District of West Vancouver
Development Permit No. 21-129

CURRENT OWNER: Nathalie Celine Ingrid James
of 8715 Lawrence Way
West Vancouver BC
V7W 2T7

THIS DEVELOPMENT PERMIT APPLIES TO:

CIVIC ADDRESS: 8715 Lawrence Way

LEGAL DESCRIPTION: 031-369-341
(LOT A BLOCK C DISTRICT LOT 2361 GROUP 1 NEW WESTMINSTER DISTRICT PLAN EPP107987)
(the "LANDS")

---

1. This Development Permit:
   (a) imposes requirements and conditions for the development of the Lands, which are designated by the Official Community Plan as Development Permit Area to ensure that detached secondary suites meet a high quality of building and landscape design, and are compatible both with the principal dwelling on the lot, and the built form character of the local neighbourhood and subject to Guidelines BF-B 3.1 specified in the Official Community Plan;

   (b) imposes requirements and conditions for the development of the Lands, which are designated by the Official Community Plan as a 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, in accordance with the Guidelines NEI specified in the Official Community Plan; and

   (c) is issued subject to the Owner's compliance with all of the Bylaws of the District applicable to the Lands, except as specifically varied or supplemented by this Permit.

2. The following requirements and conditions shall apply to the Lands:

   2.1 Buildings, structures, landscaping, and site development shall generally take place in accordance with **Schedules A and C.**

   2.2 For all buildings and structures the following fire-resistive materials and construction practices are required:

      2.2.1 Fire retardant roofing materials (Class A or B, or Class A by assembly) torch on roofing must be used as per **Schedule B.**

      2.2.2 Exterior walls must be sheathed with fire-resistive materials as per **Schedule B**.

      2.2.3 Decks, porches, balconies, and patios must use fire-resistive materials as per **Schedule B**.

2.2.4 All eaves, attics, roof vents, and openings under floors must be screened to prevent the accumulation of combustible material, using 3-mm, non-combustible wire mesh, and vent assemblies will use fire shutters or baffles as per **Schedule B**.

2.3 Softscaping must adhere to **Schedule B**.

2.4 All new buildings and structures must be located a minimum required distance of 10 m (defensible space), or at least as far away from the forest interface as any existing permanent structures, if present on the property.

2.5 Tree work on Protected Trees as per Tree Bylaw No. 4892, 2016 will require a Private Tree Cutting Permit at the Building Permit Stage.

2.6 Tree work on public land, or boulevards will require a Municipal Tree Cutting Permit at the Building Permit Stage.

2.7 The Qualified Professional that completed the wildfire hazard assessment shall be required to complete a post-completion inspection to ensure all conditions in **Schedule A** have been met prior to occupancy.

2.8 Notwithstanding, any changes from conditions 2.2 to 2.4 where the changes do not affect the intent of the plans, must be approved by the Qualified Professional during the post-completion inspection.

3. Prior to commencing site work or Building Permit issuance, whichever occurs first, the Owner shall:

a) provide and implement a plan for traffic management during construction, to the satisfaction of the District's Manager of Land Development; and

b) submit a "Sediment and Erosion Control Plan" to the District's Environmental Protection Officer for approval, and the owner shall be responsible for maintaining, repairing and implementing the Sediment Control Measures.

4. Prior to Building Permit application and as security 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 Owner shall:

(a) provide security in the amount of $5,000.00 to the District in the form of cheque; and

(b) maintain the security 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.

5. This Development Permit lapses if the work authorized herein is not commenced within 12 months of the date this permit is approved.

THE DIRECTOR OF PLANNING & DEVELOPMENT SERVICES APPROVED THIS PERMIT ON March 31, 2022

DIRECTOR OF PLANNING & DEVELOPMENT SERVICES

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, BOULEVARD WORKS, AND SUBDIVISION; 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 RECTIFED AT THE BUILDING PERMIT STAGE.

FOR THE PURPOSES OF SECTION 6.0, THIS PERMIT IS ISSUED ON March 31, 2022.

Schedules:

A – Wildfire Hazard DP Area Assessment Report, prepared by Diamond Head date stamped September 10, 2021
B – Wildfire Hazard Site Plan and Landscape Plan, prepared by McLeod Bovell Modern Houses, date stamped September 22, 2021
C – Coach House Architectural and Landscape Plan, prepared by McLeod Bovell Modern Houses, dated January 21, 2022

Schedule A

RECIEVED
September 10, 2021
Planning and Development Services

Wildfire Hazard DP Area Assessment Report

For:
McLeod Bovell Modern Houses

Site Location:
8715 Lawrence Way
West Vancouver, BC

Submitted to:
Daan Murray
293 Columbia Street
Vancouver BC
V6A 2R5
Email: daan@mcleodbovell.com

Date: September 2, 2021

DIAMOND HEAD
3559 Commercial Street
Vancouver, BC 604.733.4886

SAFE CERTIFIED

Table of Contents

List of Figures

List of Tables

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.

Prepared by:

Michael Harrhy, B.Sc., MSFM
Registered Professional Forester
ISA Certified Arborist (PN-8025A)
ISA Tree Risk Assessment Qualified (TRAQ)
BC Wildlife and Danger Tree Assessor (P2528)
Biologist in Training

Peer review:

Matt Shields, B.A., MSFM
Registered Professional Forester
ISA Certified Arborist (PN-8871A)
ISA Tree Risk Assessment Qualified (TRAQ)
BC Wildlife and Danger Tree Assessor (P2805))

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: mikeharrhy@diamondheadconsulting.com
Website: www.diamondheadconsulting.com

Insurance Information:

WCB: # 657906 AQ (003)
General Liability: Northbridge General Insurance Corporation - Policy #CBC1935506, $10,000,000
Errors and Omissions: Lloyds Underwriters – Policy #1010615D, $1,000,000

1.0 Executive Summary

- The nearest intact forest edge is approximately 10m to the east of the proposed new buildings. This forest was assessed to have a **moderate fire behavior risk** rating applying methods from the Wildfire Threat Assessment Guide and Worksheets (MFLNRO, 2020).
- Future structural hazard of the proposed development using the FireSmart Homeowners Manual (Partners in Protection and Province of BC, 2019) found the **primary dwelling** would likely have a **moderate overall wildfire risk rating** due to the use of (treated, Class B, fire-resistive) wood siding**.** The **secondary dwelling** would likely have a **moderate overall wildfire risk rating** due to the proximity of the surrounding forest. Non-combustible exterior building materials are essential to compensate for design elements and to resist radiant heat and ember transport should there be a wildfire.
- District of West Vancouver Wildfire Development Permit Guidelines require "Fire-resistive cladding material"
    - The Kebony cladding proposed for the primary residence has a Class B fire resistance rating and a flame spread rating of 65, which is does not meet the NFPA 1144 standard for ignition resistance outlined above.
    - It is the builders responsibility to maintain records and proof that the material installed carries this rating.
- Best management practices and guidelines from within this report recommend "Ignition-resistant" and "non-combustible" exterior building materials. These standards are based on the most recent edition of the National Fire Protection Association (NFPA) 1144 standard.
    - This standard is required for the secondary dwelling.
- Pruning and removal of on-site trees is required to create an adequate fuel-free area around the secondary dwelling.
    - Remove undersize (<75cm diameter) coniferous trees within 10m of the secondary building
    - Prune coniferous trees >75cm diameter to create a 10-15m buffer between the limbs and the buildings. The stems of these large trees pose a minor risk and can be retained.
    - Pruning of adjacent off-site trees is also recommended but requires permission from neighboring property owners.
- Cleaning up slash from tree removals, as well as existing accumulations of branches and twigs is required to lower the wildfire threat.

- Offsite coniferous trees within 10m of the primary building are recommended for removal due to conflict with the proposed building envelope, but also should be removed to reduce the wildfire risk – with the neighbours' permission.
- 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.

1.1 Common Deficiencies

There are many requirements specified within this report for this development to comply with the Development Permit Area requirements. The following are deficiencies commonly encountered during post construction inspections.

- No conifers or long grasses should be included in the landscaping within 10m of any buildings. This includes hedges of cedar, cypress or yew species, and grasses such as bamboo.
- Fencing within 10m of any structures must be made of ignition resistant materials.

2.0 Introduction

Diamond Head Consulting Ltd. (DHC) was retained to prepare an assessment of wildfire interface risks and mitigation measures for the following proposed development.

Civic address:	8715 Lawrence Way , District of West Vancouver
Legal Address:	PID (REM 6) 010-822-666
	Lot A Block C
	District Lot 2361, Group 1
	NWD plan EPP107987
Client name:	McLeod Bovell Modern Homes
Date of site visit:	August 13 and 31, 2021

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.

2.1 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:

1. 8715 Lawrence Way – Site Plan – McLeod Bovell. August 31, 2021
2. Topographic Survey of 8715 Lawrence Way – Bennett Land Surveying Ltd. Dec 18, 2020
3. Arborist Report – Diamond Head Consulting – September 2, 2021

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

2.2 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. In some cases, these guidelines can be difficult to achieve for developments, and can result in more stringent restrictions than intended.

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. These standards will achieve the wildfire DPA guidelines described in schedule ii of the Official Community Plan.

