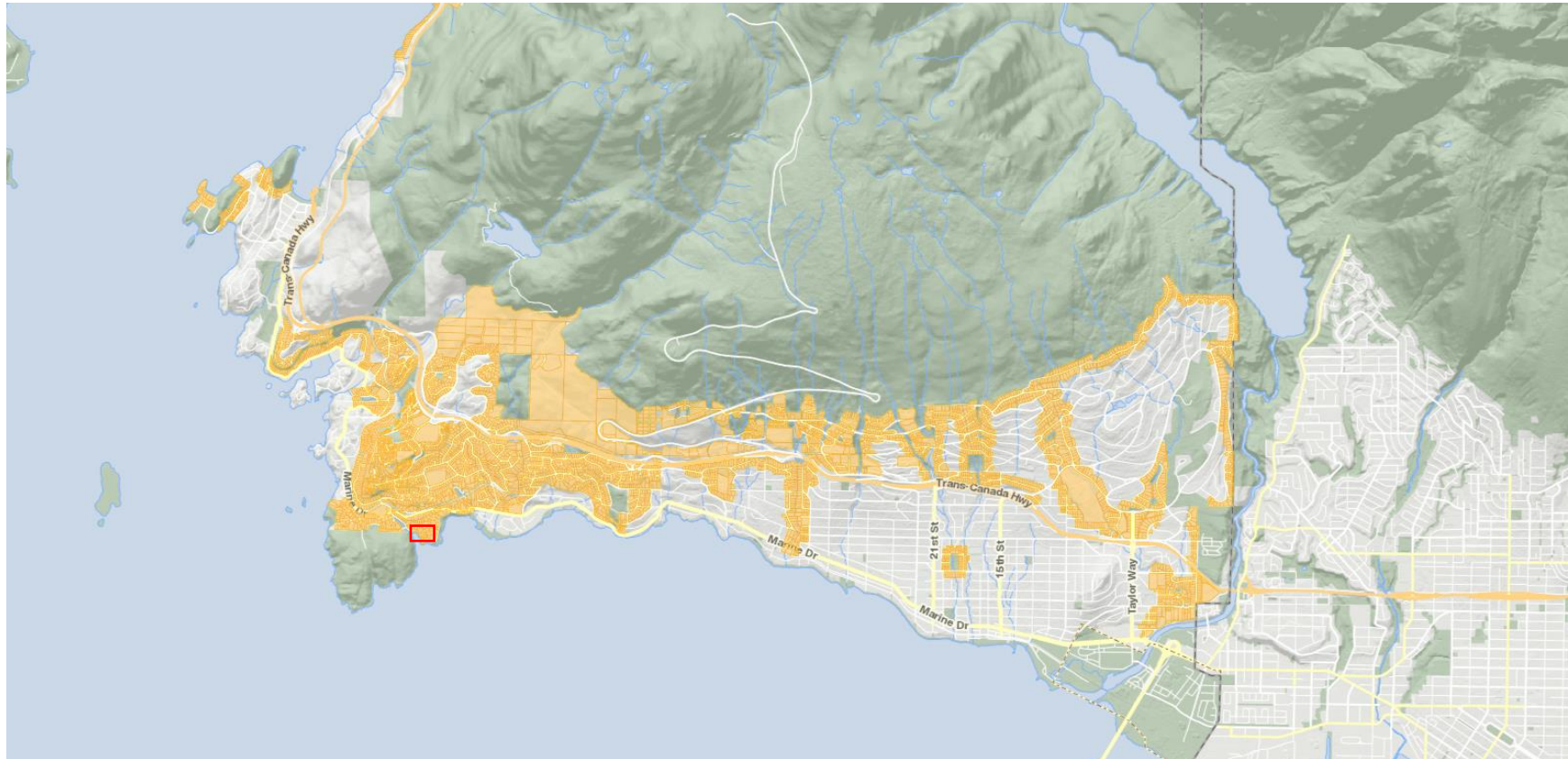


Figure 2. Development Permit Areas (Wildfire) as defined by the District of West Vancouver. Approximate site location indicated in red.

2.0 Methodology

This project falls within the DWV Wildfire Hazard Development Permit Wildfire Interface Area. There are native forests that exist approximately 150 metres west of the site in Lighthouse Park. These natural forest areas have been assessed for wildfire threat, and the forest fuels have been classified. The site has been classified according to the Canadian Fire Behaviour Prediction System to the fuel type that best represents the fire behaviour potential of the forest types. Generic descriptions of the CFBPS fuel types found in coastal British Columbia are provided in Appendix 3.

Detailed fuel hazard assessments were completed within 100m of the lot using the provincial assessment system, 2020 Wildfire Threat Assessment Guide and Worksheets³. The location of assessment plots is shown in Figure 4 and Figure 5. Data collected at each fuel plot included:

- Soil and humus characteristics
- Slope, aspect, and terrain classification
- Forest stand composition by layer (species, density, age, diameter, height, etc.)
- Vertical and horizontal stand structure
- Quantity and distribution of ladder fuels
- Composition and coverage of understory brush, herbs, and grasses
- Quantity and distribution of ground fuels by size class.

A Wildfire Hazard Assessment has been completed using:

1. Current forest fuel threat in and adjacent to the proposed development using the 2020 Wildfire Threat Assessment Guide and Worksheets.
2. Future structural hazard of the proposed development using the FireSmart Homeowners Manual⁴.

³ Ministry of Forests, Lands, Natural Resource Operations, and Rural Development BC, BC Wildfire Service. 2020, June 4. 2020 Wildfire Threat Assessment Guide and Worksheets (version 4). Available at: <https://www2.gov.bc.ca/assets/gov/public-safety-and-emergency-services/wildfire-status/prevention/fire-fuel-management/fuels-management/2020-wildfire-threat-assesment-guide-final.pdf>

⁴ Partners in Protection Association. 2019. FireSmart Begins at Home Manual. Available at: https://www2.gov.bc.ca/assets/gov/public-safety-and-emergency-services/wildfire-status/prevention/prevention-home-community/bcws_homeowner_firesmart_manual.pdf

3.0 Project Overview

The site consists of an 843 m² lot on The Highway in West Vancouver. The lot is currently occupied by a single detached coach house with no other outbuildings. The house is surrounded by maintained lawns, small landscaping shrubs and plants, and several mature coniferous and deciduous trees. The property slopes gently to the west and includes a small retaining wall and areas with partially exposed bedrock. There are 32 trees on the property that are greater than 10 centimetres in diameter.

The proposed development includes demolishing the existing dwelling and coach house and building a new single-family dwelling and foundation in the southern portion of the property. The existing driveway will be removed, and a new driveway will be built along the eastern property line. This driveway will be used to access the property south. Additional hardscaping will be installed around the new home.



Photo 1. View of the property from The Highway (Looking South).

4.0 Fuel Descriptions and Wildfire Threat Assessment

4.1 Summary of Fuel Types

Forested areas near the proposed development site were classified into the fuel types mapped in Figure 4. The fuels have been divided into classifications based on the sixteen national benchmark fuel types that are used by the Canadian Fire Behaviour Prediction System. Forest areas within 150 metres of the project site include mature coastal forests composed of the coniferous species western redcedar and Douglas-fir and the pioneer deciduous species bigleaf maple and red alder. They are classified as C5 (coniferous) and M2 (mixed) fuel types, mostly found in Lighthouse Park west of the site. These stands represent one of the largest remaining areas of contiguous forest cover within the general urban area of West Vancouver

The C5 fuel type is assigned to coniferous forests in Lighthouse Park and a thin strip of isolated trees that stretch across adjacent properties to the north. The C5 stands in Lighthouse Park are characterized by even-aged conifer stands with mature trees, moderate crown-base heights, and considerable crown fuel volumes. Ladder fuels are dominated by patchy regenerating and suppressed conifers and low-hanging conifer branches. Dead and downed material in the stand is above average due to stand health issues related to western hemlock. Surface fuels are predominately deciduous.

The isolated C5 stand north of the site is located on private property. Therefore, the assessment of this stand was conducted visually from a distance. This small stand is a single-aged, mature stand consisting predominantly of Douglas-fir and western redcedar with considerable crown fuel volumes. Ladder fuels are patchy, consisting of suppressed conifer trees and low conifer branches. Overstory and understory density is low, and surface fuels consist of deciduous shrubs and ferns.

M2 fuel type is assigned to the transitional area on the northeast edge of Lighthouse Park, where large deciduous trees interrupt continuous coniferous forest cover. Canopy coverage is approximately 60 percent conifer, with groups of bigleaf maple and red alder growing in canopy gaps. Overstory and understory density is low. Ladder fuels consist of regenerating conifer trees and low-hanging conifer branches with scattered horizontal continuity. Above average dead and down material in this stand is attributed to similar forest health issues associated with the adjacent C5 stands. Deciduous shrubs and ferns prevail in the surface layer. See Appendix 2 for commentary on the fuel-type applications in the project vicinity.