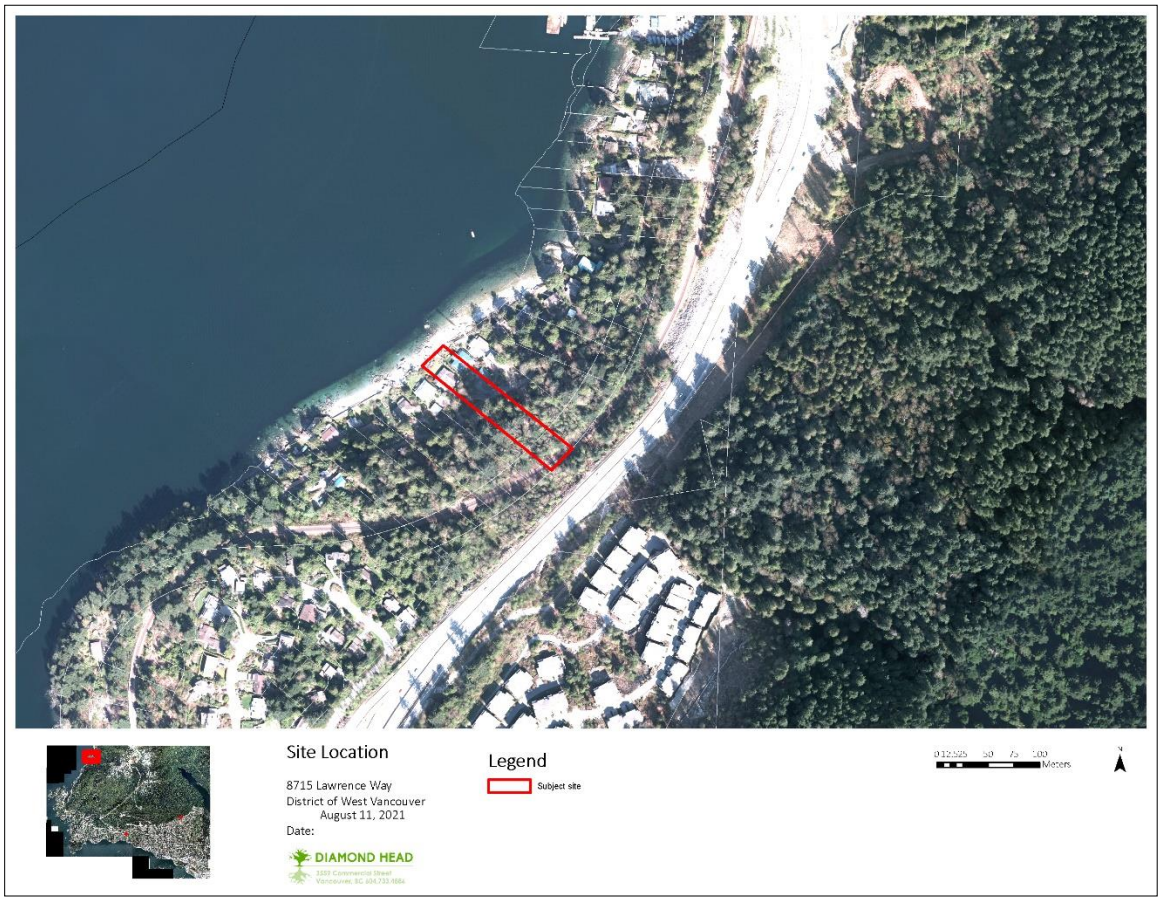


Figure 1. Location of the subject site – 8715 Lawrence Way

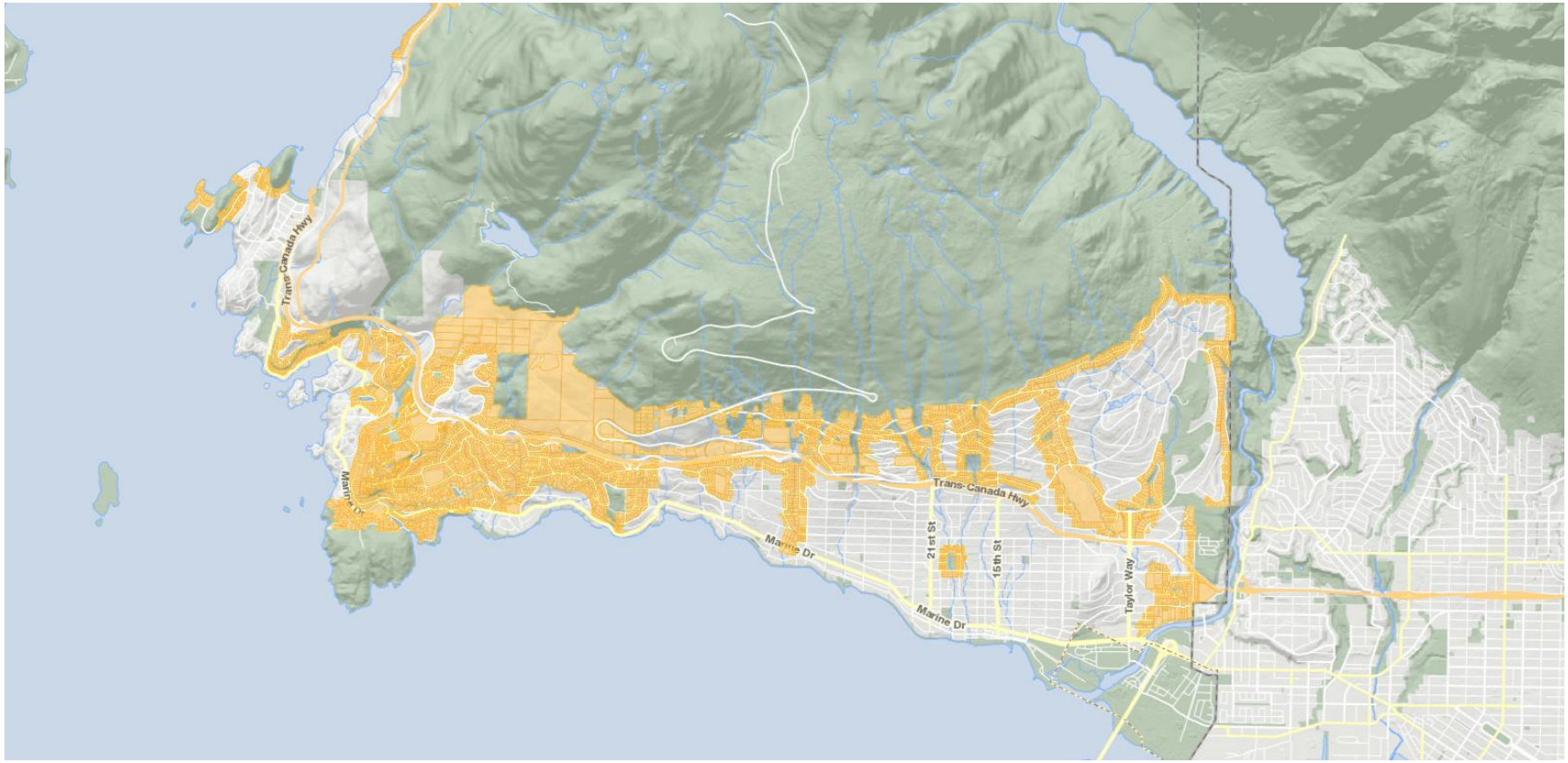


Figure 2. Development Permit Areas (Wildfire) as defined by the District of West Vancouver.

3.0 Methodology

This project falls within the DWV Wildfire Hazard Development Permit Wildfire Interface Area. There are native forests within 100m of the site. These natural forest areas have been assessed for wildfire threat and the forest fuels have been classified. There are no fuel classifications specific to the coastal region in the Canadian Fire Behaviour Prediction System. Instead, the site has been classified as the fuel type that best represents the fire behavior potential of the forest types most accurately. Fuel type interpretations can be reviewed in Appendix 2.

Detailed fuel hazard assessments were completed within 300m of the lot using the provincial assessment system, 2020 Wildfire Threat Assessment Guide and Worksheets (MFLNRORD, 2019). The location of plots is shown in Figure 4. 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 (MFLNRORD, 2020)
2. Future structural hazard of the proposed development using the FireSmart Homeowners Manual (Partners in Protection and Province of BC, 2019)

4.0 Project Overview

The property is a single residential lot located at 8715 Lawrence Way, in the Sunset Beach neighborhood of West Vancouver. Lawrence Way bisects the waterfront property. The portion of the lot downslope of Lawrence Way has a single residence and a typical mature landscape dominated by ornamental trees and shrubs. Upslope of Lawrence Way, the property is forested with second growth forest, including some very large Douglas-fir and western redcedar trees.

The proposed development includes demolishing the existing house and installing a new single-family home and landscaping. A secondary dwelling is proposed above Lawrence Way. Detailed recommendations for tree management are detailed in the concurrent Arborist Report. Wildfire specific recommendations for tree management are included in section 5.3. Note that recommendations in the arborist report are consistent with the recommendations of this report.

Separate wildfire hazard assessments have been prepared for the primary and secondary dwellings. The vegetation above and below Lawrence Way is significantly different and warrants different risk analysis and management approaches.

Photo 1: Overhead view of lower portion of lot, showing existing home (grey roof) and landscape.