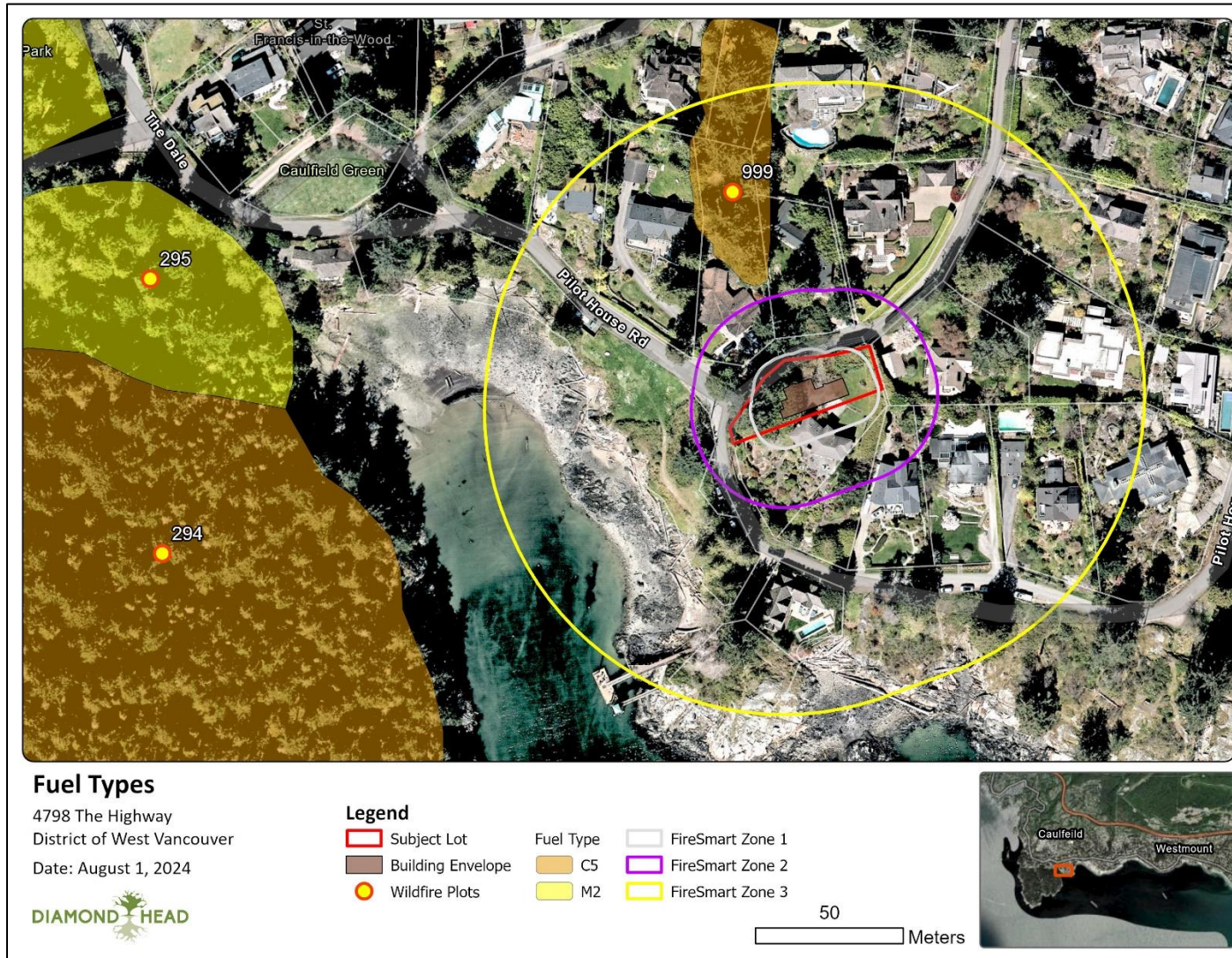


Figure 4. Location of fuel types relative to the project site.

4.2 Summary of Wildfire Threat from Surrounding Forest

Each forest stand was also assessed for wildfire threat using the Wildfire Threat Assessment worksheet. Figure 5 outlines the wildfire threat in relation to the FireSmart zones (10m, 30m, and 100m from the structure). The Wildfire Urban Interface (WUI) ratings and plot characteristics are summarized in Appendix 1. This assessment accounts for the fire behavior potential in these stands but does not represent the likelihood of ignition of the future building.

The C5 stand approximately 30 metres from the subject site is isolated from the large forests of Lighthouse Park and exhibits below average density and canopy closure, and has minimal dead and downed material or standing dead stems. This stand poses a low wildfire threat. Crown fire in this stand is unlikely under most fire weather conditions. However, surface fire may occur and pose a threat of ignition to nearby homes.

The M2 and C5 stands in Lighthouse Park were assessed to have a moderate wildfire threat. These stands share similar structural characteristics that relate to their moderate wildfire threat. Ladder fuels are patchy, conifer dominant, and generally separated from the canopy by a fuel strata gap of 6-9 metres. The forests of Lighthouse Park are located on a peninsula between the Howe Sound, Burrard Inlet and Strait of Georgia. As a result, the C5 and M2 stands within the park are exposed to winds that affect the canopy and regularly bring down smaller branches and foliage. Additionally, hemlock health issues have killed or damaged many large trees. These two factors have contributed to the above average surface fuel load in these stands and are a leading cause for the moderate wildfire threat observed within the M2 and C5 stands of Lighthouse Park. A crown fire in these stands would likely require extreme fire weather conditions, such as high winds following a period of drought-like conditions. However, these forests are separated from the site by approximately 150m of non-vegetated area, reducing the risk they present to the subject site.

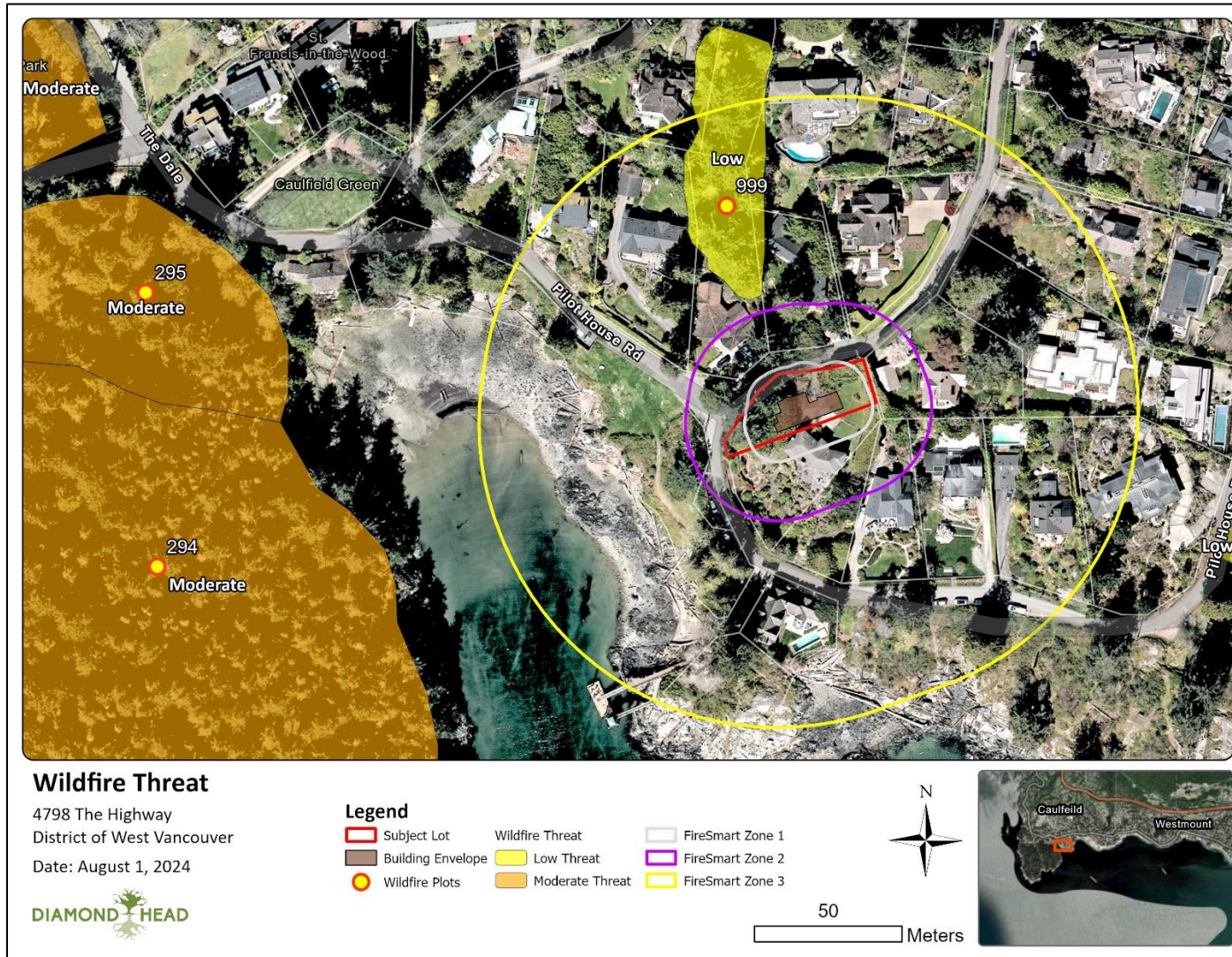


Figure 5. Wildfire threat near the subject site.

4.3 On-site vegetation

On-site landscaping consists primarily of mixed wood trees and shrubs set amid lawns. A total of 32 trees with a diameter of 10 cm or greater were observed during the site visit, seven of which are protected under the District’s tree bylaw. Most of the on-site vegetation is an unsuitable species under the DP guidelines. Section 5.1 considers existing vegetation in the context of wildfire hazard mitigation.

Table 1. On-site trees measuring 10cm diameter at breast height.

Tag #	Species	DBH (cm)	Height (m)	Overall Condition	Comments
8969	Japanese cedar (<i>Cryptomeria japonica</i>)	54	7	Poor	2 laterals have assumed vertical growth. Extensive dieback and discoloured foliage. Phototropic lean southeast.
8970	Western Red Cedar (<i>Thuja plicata</i>)	37	6	Dying	Small codominant cedar with extensive ivy cover choking out and killing tree. 3 stems 10, 15 and 12 dbh. Western stem already failed.
8971	Western Red Cedar (<i>Thuja plicata</i>)	129	22	Moderate	Bylaw sized tree. Codominant at 1.5 m. Low crown base height with asymmetrical crown to southeast. Signs of decay at union.
8972	Western Red Cedar (<i>Thuja plicata</i>)	28	7	Moderate	Suppressed cedar growing in shade of dominant surround trees.
8973	Western Red Cedar (<i>Thuja plicata</i>)	17	7	Moderate	Suppressed cedar growing in shade of dominant surround trees. Thin crown.
8974	Douglas-Fir (<i>psuedotsuga menziesii</i>)	110	30	Moderate	Bylaw sized tree. Straight stem with good taper. Asymmetrical crown to west. Potential historical codominant stem removed at 12m.
8975	Douglas-Fir (<i>psuedotsuga menziesii</i>)	114	30	Moderate	Bylaw sized tree. Straight stem with good taper. Asymmetrical crown to west. Potential historical codominant stem removed at 12m.
8976	Western Red Cedar (<i>Thuja plicata</i>)	41	10	Poor	Topped at 10 m. Single straight stem. decay at topping significant. Thin crown asymmetrical to west. Suppressed by 8977 and 8975.
8977	Western Red Cedar (<i>Thuja plicata</i>)	55	10	Moderate	Single straight stem with moderate taper. Topped at 10 m with asymmetrical crown to east. Potential decay at topping site.
8978	Western Red Cedar (<i>Thuja plicata</i>)	168	11	Moderate	Bylaw sized tree. Codominant at base. 103 and 65 dbh. Topped at 10 m . Evidence of crown reduction. Large out/downward sweeping scaffold branching. Asymmetrical crown to east with lots of green foliage and vigour still.