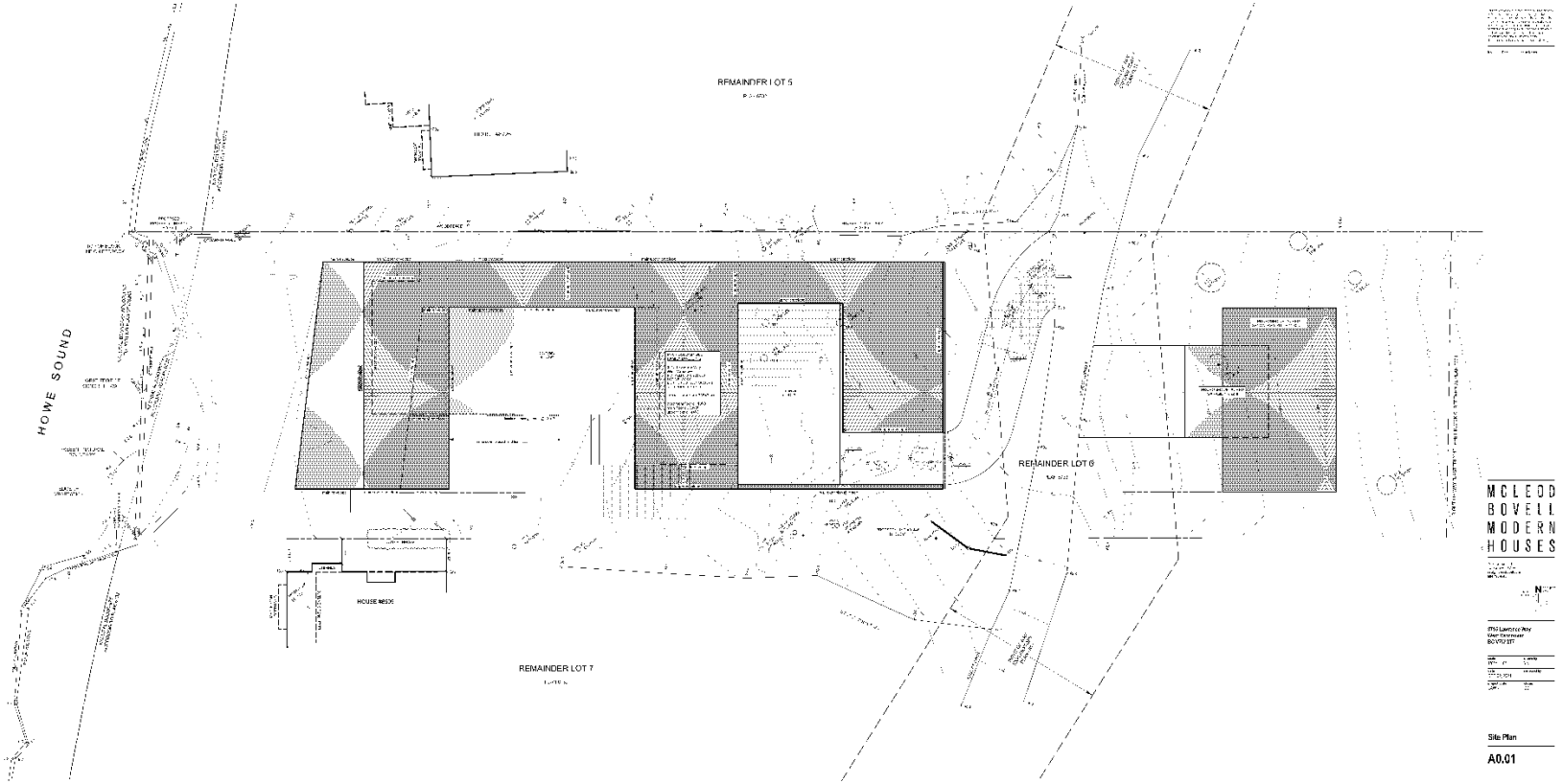


Figure 3. Site Plan for the proposed development

5.0 Fuel Descriptions and Wildfire Threat Assessment

5.1 Summary of Fuel Types

Forested areas nearby 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 (Appendix 3). Forest areas within 200 metres of the project site include mature coastal forests composed of the coniferous species western hemlock, western redcedar, and Douglas-fir and the deciduous species bigleaf maple, red alder, and cottonwood. They are classified as M2 and C5 fuel types.

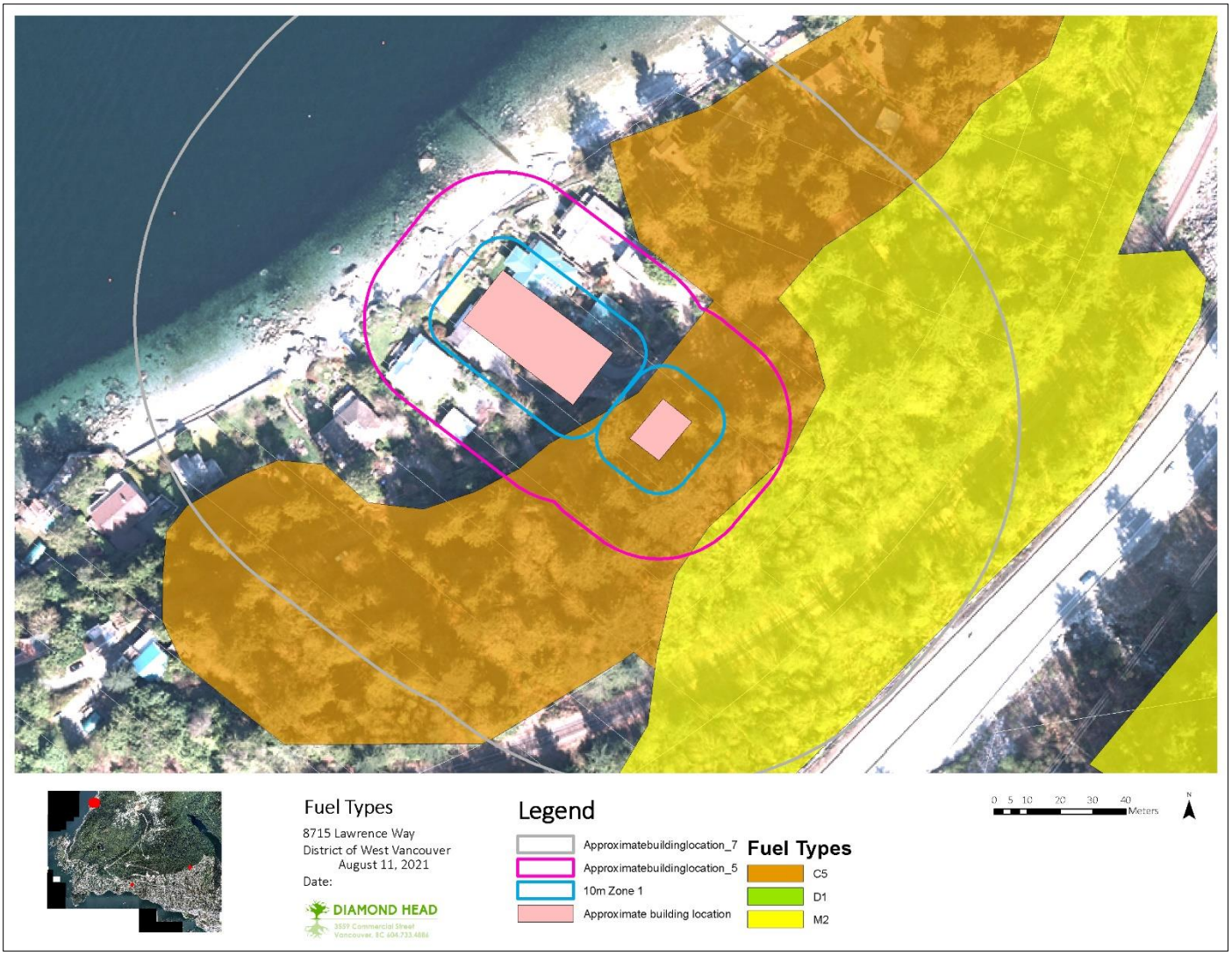


Figure 4. Location of the fuel types relative to project site and Firesmart buffers

5.2 Summary of Wildfire Threat from surrounding forest

Each fuel type and distinct stand was assessed for wildfire threat using the Wildfire Urban Interface worksheet. The subject site was assessed to have an overall ***moderate*** risk from wildfire, associated with the coniferous stands directly above the building site. The site is at the interface with contiguous forest. The forest has a notable accumulation of fine twigs and debris with ladder fuels that could allow a ground fire to 'ladder' into the taller trees in extreme conditions. Buildings could be ignited from radiant heat from fires in adjacent forest, as well as from falling embers. Creating a FireSmart landscape and building is the best defense against the wildfire risk to this property.

As access to the property is limited by a narrow road with forest on both sides, egress and evacuation could be constrained the event of a wildfire. Evacuation is not part of the wildfire development permit requirements, but we suggest that the strata consider vegetation management on Lawrence Way to create a safe evacuation route.