Tag #	Species	DBH (cm)	Height (m)	Overall Condition	Comments
8979	Western Red Cedar (<i>Thuja plicata</i>)	76	11	Moderate	Bylaw sized tree. Straight stem with good taper. Topped at 10m with large scaffold branch to east with 90 degree to obtuse union angle. Asymmetrical crown to northeast with lots of green foliage. No visible signs of stress.
8980	Douglas-Fir (<i>psuedotsuga menziesii</i>)	71	25	Moderate	Roots on north side restricted by large exposed bedrock. Straight stem with good taper. Thin asymmetrical crown with high crown base height but no dieback or signs of stress.
8981	Norway Maple (<i>Acer plantanoides</i>)	81	9	Dying	Bylaw sized tree. Codominant at base, 28 and 53 dbh. Extensive decay in larger stem. Pruned for hydro line clearance. Does not pose a treat due to size and proximity to targets.
8982	Cherry Laurel (<i>Prunus laurocerasus</i>)	18	7	Moderate	average health and structure of a laurel. No visual signs of stress or damage
8983	Mountain ash (<i>Sorbus americana</i>)	30	7	Moderate	Butting up against wooden fence. Codominant at 2m with slight included bark. Asymmetrical crown to southwest.
8984	Cherry Laurel (<i>Prunus laurocerasus</i>)	16	7	Moderate	average health and structure of a laurel. No visual signs of stress or damage
8985	Cherry Laurel (<i>Prunus laurocerasus</i>)	27	7	Moderate	average health and structure of a laurel. No visual signs of stress or damage
8986	Cherry Laurel (<i>Prunus laurocerasus</i>)	20	7	Moderate	Butting up against wood fence. Poor branch structure.
8987	Cherry Laurel (<i>Prunus laurocerasus</i>)	22	7	Moderate	Butting up against wood fence. Poor branch structure.
8988	Katsura (<i>Cercidiphyllum japonicum</i>)	61	8	Poor	Multistemmed at 1.5m. Historical hydro line pruning and reduction cutting. Every main stem and lateral branches pruned. Extensive water sprouting in upper crown.
8989	Katsura (<i>Cercidiphyllum japonicum</i>)	57	8	Poor	Multistemmed at 1m. 27cm and 30cm dbh stems. Historical hydro line pruning and reduction cutting. Every main stem and lateral branches pruned. Extensive water sprouting in upper crown.
8990	Katsura (<i>Cercidiphyllum japonicum</i>)	69	8	Poor	Multistemmed at 2m. Historical hydro line pruning and reduction cutting. Every main stem and lateral branches pruned. Extensive water sprouting in upper crown.
8991	Katsura (<i>Cercidiphyllum japonicum</i>)	57	8	Poor	Multistemmed at 1.5m. Historical hydro line pruning and reduction cutting. Every main stem and lateral branches pruned. Extensive water sprouting in upper crown.
8992	Rhododendron	35	5	Moderate	Multistemmed with slight phototropic lean. Asymmetrical crown leaning to south.
8993	Rhododendron	40	5	Moderate	Multistemmed with slight phototropic lean. Asymmetrical crown leaning to south.
8994	Western Red Cedar (<i>Thuja plicata</i>)	53	7	Moderate	Cedar hedgerow of 6 stems lift pruned to 4 m. Dieback present in northern edge. Otherwise relatively healthy with no trunk, stem or visible root damage or decay. DBH ranges from 22 to 57.

Tag #	Species	DBH (cm)	Height (m)	Overall Condition	Comments
8995	Western Red Cedar (<i>Thuja plicata</i>)	58	7	Moderate	Cedar hedgerow of 6 stems lift pruned to 4 m. Dieback present in northern edge. Otherwise relatively healthy with no trunk, stem or visible root damage or decay. DBH ranges from 22 to 57.
8996	Western Red Cedar (<i>Thuja plicata</i>)	57	7	Moderate	Cedar hedgerow of 6 stems lift pruned to 4 m. Dieback present in northern edge. Otherwise relatively healthy with no trunk, stem or visible root damage or decay. DBH ranges from 22 to 57.
8997	Western Red Cedar (<i>Thuja plicata</i>)	32	7	Moderate	Cedar hedgerow of 6 stems lift pruned to 4 m. Dieback present in northern edge. Otherwise relatively healthy with no trunk, stem or visible root damage or decay. DBH ranges from 22 to 57.
8998	Western Red Cedar (<i>Thuja plicata</i>)	32	7	Moderate	Cedar hedgerow of 6 stems lift pruned to 4 m. Dieback present in northern edge. Otherwise relatively healthy with no trunk, stem or visible root damage or decay. DBH ranges from 22 to 57.
8999	Western Red Cedar (<i>Thuja plicata</i>)	22	7	Moderate	Cedar hedgerow of 6 stems lift pruned to 4 m. Dieback present in northern edge. Otherwise relatively healthy with no trunk, stem or visible root damage or decay. DBH ranges from 22 to 57.
9000	Western Red Cedar (<i>Thuja plicata</i>)	93	7	Poor	Bylaw sized tree. Topped at 7 m. Heavy pruning on east side of crown and growing into hydro lines. Crown dieback. No visible signs of decay or other damage. .

5.0 Wildfire Threat Mitigation Recommendations

The following are recommendations to mitigate risk to the development. Community and design recommendations focus on siting of structures, construction materials, access, water sources and utilities. These are factors that provide long term mitigation against a wildfire event. Vegetation fuels on and adjacent to the development will change over time and require maintenance. Recommendations are made for on-site landscaping as well as treatments and required maintenance for forest areas adjacent to the property.

It is the responsibility of the owner and their project team to understand and comply with the following requirements.

Wildfires threaten structures primarily through radiant heat and ember ignition. Radiant heat threatens structures when a wildfire establishes in adjacent vegetation and the heat is sufficient to ignite the construction materials. This requires proximity between the wildfire and the structure. Ember ignition occurs when a wildfire spreads embers or firebrands throughout an area, which can then ignite structures. Embers can spread several kilometers, and therefore can threaten structures that do not directly interface with forests and natural vegetation.



Figure 6. Ignition pathways in the interface. Radiant heat threatens structures within 10m of the forest edge while embers spread to structures within the interior of the development.

The fire resistance of homes in the interface can be improved by achieving FireSmart standards for building materials, ignition sources and combustible fuels within each of the three FireSmart Priority Zones. In the event that a wildfire does threaten the area, suppression capability is improved with good access to the interface area, a defensible space to defend from and a good water supply. FireSmart divide the area around the home into three “priority zones”, which radiate out from the structure and reflect the different ignition pathways.

The Non-Combustible Zone is the area immediately adjacent to a structure, out to 1.5 m. A non-combustible surface should extend around the entire structure and any attachments, such as decks. Creating a non-combustible surface can be as easy as clearing vegetation and combustible material down to mineral soil.

Zone 1 is the area within 1.5 and 10 m of the home or building. In this area life and property are at higher risk from radiant heat. It has been shown through analysis of recent large-scale wildfires that the most important factors in protecting structures are the exterior construction materials and immediate landscaping next to homes⁵. FireSmart guidance emphasizes the use of non-combustible or fire-resistant building materials for decks and outbuildings along with landscaping plans that reduce the potential for direct exposure of the home to radiant heat or flame in this area. Cleaning up debris, garbage, or storage from around the home is also of primary importance in this area.

Zone 2 includes the area from 10 m to 30 m from a structure. Wildfire in forests within this zone can subject the building to radiant heat and may produce an ember shower onto the building. Forest fuels are generally treated aggressively in this area to prevent a crown fire from establishing and reduce the intensity of radiant heat and ember production. Treatments may include removal of ground fuel, thinning of trees, and lift pruning of retained trees.

Zone 3 includes the area from 30 m out to 100 m. People and structures are at risk from ember transport associated with a wildfire in this area. FireSmart guidance in this area can recommend forest stand thinning, fuel management, and the designation of access and egress. The goal in this area is to prevent a crown fire, but the distance from the home means fuel management is generally not as aggressive as treatments in Zone 2.

⁵ Westhaver, A. 2017. Why some homes survived: Learning from the Fort McMurray wildland/urban interface fire disaster. *Institute for Catastrophic Loss Reduction (ICLR) research paper series – number 56.* (March 2017).

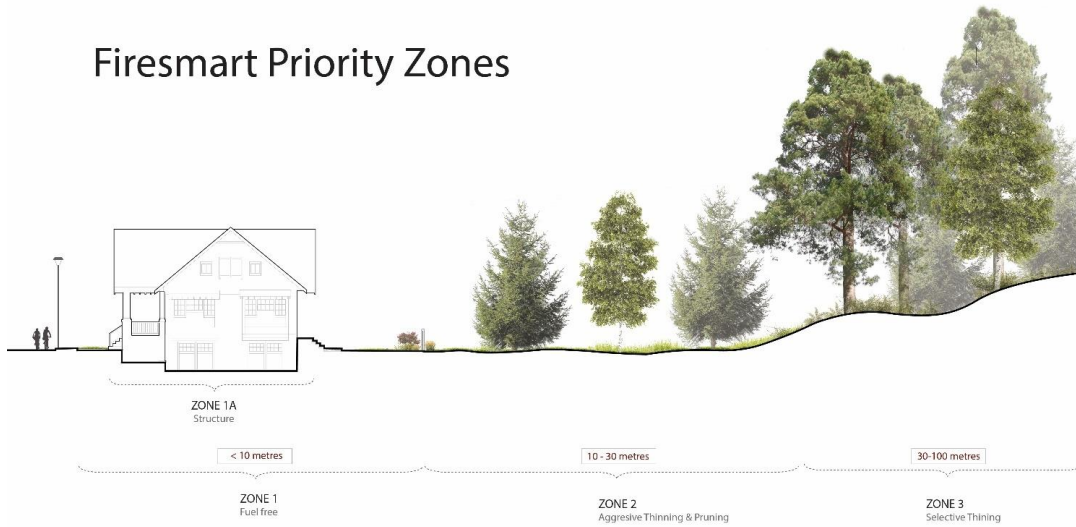


Figure 7. FireSmart Management Zones

5.1 Buildings setback from hazardous fuels and on-site vegetation

FireSmart recommends that a 10m fuel-free zone be established and maintained between structures and hazardous fuels. A landscape plan for the proposed development has not been provided at this time. All future on-site vegetation should satisfy this guideline by using only deciduous species with high foliar moisture and little resin. The perimeter of the home should be surrounded by a band of gravel or other non-combustible surface (patio, driveway pavers) that reduces the likelihood of flame transfer between landscape vegetation and building surfaces.