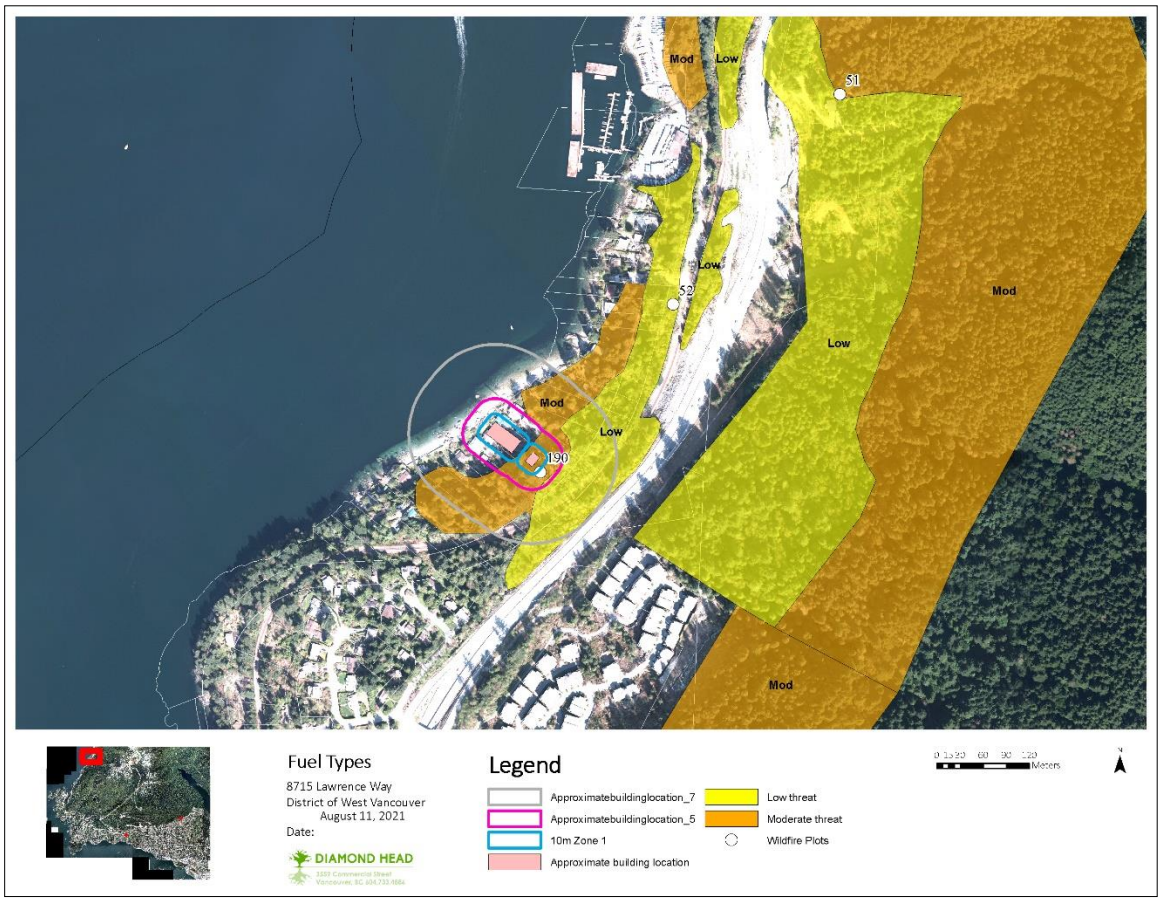


Figure 5. Wildfire threat mapping and plot locations.

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 of these stands but does not consider the future structure at risk**.**

The subject site was assessed to have an overall ***moderate*** risk from wildfire, associated with the coniferous stands directly above the building site. The site is at the interface with contiguous forest. The forest has a notable accumulation of fine twigs and debris with ladder fuels that could allow a ground fire to 'ladder' into the taller trees in extreme conditions. Buildings could be ignited from radiant heat from fires in adjacent forest, as well as from falling embers. Creating a FireSmart landscape and building is the best defense against the wildfire risk to this property.

As access to the property is limited by a narrow road with forest on both sides, egress and evacuation could be constrained the event of a wildfire. Evacuation is not part of the wildfire development permit requirements, but we suggest that the strata consider vegetation management on Lawrence Way to create a safe evacuation route.

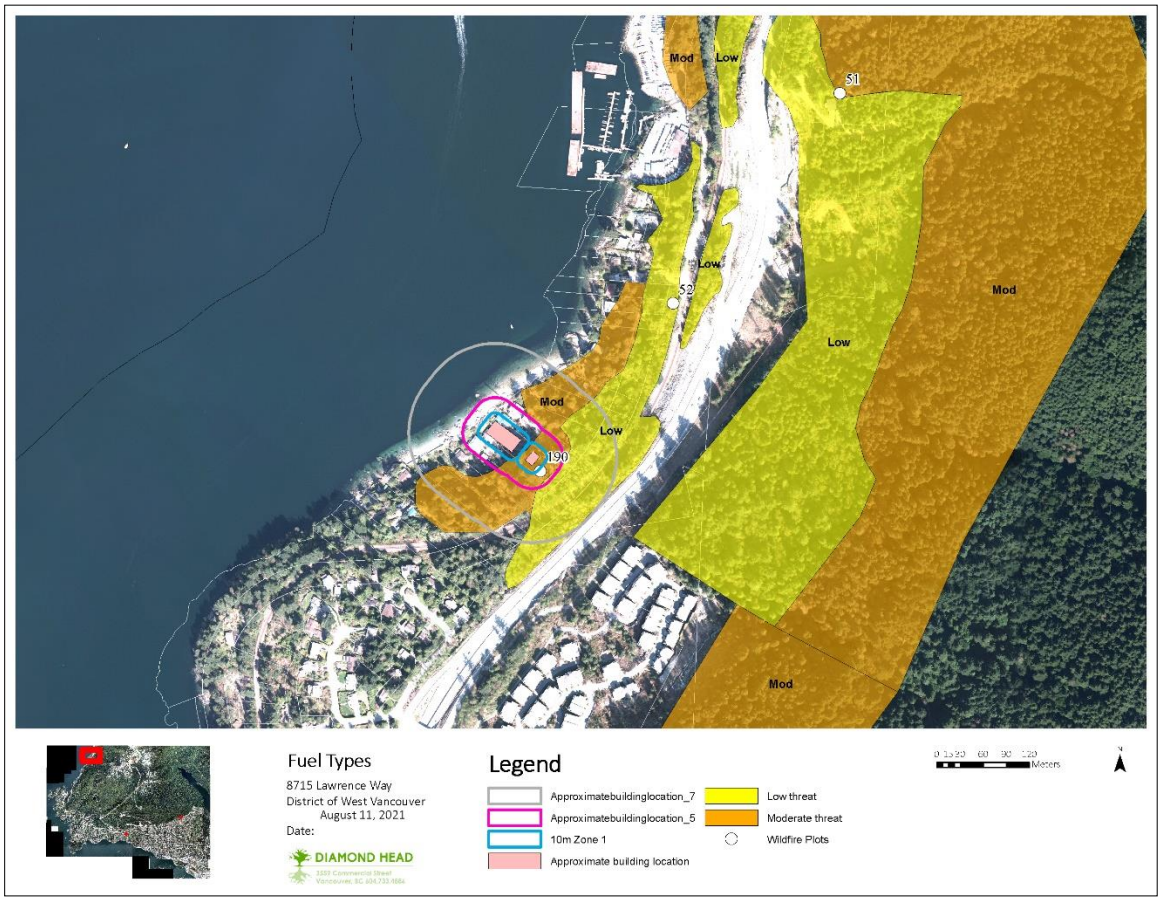


Figure 5. Wildfire threat mapping and plot locations.

5.3 On-site vegetation

On-site landscaping consists of lawns, deciduous and coniferous trees and shrubs. This landscaping is described in more detail in the arborist report, which has recommended the removal of all trees located on the subject site, and several offsite trees. Removal requirements are based primarily on tree condition and root zone conflicts with the proposed development. However, several of the coniferous trees on site would be recommended for removal to reduce wildfire risk, provided there was no direct conflict with the proposed building.

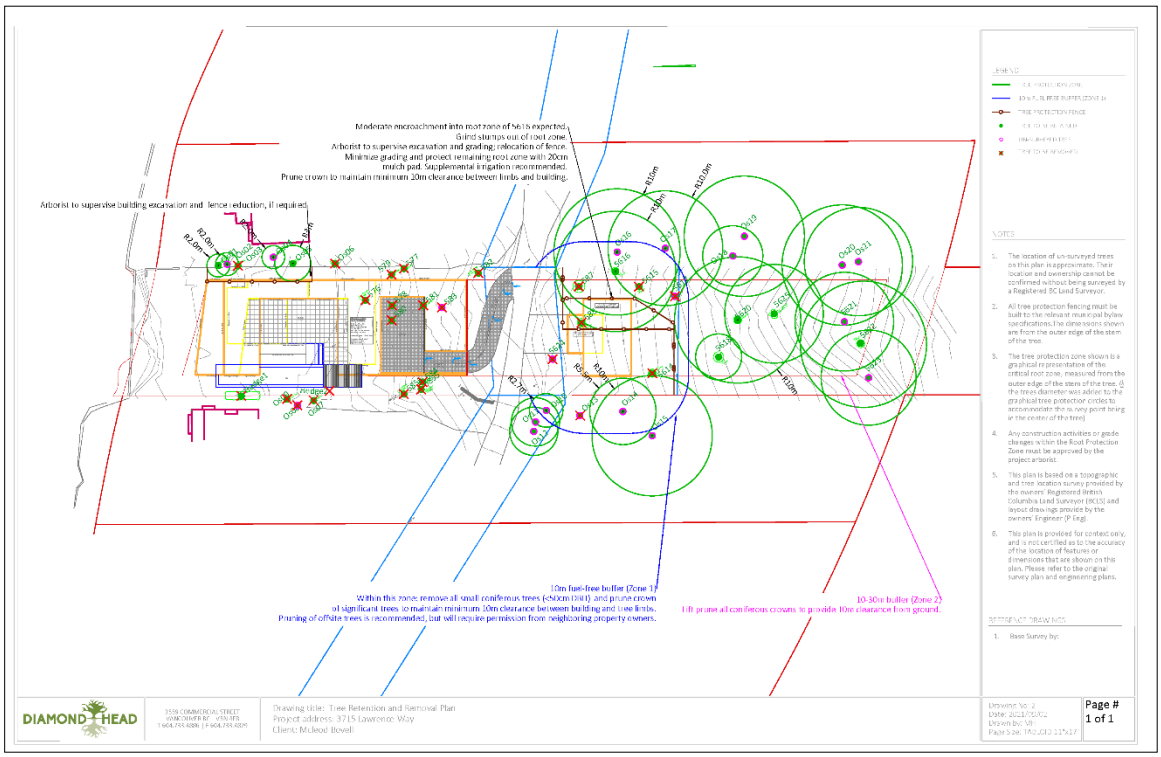


Figure 6. Tree Management Plan – See appendix for full-size.

6.0 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.

Wildfire 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 realative proximity between the wildfire and the structure. The risk of ignition by radiant heat is greatest within 10 metres of the building but can occur within 30 metres of flame. 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 7. Radiant heat threatens structureswithin 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.

Zone 1 is the area directly surround a structure out to 10m. In this area people and structures are at risk from radiant heat associated with a wildfire. It has been shown through analysis of recent large scale wildfire events such as the 2017 Fort McMurray fire that the most important factors in protecting structures is the exterior construction materials and immediate landscaping next to homes. The structure itself is sometimes considered on its own as the Home Ignition Zone (1A).