Many properties within the Wildfire Hazard DPA are unable to build homes, so all of FireSmart Zone 1 is located within the property limit because of zoning regulations. While vegetation on neighbouring properties can pose a fire hazard, removing, pruning, or otherwise modifying vegetation outside the subject site for the purposes of reducing wildfire risk is not always possible. In the event permission cannot be obtained for modification of off-site vegetation, all FireSmart recommendations and guidelines in this report must be followed. On-site FireSmart construction, landscaping, and maintenance will reduce the wildfire risk and meet the Wildfire DPA objectives as much as practically possible.

Most unsuitable vegetation within Zone 1 is found within the site boundaries. A large hedging cedar is installed on an adjacent property near the southeastern corner of the property. Additionally, two large, topped Douglas-firs reside on an adjacent property with crowns extending into Zone 1. Any future vegetation overhanging the property line should be trimmed back to maintain the maximum practicable fuel free zone.

Vegetation on the property will mostly be removed to accommodate the proposed building development. Protected Trees 8969, 8974, and 8975 can be retained but will require pruning. Trees 8981-8987 are all suitable species under the DP’s guidelines. Onsite trees 8970, 8972, 8973, 8976, and 8977 are recommended for removal to maintain a 10m fuel-free buffer from the proposed home and hazardous fuels.

Recommendations for observed vegetation as they relate to wildfire hazard are provided in Table 2.

Table 2. On site and neighboring trees relevant to wildfire hazard.

Tag #	Species	DBH (cm)	Height (m)	Overall Condition	Comments	Retain/Remove	Retention Comments
On-site Trees							
8969	Japanese cedar (<i>Cryptomeria japonica</i>)	54	7	Poor	Within 10-30m of proposed building envelope	Retain	Lift prune canopy to 10 m
8970	Western Red Cedar (<i>Thuja plicata</i>)	37	6	Dying	9.5m from proposed building envelope	Remove	Remove to maintain 10m fuel free buffer
8971	Western Red Cedar (<i>Thuja plicata</i>)	129	22	Moderate	5.3m from proposed building envelope	Retain	Lift prune canopy to 10 m
8972	Western Red Cedar (<i>Thuja plicata</i>)	28	7	Moderate	6.8m from proposed building envelope	Remove	Remove to maintain 10m fuel free buffer
8973	Western Red Cedar (<i>Thuja plicata</i>)	17	7	Moderate	6.6m from proposed building envelope	remove	Remove to maintain 10m fuel free buffer
8974	Douglas-Fir (<i>psuedotsuga menziesii</i>)	110	30	Moderate	3.7m from proposed building envelope	Retain	Lift prune canopy to 10 m
8975	Douglas-Fir (<i>psuedotsuga menziesii</i>)	114	30	Moderate	6.7m from proposed building envelope	Retain	Lift prune canopy to 10 m
8976	Western Red Cedar (<i>Thuja plicata</i>)	41	10	Poor	3.8m from proposed building envelope	remove	Remove to maintain 10m fuel free buffer
8977	Western Red Cedar (<i>Thuja plicata</i>)	55	10	Moderate	2m from proposed building envelope	Remove	Recommended for removal in arborist plan
8978	Western Red Cedar (<i>Thuja plicata</i>)	168	11	Moderate	within proposed building envelope	Remove	Recommended for removal in arborist plan
8979	Western Red Cedar (<i>Thuja plicata</i>)	76	11	Moderate	within proposed building envelope	Remove	Recommended for removal in arborist plan
8980	Douglas-Fir (<i>psuedotsuga menziesii</i>)	71	25	Moderate	2.6m from proposed building envelope	Remove	Recommended for removal in arborist plan
8981	Norway Maple (<i>Acer plantanoides</i>)	81	9	Dying	6m from proposed building envelope	Remove	Recommended for removal in arborist plan

Tag #	Species	DBH (cm)	Height (m)	Overall Condition	Comments	Retain/Remove	Retention Comments
8982	Cherry Laurel (<i>Prunus laurocerasus</i>)	18	7	Moderate	5.4m from proposed building development	Retain	Suitable species under the DP Guidelines. Retain and protect as required in Arborist Report.
8983	Mountain ash (<i>Sorbus americana</i>)	30	7	Moderate	8.5m from proposed building envelope	Retain	Suitable species under the DP Guidelines. Retain and protect as required in Arborist Report.
8984	Cherry Laurel (<i>Prunus laurocerasus</i>)	16	7	Moderate	6m from proposed building envelope	Retain	Suitable species under the DP Guidelines. Retain and protect as required in Arborist Report.
8985	Cherry Laurel (<i>Prunus laurocerasus</i>)	27	7	Moderate	4.4m from proposed building envelope	Retain	Suitable species under the DP Guidelines. Retain and protect as required in Arborist Report.
8986	Cherry Laurel (<i>Prunus laurocerasus</i>)	20	7	Moderate	7.7m from proposed building envelope	Retain	Suitable species under the DP Guidelines. Retain and protect as required in Arborist Report.
8987	Cherry Laurel (<i>Prunus laurocerasus</i>)	22	7	Moderate	7m from proposed building envelope	Retain	Suitable species under the DP Guidelines. Retain and protect as required in Arborist Report.
8988	Katsura (<i>Cercidiphyllum japonicum</i>)	61	8	Poor	1m from proposed building envelope	Remove	Recommended for removal in arborist plan
8989	Katsura (<i>Cercidiphyllum japonicum</i>)	57	8	Poor	5m from proposed building envelope	Retain	Suitable species under the DP Guidelines. Retain and protect as required in Arborist Report.
8990	Katsura (<i>Cercidiphyllum japonicum</i>)	69	8	Poor	1.5m from proposed building development	Remove	Recommended for removal in arborist plan

Tag #	Species	DBH (cm)	Height (m)	Overall Condition	Comments	Retain/Remove	Retention Comments
8991	<i>Katsura (Cercidiphyllum japonicum)</i>	57	8	Poor	5m from proposed building envelope	Remove	Recommended for removal in arborist plan
8992	Rhododendron	35	5	Moderate	3.5m from proposed building development	Remove	Recommended for removal in arborist plan
8993	Rhododendron	40	5	Moderate	6m from proposed building development	Remove	Recommended for removal in arborist plan
8994	Western Red Cedar (<i>Thuja plicata</i>)	53	7	Moderate	10m from proposed building development.	Remove	Recommended for removal in arborist plan
8995	Western Red Cedar (<i>Thuja plicata</i>)	58	7	Moderate	10m from proposed building development.	Remove	Recommended for removal in arborist plan
8996	Western Red Cedar (<i>Thuja plicata</i>)	57	7	Moderate	10m from proposed building development.	Remove	Recommended for removal in arborist plan
8997	Western Red Cedar (<i>Thuja plicata</i>)	32	7	Moderate	10m from proposed building development.	Remove	Recommended for removal in arborist plan
8998	Western Red Cedar (<i>Thuja plicata</i>)	32	7	Moderate	10-30m from proposed building development	Remove	Recommended for removal in arborist plan
8999	Western Red Cedar (<i>Thuja plicata</i>)	22	7	Moderate	10-30m from proposed building development	Remove	Recommended for removal in arborist plan
9000	Western Red Cedar (<i>Thuja plicata</i>)	93	7	Poor	1m from proposed building development	Remove	Recommended for removal in arborist plan
Off-site Trees							
OS01	English Walnut (<i>Juglans regia</i>)	35	8	Moderate	Signs of past pruning in lower canopy, woodpecker or insect feeding on stem. Black moist looking bacteria or fungi at base.	Retain	No mitigation required
OS02	Douglas-Fir (<i>psuedotsuga menziesii</i>)	89	6	Poor	Heavy topping. Poor branch structure and large reaching lateral branches hang over road and within 10 m on property.	Retain	No mitigation required
OS03	Douglas-Fir (<i>psuedotsuga menziesii</i>)	88	20	Poor	Codominant with multiple stems at 10m as result of topping. Poor branch structure asymmetry to southeast and slight phototropic lean to SE. drip line extends over road and within 1m of property line.	Retain	No mitigation required
OSH1	Western Red Cedar (<i>Thuja plicata</i>)	NA	7	Moderate	Part of cedar hedgerow 8994-8999 that extends to adjacent property. Larger stems 50+ dbh with crown base at 3m.	Retain	No mitigation required

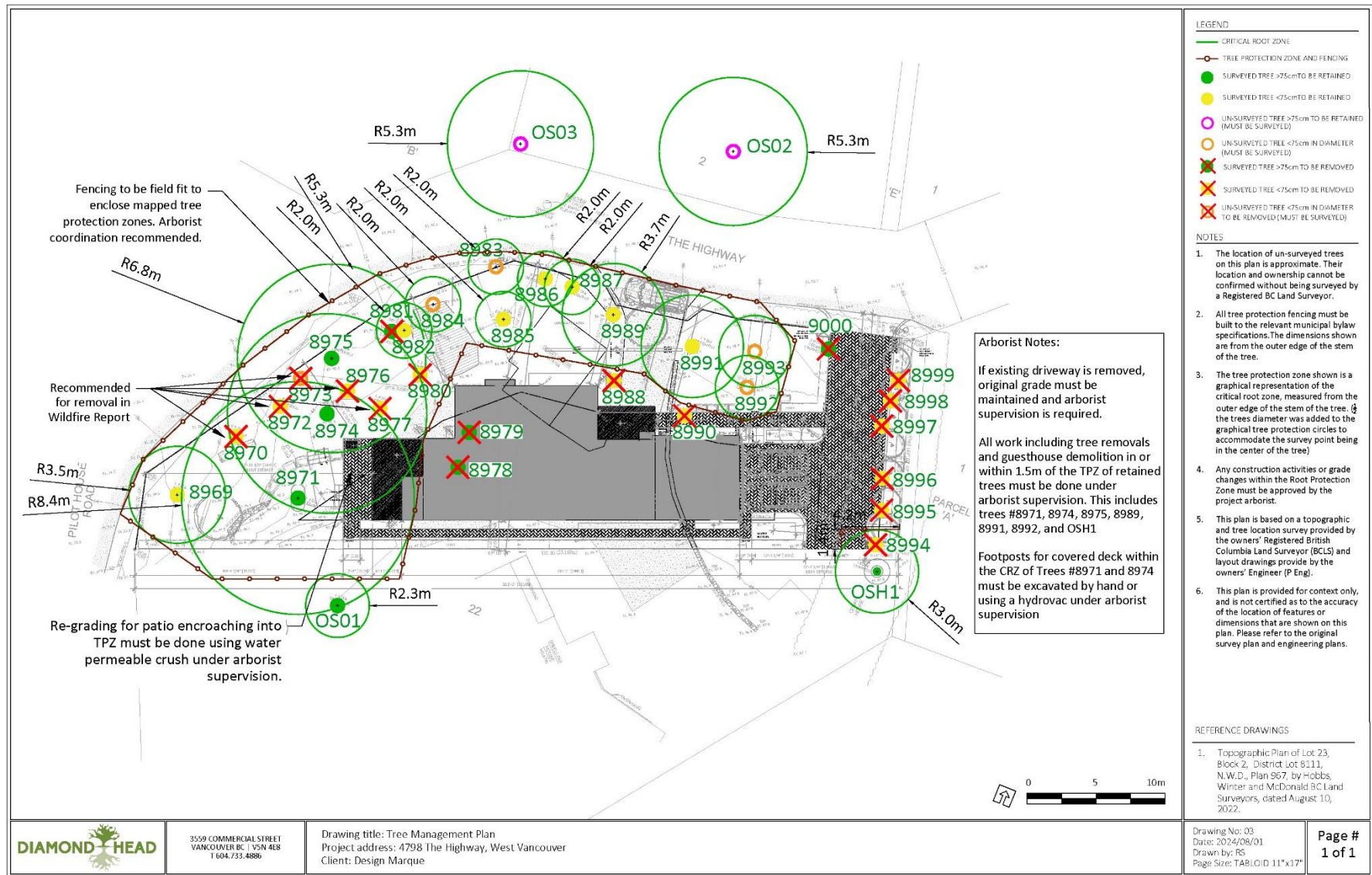


Figure 8. Location of trees referred to in this report.



Photo 2. Coniferous vegetation in western portion of property. Most will be removed to accommodate development.



Photo 3. 8994-9000 along the east property line that make up a large cedar hedge row to be removed to accommodate to new driveway installation.



Photo 4. OS02 and OS03 with crowns that extend into a 10m fuel-free buffer.

5.2 Zone 1A – Building and Construction

Generally, during a wildfire, homes are ignited by embers landing and accumulating on vulnerable surfaces such as roofs, verandas, eaves and openings. Embers can also land on or in nearby flammable materials such as bushes, trees or woodpiles and, if the resulting fire is near the home, it can create enough radiant heat to ignite the walls of the home. Small fires in the yard can also spread towards the structures, beneath porches or under homes. Combustible fencing can “wick” fires in the yard or landscaping towards the home. Therefore, the building material and construction techniques are a significant concern for homes in the interface.

Construction standards and requirements for roofs, chimneys, balconies, decks, and porches apply to all new houses that are built within the wildfire DP area. These are outlined in Schedule II of the District of West Vancouver’s Official Community Plan, which can be viewed on the District’s website. Building standards along with additional recommendations are summarized in Table 3. These should be consistent with the highest current wildfire protection standards published by the NFPA, or any similar, successor, or replacement body that may exist.

Table 3. Requirements for building design and construction

Requirements for building materials	
Building setbacks	<ul style="list-style-type: none"> All new buildings must be located as far from forest interface as possible within the constraints of zoning and environmentally sensitive areas.
Roofing	<ul style="list-style-type: none"> Class A rated roofing material* should be used, and asphalt or metal roofing should be given preference. Any spaces between roof decking and covering should be blocked. Screen or enclose rain gutters to prevent accumulation of plant debris. See additional roofing specifications below.
Siding	<ul style="list-style-type: none"> Exterior vertical walls should be clad with fire resistant materials*. Preference should be given to stucco, metal, brick and concrete cladding. Ensure that fire resistant materials extend from the foundation to the roof. Flame resistant coatings that require ongoing maintenance or reapplication are not acceptable. Exterior wall assemblies that have exterior wood that is untreated and rely on the interior wall for fire resistance are not acceptable. See additional siding specifications below.
Vents, openings, eaves, attics, overhanging projections, soffits	<ul style="list-style-type: none"> Vents should be screened using 3mm, non-combustible wire mesh, and vent assemblies should use fire shutters or baffles. Eaves, soffits, attics, overhanging projections and underfloor openings should be protected with non-combustible covers.
Exterior windows and Doors	<ul style="list-style-type: none"> All windows should be double glazed, or of glass block. Radiant faces exposed to the forest edge should be multi-paned with one pane glazed with annealed or tempered insulating glass. Limit the size and number of windows that face large areas of vegetation. Window screens should be non-combustible.

Requirements for building materials

	<ul style="list-style-type: none"> Exterior doors on radiant faces exposed to the forest edge should be of fire resistant materials.
Decks, porches, balconies	<ul style="list-style-type: none"> Decks, patios, porches, and balconies must use fire-resistant or non-combustible materials. Slotted deck surface allows needle litter to accumulate beneath the deck. Provide access to this space to allow for removal of this debris. Any covers should be built of the same ignition-resistant materials as a roof.
Chimney	<ul style="list-style-type: none"> All chimneys and wood-burning appliances should have approved spark arrestors (securely attached and made of 12-gauge welded or woven wire mesh screen with mesh opening of less than 12 mm).
Exterior sprinklers	<ul style="list-style-type: none"> While exterior wall or roof sprinklers were considered, they are not presently recommended because of the lack of accepted standards for design and installation, and the uncertainty regarding maintenance and triggering of sprinklers during a wildfire event when homes are evacuated.
Fences	<ul style="list-style-type: none"> Fencing within 1.5 m of any structures must be made of ignition resistant materials. Apply a fire protective coating rated to Class A (NFPA 1144) where wood fencing is used within 10 m of the building or accessory structures. No wood fencing may be used within 1.5 metres of buildings or accessory structures.

Recommendations during construction

Combustible materials	<ul style="list-style-type: none"> During construction of houses, all waste construction materials including brush and land clearing debris; needs to be cleaned up on a regular basis, to minimize the potential risk. No combustible materials should be left at the completion of construction.
Hydrants	<ul style="list-style-type: none"> Prior to construction of any wood frame buildings, there must be fire hydrants within operating range.
Fire Suppression	<ul style="list-style-type: none"> The contractor should be familiar with the BC Wildfire Act and the current provincial standards for wildfire suppression and have the appropriate tools on-site for the duration of the project.

* **Non-combustible materials:** means that a material meets the acceptance criteria of CAN/ULC S114, (Standard Method of test for determination of non-combustibility in Building Materials)

Fire-resistant materials: means that a material meets the acceptance criteria of CAN/ULC-S101, (Fire Endurance Tests of Building Construction and Materials)

Rated roofing materials: Class A, B or C is a measure of the external spread of flame on a roof surface. Tests are conducted using CAN/ULC S107M methods of fire tests of roof coverings, or equivalent. The best rating achieved is Class A, which may be described as effective against severe fire exposure.

Roofing specifications

Roofing must be non-combustible. These have a Class A flame spread rating defined as “Class A roof coverings are not readily flammable, are effective against severe fire exposures, and do not carry or communicate (i.e., spread) fire”. CAN/ULC S107 "Standard Test Methods for Fire Tests of Roof Coverings" is the testing procedure used to determine a product's or roof assembly's classification. Any products that are certificated as Class A with an "Assembly" requirement must have a project engineer or architect provide signed proof that the product has been installed as per the specifications of the manufacturer. Because roofing occupies a large portion of the home's exterior surface area and is oriented to down-falling embers, roofs are the most vulnerable part of the home's assembly.

The proposed roofing materials are light concrete pavers over a flat roof and are expected to meet these requirements

Siding specifications

Exterior siding must be fire resistant (stucco, brick, fibre cement boards/panels and poured concrete). Untreated wood products do not meet this standard. Flame resistant coatings that require ongoing maintenance or reapplication are not acceptable. Exterior wall assemblies that have exterior wood that is untreated and rely on the interior wall for fire resistance are not acceptable. Wood products that have permanent treatments or are naturally fire resistant can be accepted as long as product specifications and certified testing is provided. The District may require that the final structure be inspected to confirm structures have been built to these standards and to obtain permit for occupancy and bonding.

Proposed primary siding materials are Hardi plank, cedar-treated siding and metal cladding fascia and flashing. Treated-cedar siding does not meet these requirements and should be replaced with fire-resistant material such as stucco, brick, fibre cement boards or panels, or poured concrete. All other primary surface materials meet these requirements.

It is critical that the structure be designed and built to these standards. The District may require that the final structure be inspected to confirm it is compliant and to obtain permit for occupancy and bonding.

5.3 Zone 1 – FireSmart landscaping and maintenance

Landscaping and maintenance for the site should follow FireSmart principles as laid out in the most recent edition of the FireSmart BC Homeowner's Manual. FireSmart describes zones 1, 2, and 3, of increasing distance from the structure where different treatments and maintenance regimes are recommended to reduce wildfire behavior. Most of the lot will be within 10 metres of the proposed home. Planning and maintenance of this area should follow the requirements of priority zone 1 (<10m from structures) outlined in the FireSmart program. The goal in this zone is to remove hazardous fuels and convert vegetation to fire-resistant species to produce an environment that does not support combustion. Recommendations for landscape and

maintenance are summarized in Table 4. It is recommended that new coniferous trees and shrubs, including hedging, be excluded from the landscape plan.

Table 4. Requirements for landscaping and maintenance

Landscaping Requirements
<ul style="list-style-type: none">• Remove all highly flammable vegetation and other combustibles from around the building.• No conifer trees species should be planted within 10m of any buildings. Existing trees further than 10m from the proposed home can be retained if desired.• Landscaping should incorporate species that are fire resistant. These types of plants tend to have moist, supple leaves with low amounts of sap or resin. They also have a tendency not to accumulate dead material. A list of fire-resistant plants and trees can be found at the FireSmartBC website. A list of suitable species has also been provided in Appendix 6.• Ensure that vegetation will not grow to touch or overhang buildings through appropriate tree selection and proactive maintenance.• Irrigation sprinklers may be installed in landscaping but are not required. Where possible, use plants that are tolerant of drought.
Landscaping Maintenance Requirements
<ul style="list-style-type: none">• Annual grasses within 10 meters of buildings should be kept mowed to 10 centimeters or less and watered regularly during the summer months• Remove any local accumulations of woody or combustible material (e.g., no woodpile or yard waste accumulations).• Remove any over mature, dead or dying shrubs and trees.• Ensure off-site and encroaching trees are pruned to eliminate contact between foliage and building surfaces• Plant only fire-resistant trees and shrubs. A list of fire-resistant plants and trees can be found at the FireSmartBC website. A list of suitable species has also been provided in Appendix 6.