Zone 2 includes the area from 10 m to 30 m from a structure. In this area there is still a risk from radiant heat but also even earlier on from ember transport associated with a wildfire. Fuels are generally treated aggressively in this area to prevent a crown fire from establishing. Treatments include removal of ground fuel, thinning of trees and lift pruning of those retained.

Zone 3 includes the area from 30m out to around 100m. People and structures are at risk from ember transport associated with a wildfire in this area. Treatment of fuels in this area generally includes stand thinning and aims to prevent a crown fire but is generally not as aggressive as treatments in zone 2.

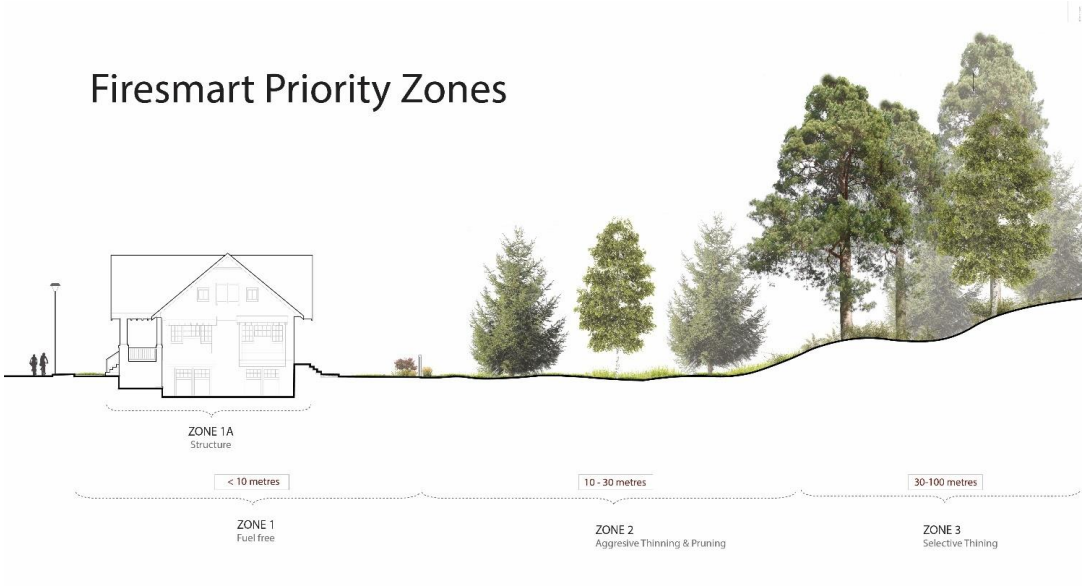


Figure 8 – FireSmart Management Zones

6.1 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. Off-site trees Os06, Os07, Os08, and Os09 are moderate coniferous trees that should be removed because they are within the 10m fuel free zone.

Additionally, their root zone's will be compromised by the proposed excavation. However, removal is ultimately at the discretion of the owners of these trees.

The proposed primary residence will be approximately 12 metres from the nearest intact forest edge (across Lawrence Way).The secondary dwelling will be much closer to the forest, with the canopies of large conifers overhanging into the 10m fuel-free zone. The large conifers have diameters >100cm and their stems pose a low ignition risk; they can be retained where there building does not conflict with their structural root zones. Any on site retained conifer trees further than 10m from the proposed home should be pruned to maintain at least 10 metres of separation between their foliage and any buildings or accessory structures. We recommend that the developer seek permission from their neighbors to prune the canopies of adjacent offsite trees to maintain adequate clearance between their crowns and the secondary building. Additionally, we recommend that that all undersized conifers (<75 diameter) be removed from the 10m fuel free zone. Conifers in the 10-30m buffer zone should be pruned to increase the clearance between their crowns and the ground, to a minimum of 5m. Pruning should be done by an ISA Certified Arborist and may require the permission of neighbouring property owners and/or a tree permit. Cleaning up slash from tree removals, as well as accumulations of branches and twigs is required.

Table 1 outlines tree attributes and recommendations for individual trees to reduce the risk from wildfire. This recommendations within this table should be coordinated with the Arborist Report.

Table 1. On site and neighboring trees relevant to wildfire hazard.

Tag #	Common Name	DBH (cm)	Ht (m)	Overall Condition	Comments	Retain/ Remove	Tree Retention Comments
Os06	Western White Pine	25	11	Good	Within 10m of proposed building.	Remove	Arborist report recommends removal. Removal recommended for fire risk reduction additionally. Permission from neighbor required for removal.
Os07	Sawara Cypress	35	10	Good	Within 10m of proposed building.	Remove	Arborist report recommends removal. Removal recommended for fire risk reduction additionally. Permission from neighbor required for removal.

Tag #	Common Name	DBH (cm)	Ht (m)	Overall Condition	Comments	Retain/ Remove	Tree Retention Comments
Os08	Sawara Cypress	35	10	Good	Within 10m of proposed building.	Remove	Arborist report recommends removal. Removal recommended for fire risk reduction additionally. Permission from neighbour required for removal.
Os09	Sawara Cypress	35	10	Good	Within 10m of proposed building.	Remove	Arborist report recommends removal. Removal recommended for fire risk reduction additionally. Permission from neighbour required for removal.
584	Western Red Cedar	52	16	Moderate	Within 10m of proposed building	Remove	Arborist report recommends removal. Removal recommended for fire risk reduction additionally.
577	Western Red Cedar	42	16	Moderate	Within 10m of proposed building.	Remove	Arborist report recommends removal. Removal recommended for fire risk reduction additionally.
5616	Western red cedar	128	35	Good	Within 10m of proposed building.	Prune	Lift prune crown to create 10m buffer from building and 5m from ground
5621	Western red cedar	81	30	Good	Within 30m of building	Prune	Lift prune to 10m
5623	Western red cedar	79	30	Good	Within 30m of building	Prune	Lift prune to 10m
Os10, 11, 12	Western red cedar	~40	30	Moderate	Within 10m of proposed building.	Prune	Lift prune crown to create 10m buffer from building and 5m from ground, with neighbor's permission.
Os16	Western red cedar	128	35	Good	Within 10m of proposed building.	Prune	Lift prune crown to create 10m buffer from building and 5m from ground, with neighbor's permission.
Os17	Western red cedar	110	35	Good	Within 10m of proposed building.	Prune	Lift prune crown to create 10m buffer from building and 5m from ground, with neighbor's permission.

Tag #	Common Name	DBH (cm)	Ht (m)	Overall Condition	Comments	Retain/ Remove	Tree Retention Comments
Os14	Western red cedar	55	25	Good	Within 10m of proposed building.	Prune	Lift prune crown to create 10m buffer from building and 5m from ground, with neighbor's permission.

6.2 Buildings and Construction

Generally, during a wildfire, homes are ignited as a result of 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 could 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 is accessible on the DWV website(https://westvancouver.ca/government/bylaws-strategies-reports/strategies-plans/official-community-plan). Building standards along with additional recommendations are summarized in Table 2. 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 2. Requirements for community design and construction

Feature	Requirements for building materials
Defensible Space	• All new buildings must be located as far from forest interface as possible with a minimum required distance of 10m, or at least as far as any current permanent structures. Distance is measured from outermost part of building.
Roofing	• Class A 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.
Siding	• Exterior vertical walls should be cladded fire-resistive material per District DP guidelines. Non-combustible materials should be given preference (ie. 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. • Note that Kebony siding is proposed for the primary residence. The architect has provided a data sheet indicating that this material has a Class B fire resistance.
Vents, openings, eaves, attics, overhanging projections, soffits	• 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	• 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. • Exterior doors on radiant faces exposed to the forest edge should be of fire resistant materials.
Decks, porches, balconies	• 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.

Chimneys and Wood burning Appliances	• All chimneys and wood-burning appliances must have spark arrestors.
Exterior sprinklers	• 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. • Irrigation sprinklers should be installed on private property and in landscaped parks to keep plants healthy and fire-resistant. The switch for these should be made accessible to turn on in the case of a wildfire.
Fences	• Where fencing is within 10 m of the building or accessory buildings, use fire-resistant or non-combustible 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.

Feature	Recommendations during construction
Combustible materials	• 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	• Prior to construction of any wood frame buildings, there must be fire hydrants within operating range.
Fire Suppression	• 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 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”. ANSI/UL 790, "Tests for Fire Resistance of Roof Covering Materials," and ASTM E 108, "Standard Test Methods for Fire Tests of Roof Coverings," are the fire-resistance capacity tests 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.

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.

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.

6.3 Firesmart Landscaping and Fuel Mitigation

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. FireSmart BC, *FireSmart Begins at Home* [Homeowner’s Manual]). Planning and maintenance of this area should follow the requirements of priority zone 1 (<10m from structures) outlined in the FireSmart program. All of the lot below Lawrence Way will be within 10m of the home. 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. Within Zone 2 (10-30m from structures), there is a significant amount of coniferous forest and woody debris on the forest floor. Within 30m of the building, we recommend that accumulations of debris, fine fuels (twigs and dead branches), and that the lower limbs of trees be pruned up to 5m be removed.

Recommendations for landscape and maintenance are summarized in Table 3. It is recommended that new coniferous trees and shrubs, including hedging, be excluded from the landscape plan.

Table 3. Requirements for Landscaping

Feature	Recommendations
Planting	• Remove all highly flammable vegetation and other combustibles from around the building. This includes all conifer hedging. • No conifer trees species should be planted within 10m of any buildings. We recommend no coniferous species are planted on-site within the property, given the small size of the lot and proximity to forest fuels. 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 Firesmart Canada website[1]. 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.
Clean-up and fuel reduction	• Clean up accumulations of downed twigs and branches within 30m of the structure • Prune limbs of trees within 30m of structure up to 5m to reduce laddering risk. • Remove all trees <20cm diameter within 30m of the building.
Maintenance	• Annual grasses within 10 meters of buildings should be kept mowed to 10 centimeters or less and watered regularly during the summer months; • Ground litter and downed trees should be removed regularly and prior to the fire season.