5.4 Zones 2 and 3 – Fuel Hazard Mitigation in Adjacent Forested Areas

Forests that are adjacent to planned structures and pose a high wildfire risk wildfire can be treated to reduce fuel loading and continuity. The property does not directly interface with forest vegetation. Proposed landscaping in the on-site portion of FireSmart Zones 2 must follow the guidance listed in Table 4. No off-site fuel mitigation is proposed in relation to this project.

6.0 Future Condition FireSmart Structure and Hazard Assessment

The form below provides an assessment of the proposed development using the FireSmart Structure and Hazard Assessment form. Assessment ratings are made assuming that the recommendations outlined in this report are adhered to.

Table 5. FireSmart Structure and Hazard Assessment

ZONE 1			
HOME/10 m	Criteria	Rating Options	RATING
What type of roofing material do you have?	Metal, clay tile, asphalt shingle or ULC rated shakes (may be affected by the condition of your roof)	0	0
	Unrated Wood Shakes	30	
Gutter type and roof cleanliness?	Non-combustible gutter – no debris	0	0
	Combustible gutter – no debris	6	
	Non-combustible gutter with debris	10	
	Combustible gutter with debris	16	
What is the exterior of your home built of?	Non-combustible material, stucco, metal siding or brick	0	0
	Combustible or non-ignition resistant (vinyl, wood)	6	
How fire-resistant are your windows and doors?	Tempered glass in all doors/windows	0	2
	Double-pane glass - small/medium (smaller than 1 metre x 1 metre)	1	
	Double-pane glass - large (greater than 1 metre x 1 metre)	2	
	Single-pane glass - small/medium (smaller than 1 metre x 1 metre)	4	
	Single-pane glass - large (greater than 1 metre x 1 metre)	6	
Are your vents screened?	Non-combustible, fire-rated vents or vents with 3 mm screening	0	0
	Combustible vents, not fire rated or without 3 mm screening	6	
Are your eaves closed?	Closed or Boxed-in eaves	0	0
	Open eaves	6	
Have you sheathed-in the underside of your balcony, deck, porch or open foundation?	N/A, no gaps or cracks, heavy timber, noncombustible or fire-rated construction with non-combustible surface and no combustible debris under deck	0	0
	Gaps or cracks, no heavy timber or fire-rated construction with combustible surface and combustible debris under deck	30	
Is your home set back from the edge of a slope?	Building is located on the bottom or lower portion of a hill	0	0
	Building is located on the mid to upper portion of a hill or the crest of a hill	6	
ZONE 1 HOME SCORE			2

*Building materials have not been provided at this time

NON-COMBUSTIBLE ZONE			
Within 1.5 m of home	Criteria	Rating Options	RATING
1.5 m from the ground-level exterior footprint of the structure including any attachments or extensions	Non-combustible surface, no combustible debris, materials, fences or plants present	0	N/A
	Combustible surface, combustible debris, materials, fences or plants present	30	
NON-COMBUSTIBLE ZONE SCORE			0

ZONE 1			
YARD/within 10 m	Criteria	Rating Options	RATING
Where are your outbuildings (or adjacent buildings) located	More than 10 metres from home	0	0
	Less than 10 metres from home	6	
Where is your woodpile located?	More than 10 metres from any building	0	0
	Less than 10 metres away from any building	6	
What type of forest* grows within 10 metres of your home?	Deciduous trees	0	0
	Mixed wood trees (deciduous and conifer)	30	
	Conifer trees	30	
What kind of surface vegetation and combustible materials are within 10 metres of your home and outbuildings?	Well-drained lawn or non-combustible landscaping material	0	0
	Uncut grass or shrubs	30	
	Twigs, branches and tree needles on the ground	30	
ZONE 1 YARD SCORE			0

*a forest is considered a continuous intact treed area

ZONE 2			
YARD/10 – 30 m	Criteria	Rating Options	RATING
What type of forest surrounds your home?	Deciduous trees	0	0
	Mixed wood trees (deciduous and conifer)	10	
	Conifer trees separated	10	
	Conifer trees continuous	30	
What kind of surface vegetation grows within 10-30 metres of your home and around your buildings?	Well-drained lawn or non-combustible landscaping material	0	0
	Uncut grass or shrubs	5	
	Scattered twigs, branches and tree needles on the ground	5	
Are there shrubs and low branches (within 2 metres of the ground) in the surrounding forest?	Abundant twigs, branches and tree needles on the ground	30	5
	None within 10-30 metres	0	
	Scattered within 10- 30 metres of buildings	5	
ZONE 2 YARD SCORE			5
TOTAL SCORE			

		Rating
ZONE 1/ Home and Yard	Home	2
	Non-Combustible Zone	0
	10 metres from home	6
ZONE 2 / Yard	10 – 30 metres from home	5
TOTAL		13 - Low

HAZARD SCORE: Low: <21 Moderate: 21-29 High: 30 – 35 Extreme: >35

Following the recommendations in this report will achieve a FireSmart hazard score of low

The FireSmart Hazard Assessment for this property is low assuming the recommendations in this report are followed. This rating reflects the building materials and landscaping prescribed by this report and proposed in the reviewed issue of the site plans. Risk associated with ember transport from landscape forests can be managed through FireSmart construction and landscape maintenance.

7.0 Final Remarks

The District of West Vancouver requires that the proposed development is consistent with the Wildfire Development Permit Guidelines. Planners, engineers, and landscape architects should refer to this report and the FireSmart manual during the design phase of this development. All construction operations should be conducted according to the Wildfire Act and the regulations. Following these regulations will help reduce liability and protect the development.

The District may require that an inspection be done following construction to ensure that the structure and landscaping meet these requirements.

If the recommendations made within this report and the requirements outlined by the District of West Vancouver are complied with, wildfire risk to life and property will be substantially mitigated and the development will meet FireSmart standards to a reasonable extent within the limitations of zoning and ownership.

If there are any questions or concerns as to the contents of this report, please contact us at any time.

Sincerely,



Signed: August 1, 2024

Michael Coulthard
Registered Professional Forester
Registered Professional Biologist
ISA Tree Risk Assessment Qualified (TRAQ)

Appendix 1 Wildland Urban Interface Plots

Wildfire Threat Assessment Worksheet - Fuel Setting Scoring			
Location	999	Date	28-Mar
Assessor	RS		
Crown species composition (species %)	Fd7Cw3		

Component/subcomponent	PULLDOWNS	SCORE
Depth of organic layer	2-<5	3
Surface and ladder fuel (.1-3m in height)		
Surface fuel composition	Moss, herbs and deciduous shrubs	4
Dead and down material continuity (<7cm)	Scattered <10% coverage	4
Ladder fuel composition	Other conifer	8
Ladder fuel horizontal continuity	Scattered 10-39% coverage	8
Stems/ha (understory)	<500	2
Stand structure and composition (dominant and co-dominant)		
Overstory composition/CBH	Conifer with moderate CBH (5-9 m)	4
Crown closure	20-40% or deciduous (any closure)	1
Fuel strata gap	3-6	3
Stems/ha (overstory)	<400	0
Dead and dying (% of dominant and co-dominant stems)	Standing dead/partial down <20%	2
Comments:	TOTAL	39
	RATING	LOW
low density, conifer dominant, semi natural stand. Mostly douglas fir in overstory. Scattered ladder fuels consisting of low conifer branches and are scattered. Surface fuels likely deciduous shrubs and ferns.		

Threat Rating (Max Score 110)				
Eco - province	Low	Moderate	High	Extreme
Coast and Mountains, Georgia Depression	0 - 41	42 - 57	58 - 69	70-100

Wildfire Threat Assessment Worksheet - Fuel Setting Scoring			
Location	295	Date	28-Mar
Assessor	RS		
Crown species composition (species %)	Cw4Fd2Mb2Dr2		

Component/subcomponent	PULLDOWNS	SCORE
Depth of organic layer	2-<5	3
Surface and ladder fuel (.1-3m in height)		
Surface fuel composition	Moss, herbs and deciduous shrubs	4
Dead and down material continuity (<7cm)	26-50% coverage	12
Ladder fuel composition	Other conifer	8
Ladder fuel horizontal continuity	Scattered 10-39% coverage	8
Stems/ha (understory)	<500	2
Stand structure and composition (dominant and co-dominant)		
Overstory composition/CBH	Mixwood 50%	2
Crown closure	41-60%	2
Fuel strata gap	6-9	1
Stems/ha (overstory)	<400	0
Dead and dying (% of dominant and co-dominant stems)	Standing dead/partial down <20%	2
Comments:	TOTAL	44
	RATING	MODERATE
Conifer dominant mixedwood stand. Canopy dominated by cedar and pioneer deciduous growing in canopy gaps. Ladder fuels are scattered conifer branches and suppressed conifers. Similar dead wood continuity in conifer stand exists. Surface fuels are deciduous shrubs, ferns and mosses.		

Threat Rating (Max Score 110)				
Eco - province	Low	Moderate	High	Extreme
Coast and Mountains, Georgia Depression	0 - 41	42 - 57	58 - 69	70-100

Wildfire Threat Assessment Worksheet - Fuel Setting Scoring			
Location	294	Date	28-Mar
Assessor	RS		
Crown species composition (species %)	Fd6Cw4		

Component/subcomponent	PULLDOWNS	SCORE
Depth of organic layer	2-<5	3
Surface and ladder fuel (.1-3m in height)		
Surface fuel composition	Moss, herbs and deciduous shrubs	4
Dead and down material continuity (<7cm)	26-50% coverage	12
Ladder fuel composition	Other conifer	8
Ladder fuel horizontal continuity	Scattered 10-39% coverage	8
Stems/ha (understory)	<500	2
Stand structure and composition (dominant and co-dominant)		
Overstory composition/CBH	Conifer with high CBH (>10 m)	3
Crown closure	41-60%	2
Fuel strata gap	6-9	1
Stems/ha (overstory)	<400	0
Dead and dying (% of dominant and co-dominant stems)	Standing dead/partial down <20%	2
Comments:	TOTAL	45
	RATING	MODERATE
Mixed age conifer stand dominated by douglas fir and western redcedar. Patchy conifer ladder fuels and high component of dead wood due to wind damage and stand health issues. Ground fuels consist of deciduous shrubs ferns and mosses		

Threat Rating (Max Score 110)				
Eco - province	Low	Moderate	High	Extreme
Coast and Mountains, Georgia Depression	0 - 41	42 -57	58 - 69	70-100

Appendix 2 Description of Forest Fuel Types

Fuel Type C5 – Coniferous dominated stand

An area of C5 fuels has been identified within 100 metres of the project site. This part of Lighthouse Park is characterized by mixed age coniferous stands with a dominant canopy layer of large old trees and a secondary canopy layer of young—mature trees. The stand is composed of moderately stocked (300 – 700 stems per hectare) conifers Western Hemlock (*Tsuga heterophylla*), Western Redcedar (*Thuja plicata*), and Douglas-fir (*Pseudotsuga menziesii*). This fuel type potentially poses a moderate wildfire threat. Another small C5 stand exists within adjacent properties. This stand is predominantly mature douglas-fir, has below average density, and minimal stand dead and/or dead and downed woody debris. This stand poses a moderate wildfire threat. It takes a large amount of energy to create a crown fire in this fuel type. In order for a crown fire to generate it would likely require extreme fire weather conditions, where temperature exceeds relative humidity during a period of drought. Table 6 outlines the general stand characteristics of a C5 stand.