6.4 Ongoing Maintenance

To ensure that FireSmart standards are maintained on the property, periodic re-treatment or maintenance is recommended in Table 4.

Table 4. Requirements for ongoing maintenance

Owner	Recommendation
Homeowners responsibility	• Regularly remove debris from roofs, gutters and beneath overhanging projections. • Grass and landscaping should be kept mowed to 10 cm or less and watered regularly during the summer months. • Landscape sprinkler systems should be installed and maintained by the homeowner. • 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 fire smart canada website (*https://www.firesmartcanada.ca/images/uploads/resources/FireSmart-Guide-to-Lanscaping.pdf*).

7.0 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 – Primary residence.

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	
How clean is your roof?	No needles, leaves or other combustible materials	0	**0**
	A scattering of needles and leaves	2	
	Clogged gutters and extensive leaves	3	
What is the exterior of your home built of?	Non-combustible material, stucco, metal siding or brick	0	**6**
	Logs of heavy timbers	1	
	Wood, vinyl siding or wood shakes	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)	2	
	Single-pane glass - large (greater than 1 metre x 1 metre)	4	
Are your eaves closed up and your vents screened?	Closed eaves, vents screened with 3-millimetre wire mesh	0	**0**
	Closed eaves, vents without mesh	1	
	Open eaves, vents not screened	6	
Have you sheathed-in the underside of your balcony, deck, porch or open foundation?	Sheathed with fire-resistant materials	0	**0**
	Sheathed with combustible materials	2	
	Not sheathed	6	
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			**8**

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	**N/A**
	Less than 10 metres from home	6	
Where is your woodpile located?	More than 10 metres from any building	0	**N/A**
	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	**10**
	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	
	Abundant twigs, branches and tree needles on the ground	30	
Are there shrubs and low branches (within 2 metres of the ground) in the surrounding forest?	None within 10-30 metres	0	**5**
	Scattered within 10- 30 metres of buildings	5	
	Abundant within 10-30 metres of buildings	30	
	ZONE 2 YARD SCORE		**15**

TOTAL SCORE		**Rating**
ZONE 1/ Home and Yard	**Home (primary)**	**8**
	10 metres from (primary) home	**0**
ZONE 2 / Yard	**10 – 30 metres from (primary) home**	**15**
	TOTAL	**23 - Moderate**

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 Moderate – the risk level is elevated because of the use of wood siding. The proposed KEBONY siding has a Class B fire resistance rating and is a specialty product that does not categorize well with the FireSmart scoring system.

Table 6. FireSmart Structure and Hazard Assessment – Secondary residence.

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	
How clean is your roof?	No needles, leaves or other combustible materials	0	**0**
	A scattering of needles and leaves	2	
	Clogged gutters and extensive leaves	3	
What is the exterior of your home built of?	Non-combustible material, stucco, metal siding or brick	0	**0/NA***
	Logs of heavy timbers	1	
	Wood, vinyl siding or wood shakes	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)	2	
	Single-pane glass - large (greater than 1 metre x 1 metre)	4	
Are your eaves closed up and your vents screened?	Closed eaves, vents screened with 3-millimetre wire mesh	0	**0**
	Closed eaves, vents without mesh	1	
	Open eaves, vents not screened	6	
Have you sheathed-in the underside of your balcony, deck, porch or open foundation?	Sheathed with fire-resistant materials	0	**6**
	Sheathed with combustible materials	2	
	Not sheathed	6	
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			**8**

*Building materials have not been provided at this time

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	**N/A**
	Less than 10 metres from home	6	
Where is your woodpile located?	More than 10 metres from any building	0	**N/A**
	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	**10**
	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	**5**
	Uncut grass or shrubs	5	
	Scattered twigs, branches and tree needles on the ground	5	
	Abundant twigs, branches and tree needles on the ground	30	
Are there shrubs and low branches (within 2 metres of the ground) in the surrounding forest?	None within 10-30 metres	0	**5**
	Scattered within 10- 30 metres of buildings	5	
	Abundant within 10-30 metres of buildings	30	
	ZONE 2 YARD SCORE		**20**

TOTAL SCORE		Rating
ZONE 1/ Home and Yard	**(secondary) Home**	**8**
	10 metres from (secondary) home	**0**
ZONE 2 / Yard	**10 – 30 metres from (secondary) home**	**20**
	TOTAL	**28 - Moderate**

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 moderate. Much of the forest vegetation within 30m of the secondary dwelling is offsite, where pruning is not practical.

The FireSmart Hazard Assessment Sheet gives both the primary and the secondary dwelling moderate hazard ratings, if recommendations in this report are followed. This rating reflects the building materials and landscaping prescribed by this report.

The architect has stated that the preferred cladding material for the primary residence is KEBONY, a modified wood material with a Class B fire resistance rating. **We recommend that non-combustible material be used for the secondary dwelling. Closer proximity to forest fuels elevates the wildfire risk of the secondary dwelling, and using KEBONY would produce a FireSmart score of high.**

Risk associated with ember transport from forests above Lawrence way can be managed through FireSmart construction and landscape maintenance. Managing the risk of radiant heat and fire spread can be achieved through reducing fuels in the 10-30m zone beyond the building by: pruning of lower limbs up to 5m from the ground, removing small coniferous trees <20cm diameter, and cleaning up downed fine material on from the ground.

8.0 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,

Michael Harrhy, B.Sc., MSFM
Registered Professional Forester
ISA Certified Arborist (PN-8025A)
ISA Tree Risk Assessment Qualified (TRAQ)
BC Wildlife and Danger Tree Assessor (P2528)

Appendix 1 Wildland Urban Interface Plots

Wildfire Threat Assessment Worksheet - Fuel Setting Scoring			
Location	Plot 190	Date	09-Aug
Assessor	MH		
Crown species composition (species %)	Fd35 Cw50 Mb15.		

Component/subcomponent	PULLDOWNS	SCORE
Depth of organic layer	2-<5	3
Surface and ladder fuel (.1-3m in height)		
Surface fuel composition	Dead fines (leaves, needles, fine brances)	8
Dead and down material continuity (<7cm)	26-50% coverage	12
Ladder fuel composition	Other conifer	8
Ladder fuel horizontal continuity	Sparse <10% coverage	2
Stems/ha (understory)	<500	2
Stand structure and compostion (dominant and co-dominant)		
Overstory composition/CBH	Mixwood 75%	3
Crown closure	41-60%	2
Fuel strata gap	3-6	3
Stems/ha (overstory)	401-600	2
Dead and dying (% of dominant and co-dominant stems)	Standing dead/partial down <20%	2
Comments:	TOTAL	**47**
	RATING	**MODERATE**
Very large conifers with scattered mature maples. Some 30cm intermediates in understory.		

Wildfire Threat Assessment Worksheet - Fuel Setting Scoring			
Location	Plot 52	Date	29-Apr
Assessor	MH		
Crown species composition (species %)	Fd20 Cw 20 Hw 10 Mb25 Dr25.		

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	Mixedwood	5
Ladder fuel horizontal continuity	Sparse <10% coverage	2
Stems/ha (understory)	801-1,200	6
Stand structure and compostion (dominant and co-dominant)		
Overstory composition/CBH	Mixwood 50%	2
Crown closure	61-80%	5
Fuel strata gap	<3	5
Stems/ha (overstory)	401-600	2
Dead and dying (% of dominant and co-dominant stems)	Standing dead/partial down <20%	2
Comments:	TOTAL	**40**
	RATING	**LOW**
Mixed wood. Mostly younger pioneer forest around hwy and development. Some pockets of pure confier, including on subject site.		

Wildfire Threat Assessment Worksheet - Fuel Setting Scoring			
Location	Plot 51	Date	22-Feb
Assessor	MH		
Crown species composition (species %)	Fd50 Hw25 Cw 25.		

Component/subcomponent	PULLDOWNS	SCORE
Depth of organic layer	5-<10	5
Surface and ladder fuel (.1-3m in height)		
Surface fuel composition	Moss, herbs and deciduous shrubs	4
Dead and down material continuity (<7cm)	10-25% coverage	8
Ladder fuel composition	Other conifer	8
Ladder fuel horizontal continuity	Scattered 10-39% coverage	8
Stems/ha (understory)	<500	2
Stand structure and compostion (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	**43**
	RATING	**MODERATE**
Steepers slopes. Tall Douglas fir dominated with suppressed cedar understory below. Limited visual assessment.		

	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 30 metres of the project site. One plot was sampled in the area. Observations within this stand type were limited by access; most of the adjacent forest of this type is located on private parcels. In the C5 stand closest to the property, the forest is dominated by very large (100cm+) Douglas-fir and western redcedar, with occasional bigleaf maple. The abundance of bigleaf ample varies across the stand, giving some portions the characteristics of a mixed or 'M2' stand. An understory of younger western redcedar at low density is the primary ladder fuel. In general, a crown fire could spread in this fuel type, but would require extreme drought and wind conditions. Fine fuels on the forest floor pose the greatest ignition risk the observed forest area.

Table 7. Stand characteristics for fuel type C5

Characteristic	Risk Level	Description
Surface fuel continuity (% cover)	Med	20-40 % cover
Vegetation fuel composition	Med	Dead fines (leaves, needles, fine branches)
Fine woody debris continuity (<=7cm) (% cover)	Med-High	26-50% 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 2:C5 stand closest to site.

Photo 3: Accumulations of dead fine material within 30m of the structure poses a moderate-high risk to the site.

Fuel Type M2 – Mixed conifer and deciduous stand

In general, the forest cover in the vicinity of the project site matches this fuel type description. The forests in the area consist of approximately 50% native conifers with groups or patches of deciduous trees, including bigleaf maple and red alder, accounting for 50% of the canopy cover.

The fire behavior potential in these stands varies depending on the percentage content of coniferous species. The concentration of conifers versus decisuous trees vaiers considerably across the assessed polygons, but the aggregate composition is mixed. The M2 stands are considerably younger than the C5 stand the crown base height is lower. They are mostly found along the rail lines and roadsides.

Table 8. 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 conifer crown height (m)	Med	2-<3 m
Live and dead suppressed and understory conifer (stems/ha)	Very Low	0-500 stems/ha

Photo 4: Mixed conifers and deciduous trees along the rail line

Photo 5: Mature M2 stand above the assessment site.

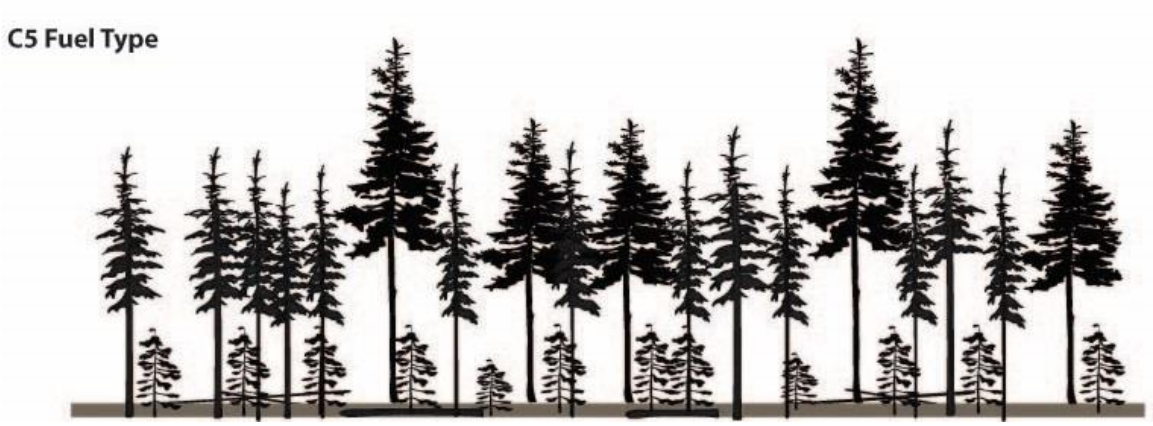
.

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

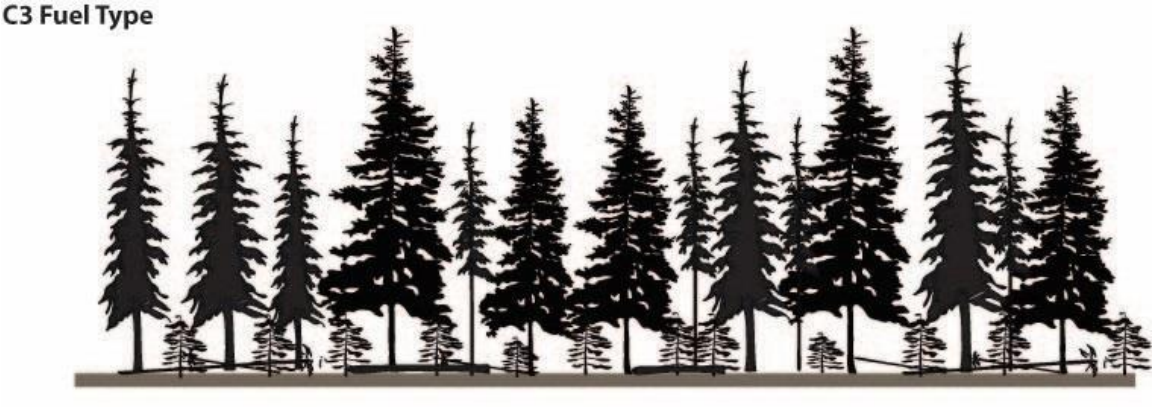
This fuel type is characterized by mature second growth stands dominated by Western Red Cedar (Thuja plicata) and Western Hemlock (Tsuga heterophylla). There can be small component of dominant Douglas-fir (Pseudotsuga menziesii) in the overstory. This fuel type is moderately dense (500-1000 stems per 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.



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.

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

Agee, James K. 1993. Fire Ecology of the Pacific Northwest. Island Press. Covelo, California.

Agee, J.K. 1996. The influence of forest structure on fire behavior. Presented at the 17th Annual Forest Vegetation Management Conference, Redding CA, January 16-18, 1996.

Agee, J.K., G. Bahro, M.A Finney, P.N. Omin, D.B. Sapsis, C.N. Skinner, J.W. van Wagtendonk, and C.P. Weatherspoon. 2000. The use of shaded fuelbreaks in landscape fire management. Forest Ecology and Management 127 (2000):55-66

Agee, J.K. and M.H. Huff. 1986. Structure and process goals for vegetation in wilderness areas. Pages 17-25 in Lucas, R.C. compiler. Proceedings-National wilderness research conference: current research, 23-26 July 1985, Fort Collins, Colorado, USA. USDA Forest Service General Technical Report INT-212.

Arno, S.F., 1980. Forest fire history in the northern Rockies. Journal of Forestry. 78: 460-465.

Brown, R. 2000. Thinning, Fire and Forest Restoration: A science-based approach for national forests in the interior northwest. for Defenders of Wildlife. West Linn, Oregon.

Graham, Russel T., Dr. Sarah McCaffrey, and Dr. Theresa B. Jain. 2004. Science Basis for Changing Forest Structure to Modify Wildfire Behavior and Severity. U.S. Department of Agriculture Forest Service. RMRS-GTR-120.

Graham, Russel T., A. Harvey, T.B. Jain and J.R. Tonn. 1999. The Effects of Thinning and Similar Stand Treatments on Fire Behavior in Western Forests. USDA Forest Service General Technical Report PNW-GTR-463.

Ingalsbee, Timothy. 2004. American Lands proposal for fuels reduction and restoration. URL: http://www.kettlerange.org/salvagelogging/Ingalsbee-restoration.html.

Meidinger, D. Pojar, J.1991. Ecosystems of British Columbia. BC Ministry of Forests, Research Branch. Victoria, BC. URL: http://www.for.gov.bc.ca/hfd/pubs/Docs/Srs/SRseries.htm

BC Wildfire Service, 2020. 2020 Wildfire Threat Assessment Guide and Worksheets. Online 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

National Fire Protection Association. 2013. NFPA 1141. Standard for Fire Protection Infrastructure for Land Developments in Suburban and Rural Areas.

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.

Pacific Northwest Research Station. Science Update. Issue 7. June 2004. Retrieved Nov. 2004. URL: http://www.fs.fed.us/pnw/pubs/science-update-7.pdf

Partners in Protection and Province of British Columbia. 2018. FireSmart Homeowner's Manual: FireSmart Begins at Home. Online https://www2.gov.bc.ca/assets/gov/public-safety-and-emergency-services/wildfire-status/prevention/prevention-home-community/bcws_homeowner_firesmart_manual.pdf

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-dominants. These receive little direct light from above and none from the sides, and usually have small crowns that are crowded on the sides.

Term	Definition
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
• Achillea species (when mowed, turf alternative) • Ajuga reptans • Arctostaphaylos uva-ursi • Autennaria rosea • Aubrieta detoidea • Ceanothus prostatus • Cerastium tomentosum • Dianthus species • Delosperma nubigenum and the less cold hardy cooperi • Fragaria species (turf alternative) • Phlox subulata • Sedums • Semperviums • Thymus praecox turf alternative) • Veronica species	• 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:**
• 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, spidouglasii • Yucca species	• 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, palustria, garryana • Robinia pseudoacacia • Salix species • Sorbus aucuparia

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

Limitations

1. Except as expressly set out in this report and in these Assumptions and Limiting Conditions, Diamond Head Consulting Ltd. ("Diamond Head") makes no guarantee, representation or warranty (express or implied) with regard to: this report; the findings, conclusions and recommendations contained herein; or the work referred to herein.

2. This report has been prepared, and the work undertaken in connection herewith has been conducted, by Diamond Head for the "Client" as stated in the report above. It is intended for the sole and exclusive use by the Client for the purpose(s) set out in this report. Any use of, reliance on or decisions made based on this report by any person other than the Client, or by the Client for any purpose other than the purpose(s) set out in this report, is the sole responsibility of, and at the sole risk of, such other person or the Client, as the case may be. Diamond Head accepts no liability or responsibility whatsoever for any losses, expenses, damages, fines, penalties or other harm (including without limitation financial or consequential effects on transactions or property values, and economic loss) that may be suffered or incurred by any person as a result of the use of or reliance on this report or the work referred to herein. The copying, distribution or publication of this report (except for the internal use of the Client) without the express written permission of Diamond Head (which consent may be withheld in Diamond Head's sole discretion) is prohibited. Diamond Head retains ownership of this report and all documents related thereto both generally and as instruments of professional service.

3. The findings, conclusions and recommendations made in this report reflect Diamond Head's best professional judgment in light of the information available at the time of preparation. This report has been prepared in a manner consistent with the level of care and skill normally exercised by arborists and foresters currently practicing under similar conditions in a similar geographic area and for specific application to the trees subject to this report as at the date of this report. Except as expressly stated in this report, the findings, conclusions and recommendations set out in this report are valid for the day on which the assessment leading to such findings, conclusions and recommendations was conducted. If generally accepted assessment techniques or prevailing professional standards and best practices change at a future date, modifications to the findings, conclusions, and recommendations in this report may be necessary. Diamond Head expressly excludes any duty to provide any such modification if generally accepted assessment techniques and prevailing professional standards and best practices change.