Table 6. Stand characteristics for fuel type C5

Characteristic	Risk Level	Description
Surface fuel continuity (% cover)	Low	20-40 % cover
Vegetation fuel composition	Low	Herbs and deciduous shrubs
Fine woody debris continuity (<=7cm) (% cover)	Med	10-25% coverage
Large woody debris Continuity (>=7cm) (% cover)	Low	<10% coverage
Live conifer canopy closure (%)	Med	41-60% crown closure
Live deciduous canopy closure (%)	High	<20% crown closure
Live and dead conifer crown height (m)	Low	3-5m
Live and dead suppressed and understory conifer (stems/ha)	Low	<500 stems/ha



Photo 5. Coniferous fuels in Lighthouse Park.

Fuel Type M2 – Mixed conifer and deciduous stand

A small portion of the forests near the project site matches this fuel type description. The forests in the area consist of approximately 50-75% native conifers with groups or patches of deciduous trees, including bigleaf maple and red alder, accounting for 25-50% of the canopy cover. The fire behavior potential in these stands varies depending on the percentage content of coniferous species; higher deciduous component typically reduces the wildfire threat to low. This particular area in the northeast of Lighthouse Park has a low wildfire threat. Ignition in this area could result in a crown fire during periods of extreme fire weather conditions. The low-rated stand has widely spaced trees, deciduous understory and ladder fuels, and inclusion of large deciduous trees. Ignition in this area is unlikely to result in a crown fire. Table 7 outlines general stand characteristics.

Table 7. Stand characteristics for fuel type M2

Characteristic	Risk Level	Description
Surface fuel continuity (% cover)	Low	20-40 % cover
Vegetation fuel composition	Low	Herbs and deciduous shrubs
Fine woody debris continuity (<=7cm) (% cover)	Low	Scattered, <10% coverage
Large woody debris Continuity (>=7cm) (% cover)	Low-Med	10-25% coverage
Live conifer canopy closure (%)	Low-Med	20-40% crown closure
Live deciduous closure (%)	Med	20-40% crown closure
Live and dead conifer crown height (m)	Med	2-<3 m
Live and dead suppressed and understory conifer stems/ha)	Very Low	0-500 stems/ha

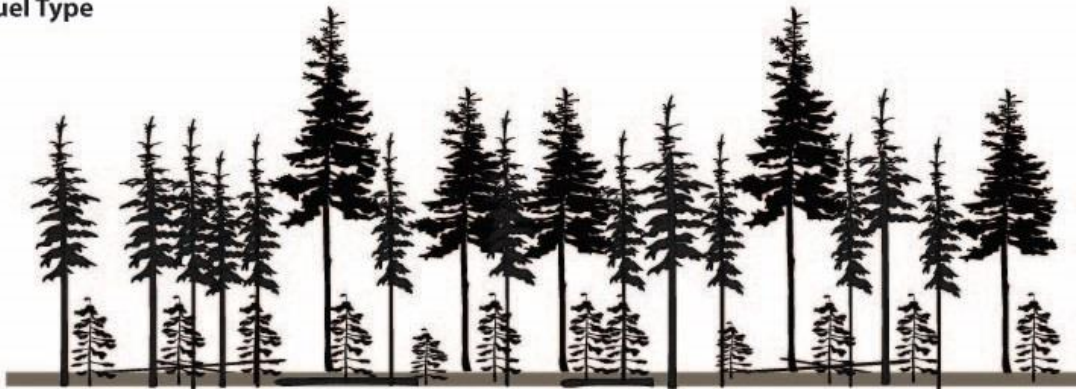
Appendix 3 Generic Description of Coastal Fuel Types

The current Canadian Forest Fire Behavior Prediction (FBP) System does not include coastal forests in their fuel type descriptions. These fuel types reflect stand conditions that were modeled to predict fire behavior potential. On the coast the fuel type that most closely represents forest stand structure and conditions has been used. The following fuel types are the most common interpretations used on the coast.

C5 – Uniform Second Growth Conifer Stand – Moderate Risk

This fuel type is characterized by mature second growth stands dominated by Western Red Cedar (*Thuja plicata*) and Western Hemlock (*Tsuga heterophylla*). There can be small component of dominant Douglas-fir (*Pseudotsuga menziesii*) in the overstory. This fuel type is moderately dense (500-1000 stems per ha) and has a high crown base height of 10 to 15m. The understory is of moderate density, usually consisting of Western Redcedar and Western Hemlock regeneration. The ground fuel component consists of moderately dense fine fuel layer (>7cm) and a low percent cover of large woody debris (>7cm). It takes a large amount of energy to create a crown fire.

C5 Fuel Type



C3 – Multistoried Second Growth Conifer Stand – High Risk

This fuel type is characterized by a uniform mature second growth conifer dominated stand. This stand consists of mature Western Red Cedar (*Thuja plicata*) and Western Hemlock (*Tsuga heterophylla*). There is also a minor component of dominant Douglas-fir (*Pseudotsuga menziesii*) in the stand. Compared to a C5 stand, a C3 stand is more densely stocked (1000-2000 stems per ha) and there is a lower crown base height (usually 4-8 m). The understory is more densely stocked with Western Redcedar and Western Hemlock. The ground fuel component consists of moderately dense fine fuel layer (>7cm) and a low percent cover of large woody debris (>7cm). A crown fire in a C3 stand takes less energy to create than a C5 stand.

C3 Fuel Type



M2 - Mature Stands Consisting of a mix of Conifer and Deciduous Trees – Low to Moderate Risk

This fuel type consists of a mixed conifer and deciduous tree type. This stand is not uniform in structure and is composed of a wide variety of species. These may include and not limited to:

Western Red Cedar (*Thuja plicata*), Western Hemlock (*Tsuga heterophylla*), Douglas-fir (*Pseudotsuga menziesii*), Red Alder (*Alnus rubra*), Bigleaf Maple (*Acer macrophyllum*), and Paper Birch (*Betula papyrifera*).

These stands usually consist of less than a 70% of conifer trees, reducing the wildfire risk. There is usually a low crown height (5m) and a high percentage of ladder fuels. There is a high percent cover of suppressed trees, but they are usually composed of deciduous species.

M2 Fuel Type



D1 - Deciduous Dominated Stands – Low Risk

This fuel type is dominated by deciduous trees consisting mostly of Red Alder (*Alnus rubra*), Bigleaf Maple (*Acer macrophyllum*), and Paper Birch (*Betula papyrifera*). D1 stand structure is not uniform with a wide variety of tree ages. There is a well-developed shrub layer, but is mostly composed of low-flammable species. Crown fires are not expected because of the deciduous fuel type. D1 stands on the coast can be used as fuel buffers as they present a low wildfire risk.

D1 Fuel Type



C4 - Uniform Densely Stocked Conifer Stand

This fuel type is rare within the lower mainland as it is mostly defined by densely stocked Lodgepole pine (*Pinus contorta*). This fuel type can be found more towards Squamish and Pemberton. Some small densely stocked Western Red Cedar (*Thuja plicata*), Western Hemlock (*Tsuga heterophylla*), and Sitka Spruce (*Picea sitchensis*) can be found in the Lower Mainland, but these stands are often isolated and small. Stands are densely stocked, (approximately 10,000-30,000 stems/ha) with a large quantity of fine and large woody debris. These stands are characterized as having vertical and horizontal fuel continuity. The shrub community in this stand is of very low density.

Appendix 4 Resources and Links

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- National Fire Protection Association. 2013. NFPA 1144. Standard for Reducing Structure Ignition Hazards from Wildland Fire.
- National Fire Protection Association. 2013. NFPA 1141. Standard for Fire Protection Infrastructure for Land Developments in Suburban and Rural Areas.
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Appendix 5 Description of Terminology

Term	Definition
Co-dominant Trees	Defines trees with crowns forming the general level of the main canopy in even-aged groups of trees, receiving full light from above and partial light from the sides.
Coarse fuels (coarse woody debris)	Combustible material over 7cm in diameter
Crown base height	The height, above ground, where the live crown of coniferous trees begins. Measured in meters (m).
Crown Closure	An assessment of the degree to which the crowns of trees are nearing general contact with one another. The percentage of the ground surface that would be considered by a downward vertical projection of foliage in the crowns of trees.
Diameter at Breast Height	The diameter of a tree measured at 1.3m above the point of germination.
Dominant Trees	Defines trees with crowns extending above the general level of the main canopy of even-aged groups of trees, receiving full light from above and comparatively little from the sides.
Fire-resistant materials	These meet the acceptance criteria of CAN/ULC-S101, (Fire Endurance Tests of Building Construction and Materials)
Fuel Break	An area of non-combustible materials that inhibits the continuous burning of fuels.
Fuel Load	The mass of combustible materials expressed as a weight of fuel per unit area.
Fuel Moisture	Percent water content of vegetation. This is an important factor in rate of spread.
Fuel Types	Classification of forested stands as described by Canadian Forest Fire Behavior Prediction (FBP) System. There are currently no fuel type classifications specific to coastal fuels.
Fine fuels (fine woody debris)	Combustible woody debris under 7cm in diameter.
Fire Behaviour	The manner in which a fire reacts to the influences of fuel, weather, and topography.
Intermediate Trees	Defines trees with crowns extending into the lower portion of the main canopy of even-aged groups of trees, but shorter in height than the co-

Term	Definition
	dominants. These receive little direct light from above and none from the sides, and usually have small crowns that are crowded on the sides.
Ladder Fuels	Live or dead vegetation that allows a fire to burn into the canopy (crown) of a forested stand.
Lift Pruned	The removal of ladder fuels to increase the crown base height.
Litter Layer	Surface buildup of leaves and woody material.
Live Crown Ratio	Is the percentage of the total stem length covered with living branches. It provides a rough but convenient index of the ability of a tree’s crown to nourish the remaining part of the tree. Trees with less than 30 percent live crown ratio are typically weak, lack vigor, and have low diameter growth, although this depends very much on the tree’s age and species.
Non-combustible materials	Means that a material meets the acceptance criteria of CAN/ULC S114, (Standard Method of test for determination of non-combustibility in Building Materials)
Open Grown	Defines trees with crowns receiving full light from all sides due to the openness of the canopy.
Rated roofing materials	Class A, B or C is a measure of the external spread of flame on a roof surface. Tests are conducted using CAN/ULC S107M methods of fire tests of roof coverings, or equivalent. The best rating achieved is Class A, which may be described as effective against severe fire exposure.
Spotting	Fire producing sparks or embers that are carried by the wind and start new fires.
Stems Per Hectare	The number or size of a population (trees) in relation to some unit of space (one hectare). It is measured as the amount of tree biomass per unit area of land.
Suppressed Trees	Defines trees with entirely below the general level of the canopy of even-aged groups of trees, receiving no direct light either from above or from the sides.
Wildfire	An unplanned, unwanted wildland fire, including unauthorized human-caused fires, escaped wildland fire use events, escaped prescribed fire projects, lightning strikes, downed power lines, and all other wildland fires where the objective is to put the fire out.

Appendix 6 Fire Resistant Plants for Landscaping

Fire resistant and drought tolerant ground covers:	Fire resistant and drought tolerant perennials:
<ul style="list-style-type: none"> • Achillea species (when mowed, turf alternative) • Ajuga reptans • Arctostaphylos uva-ursi • Autennaria rosea • Aubrieta detoidea • Ceanothus prostratus • Cerastium tomentosum • Dianthus species • Delosperma nubigenum and the less cold hardy cooperi • Fragaria species (turf alternative) • Phlox subulata • Sedums • Sempervivums • Thymus praecox turf alternative) • Veronica species 	<ul style="list-style-type: none"> • Achillea species • Armeria maritima • Aquilegia • Aurinia saxatilis • Coreopsis • Echinacea purpurea • Epilebium angustifolium • Gaillardia varieties • Geranium species • Helianthemum • Hemerocallis • Kniphofia uvaria • Iris - bearded • Lavendula • Lupinus • Penstemon • Oenothera species • Papaver orientale • Perovskia atriplicifolia • Ratibida columnifera • Salvia species • Stachys byzantina
Fire resistant and drought tolerant shrubs:	Fire resistant and drought tolerant trees:
<ul style="list-style-type: none"> • Amelanchier alnifolia • Caryopteris x clandonesis • Ceanothus • Cistus • Cotoneaster species • Euonymus alatus • Fremontoden on californium • Fuchsia (dieback) • Gaultheria shallow • Holodiscus discolour • Lagerstroemia indica • Mahonia • Pachystima myrsinites • Philadelphus speceis • Paxistima myrthifolia • Pyracantha species • Ribes species • Rhus species • Rosa species and hardy own root shrub • Spiraea bumalda • Symphoricarpos albus • Syringa vulgaris, spidouglassii • Yucca species 	<ul style="list-style-type: none"> • Acer circinatum, glabrum, macrophyllum, plantanoides, rubrum • Aesculus hippocastanum • Alnus rubra tenuifolia • Betula species • Catalpa speciosa • Celtis occidentalis • Cercis canadensis • Cornus florida, stolonifera, nuttallii • Crataegus species • Fagus species • Fraxinus species • Gingko biloba • Gleditsia triacanthos • Gymnocladus dioicus • Juglans • Liquidambar styraciflua • Malus species • Populus species • Prunus cherry • Quercus agrifolia, rubra, palustris, garryana • Robinia pseudoacacia • Salix species • Sorbus aucuparia

Source: Master Gardeners Association of BC. <http://mgabc.org/node/1514>.

Limitations

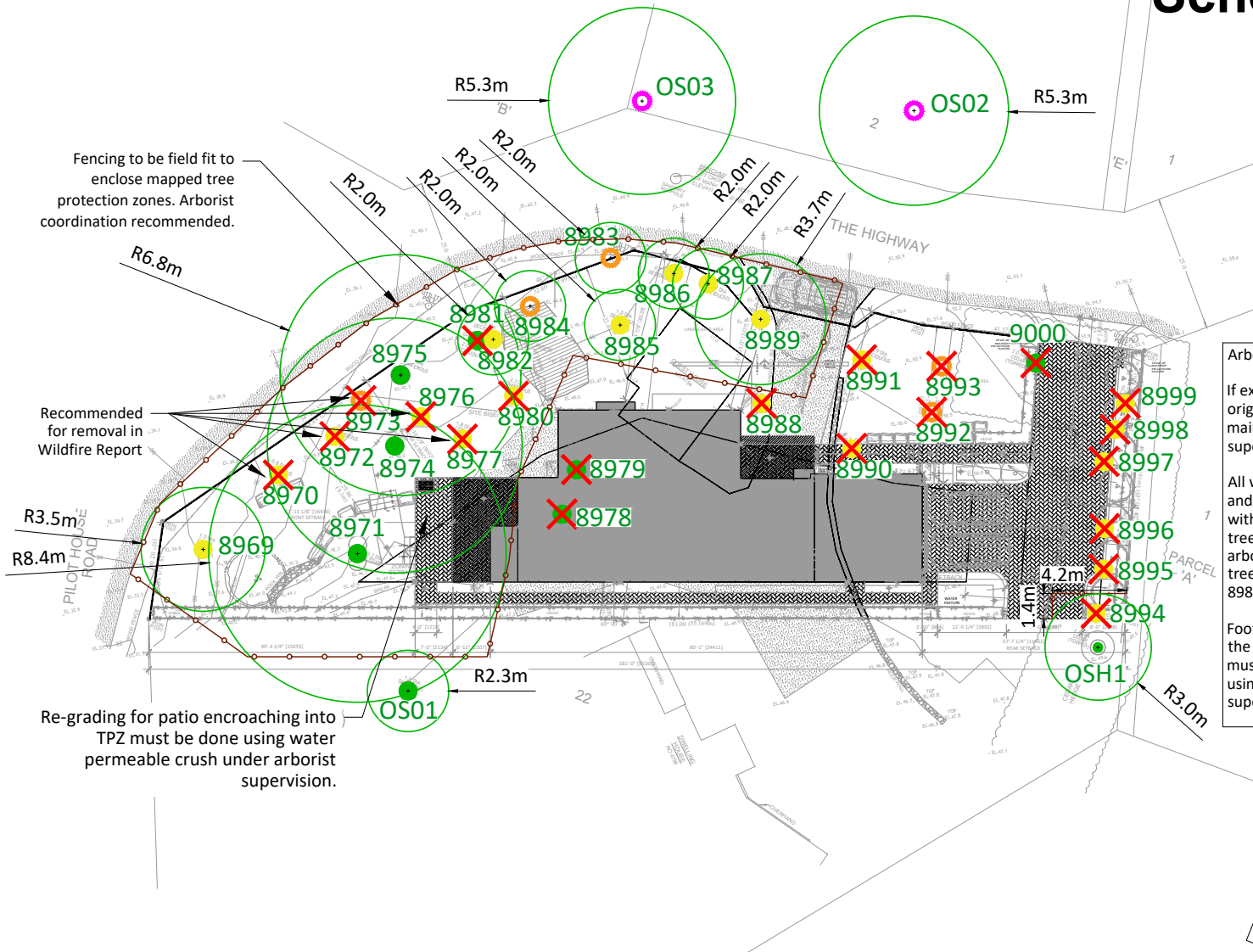
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Schedule C



- LEGEND**
- CRITICAL ROOT ZONE
 - TREE PROTECTION ZONE AND FENCING
 - SURVEYED TREE >75cm TO BE RETAINED
 - SURVEYED TREE <75cm TO BE RETAINED
 - UN-SURVEYED TREE >75cm TO BE RETAINED (MUST BE SURVEYED)
 - UN-SURVEYED TREE <75cm IN DIAMETER (MUST BE SURVEYED)
 - SURVEYED TREE >75cm TO BE REMOVED
 - SURVEYED TREE <75cm TO BE REMOVED
 - UN-SURVEYED TREE <75cm IN DIAMETER TO BE REMOVED (MUST BE SURVEYED)

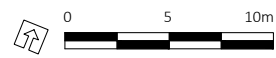
- NOTES**
- The location of un-surveyed trees on this plan is approximate. Their location and ownership cannot be confirmed without being surveyed by a Registered BC Land Surveyor.
 - All tree protection fencing must be built to the relevant municipal bylaw specifications. The dimensions shown are from the outer edge of the stem of the tree.
 - The tree protection zone shown is a graphical representation of the critical root zone, measured from the outer edge of the stem of the tree. (1/3 the tree diameter was added to the graphical tree protection circles to accommodate the survey point being in the center of the tree)
 - Any construction activities or grade changes within the Root Protection Zone must be approved by the project arborist.
 - This plan is based on a topographic and tree location survey provided by the owners' Registered British Columbia Land Surveyor (BCLS) and layout drawings provide by the owners' Engineer (P Eng).
 - This plan is provided for context only, and is not certified as to the accuracy of the location of features or dimensions that are shown on this plan. Please refer to the original survey plan and engineering plans.

Arborist Notes:

If existing driveway is removed, original grade must be maintained and arborist supervision is required.

All work including tree removals and guesthouse demolition in or within 1.5m of the TPZ of retained trees must be done under arborist supervision. This includes trees #8971, 8974, 8975, 8982, 8989, and OSH1

Footposts for covered deck within the CRZ of Trees #8971 and 8974 must be excavated by hand or using a hydrovac under arborist supervision



- REFERENCE DRAWINGS**
- Topographic Plan of Lot 23, Block 2, District Lot 8111, N.W.D., Plan 967, by Hobbs, Winter and McDonald BC Land Surveyors, dated August 10, 2022.



3559 COMMERCIAL STREET
VANCOUVER BC | V5N 4E8
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Drawing title: Tree Management Plan
Project address: 4798 The Highway, West Vancouver
Client: Design Marque

Drawing No: 03
Date: 2024/08/23
Drawn by: RS
Page Size: TABLOID 11"x17"

Page #
1 of 1

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