4. Conditions affecting the trees subject to this report (the "Conditions", including without limitation structural defects, scars, decay, fungal fruiting bodies, evidence of insect attack, discoloured foliage, condition of root structures, the degree and direction

of lean, the general condition of the tree(s) and the surrounding site, and the proximity of property and people) other than those expressly addressed in this report may exist. Unless otherwise stated: information contained in this report covers only those Conditions and trees at the time of inspection; and the inspection is limited to visual examination of such Conditions and trees without dissection, excavation, probing or coring. While every effort has been made to ensure that the trees recommended for retention are both healthy and safe, no guarantees, representations or warranties are made (express or implied) that those trees will remain standing or will not fail. The Client acknowledges that it is both professionally and practically impossible to predict with absolute certainty the behaviour of any single tree, or groups of trees, in all given circumstances. Inevitably, a standing tree will always pose some risk. Most trees have the potential for failure and this risk can only be eliminated if the risk is removed. If Conditions change or if additional information becomes available at a future date, modifications to the findings, conclusions, and recommendations in this report may be necessary. Diamond Head expressly excludes any duty to provide any such modification of Conditions change or additional information becomes available.

5. Nothing in this report is intended to constitute or provide a legal opinion, and Diamond Head expressly disclaims any responsibility for matters legal in nature (including, without limitation, matters relating to title and ownership of real or personal property and matters relating to cultural and heritage values). Diamond Head makes no guarantee, representation or warranty (express or implied) as to the requirements of or compliance with applicable laws, rules, regulations, or policies established by federal, provincial, local government or First Nations bodies (collectively, “Government Bodies”) or as to the availability of licenses, permits or authorizations of any Government Body. Revisions to any regulatory standards (including bylaws, policies, guidelines an any similar directions of a Government Bodies in effect from time to time) referred to in this report may be expected over time. As a result, modifications to the findings, conclusions and recommendations in this report may be necessary. Diamond Head expressly excludes any duty to provide any such modification if any such regulatory standard is revised.

6. Diamond Head shall not be required to give testimony or to attend court by reason of this report unless subsequent contractual arrangements are made, including payment of an additional fee for such services as described in the fee schedule and contract of engagement.

7. In preparing this report, Diamond Head has relied in good faith on information provided by certain persons, Government Bodies, government registries and agents and representatives of each of the foregoing, and Diamond Head assumes that such information is true, correct and accurate in all material respects. Diamond Head accepts no responsibility for any deficiency, misinterpretations or fraudulent acts of or information provided by such persons, bodies, registries, agents and representatives.

8. Sketches, diagrams, graphs, and photographs in this report, being intended as visual aids, are not necessarily to scale and should not be construed as engineering or architectural reports or surveys.

9. Loss or alteration of any part of this report invalidates the entire report.

Moderate encroachment into root zone of 5616 expected.
Grind stumps out of root zone.
Arborist to supervise excavation and grading; relocation of fence.
Minimize grading and protect remaining root zone with 20cm mulch pad. Supplemental irrigation recommended.
Prune crown to maintain minimum 10m clearance between limbs and building.

Arborist to supervise building excavation and fence reduction, if required

10m fuel-free buffer (Zone 1)
Within this zone: remove all small coniferous trees (<50cm DBH) and prune crown of significant trees to maintain minimum 10m clearance between building and tree limbs.
Pruning of offsite trees is recommended, but will require permission from neighboring property owners.

10-30m buffer (Zone 2)
Lift prune all coniferous crowns to provide 10m clearance from ground.

LEGEND

- TREE PROTECTION ZONE
- 10m FUEL FREE BUFFER (ZONE 1)
- TREE PROTECTION FENCE
- TREE TO BE RETAINED
- UN-SURVEYED TREE
- TREE TO BE REMOVED

NOTES

1. 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.
2. 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.
3. 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. (½ the trees diameter was added to the graphical tree protection circles to accommodate the survey point being in the center of the tree)
4. Any construction activities or grade changes within the Root Protection Zone must be approved by the project arborist.
5. 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).
6. 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.

REFERENCE DRAWINGS

1. Base Survey by:

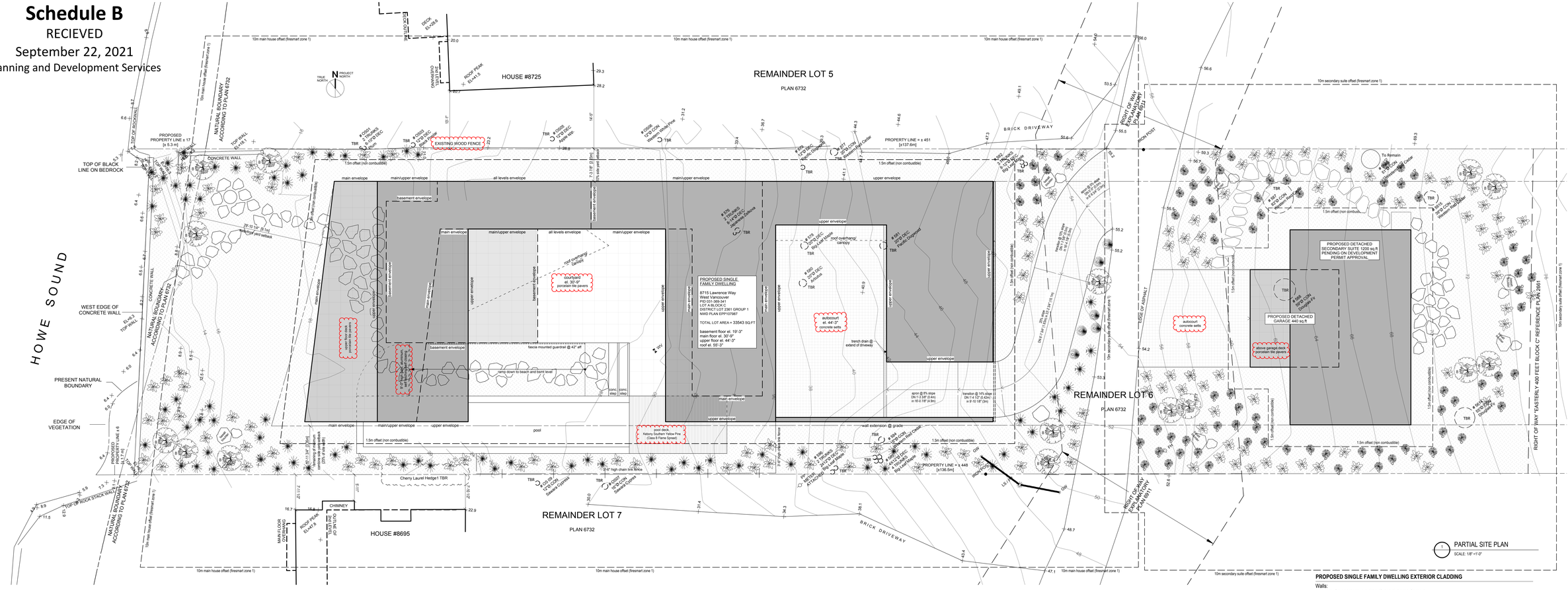
DIAMOND HEAD
3559 COMMERCIAL STREET
VANCOUVER BC | V5N 4E8
T 604.733.4886 | F 604.733.4879

Drawing title: Tree Retention and Removal Plan
Project address: 3715 Lawrence Way
Client: Mcleod Bovell

Drawing No: 2
Date: 2021/09/02
Drawn by: MH
Page Size: TABLOID 11"x17"

Schedule B

RECIEVED
September 22, 2021
Planning and Development Services

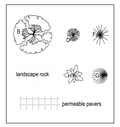


PARTIAL SITE PLAN
SCALE: 1/8" =1'-0"

PLANTING

PLANT ID	LATIN NAME	COMMON NAME	SIZE
B	Acer circinatum	Vine Maple	5cm caliper specimen
D	Aster divaricatus	Whitewood Aster	#1 pot
F	Polystichum munitum	Sword Fern	#1 pot
G	Gaultheria Shallon	Salal	#3 pot
H	Rhododendron macrophyllum	Pacific rhododendron	#3 pot

SYMBOLS

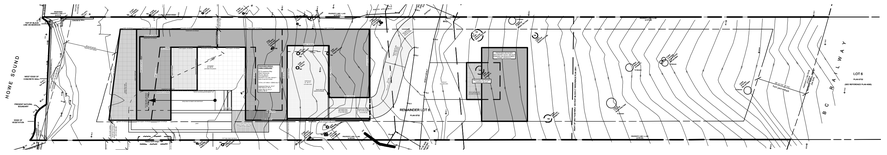


FIRESMART LANDSCAPE GUIDELINES

Non-Combustible Zone (0.0m to 1.5m Offset from Dwelling)
- crushed basalt aggregate ground cover (2" to 6")
- no new or retained planting

Zone 1 (1.5m to 10.0m Offset from Dwelling)
- crushed basalt aggregate ground cover (2" to 6")
- no new or retained conifer shrubs or trees

Zone 2 (10.0m to 30.0m Offset from Dwelling)
- no new conifer shrubs or trees
- remove existing combustible material from forested areas
- prune existing tree branches min 2m above finished grade



SITE KEY PLAN
SCALE: 1/32" =1'-0"

PROPOSED SINGLE FAMILY DWELLING EXTERIOR CLADDING

Walls:
- Kebony Southern Yellow Pine (Class B Flame Spread)
- Painted Aluminum 1/4" thick
- Glazing with anodized aluminum frame
- Concrete, architectural finish

Roof:
- 3" of 1" angular ballast over 2-ply torched on membrane
- Concrete pavers over adjustable pedestals over 2-ply torched on membrane

Windows and Doors:
-Aluminum frame

All eaves, attics, roof vents, and openings under floors will be screened to prevent the accumulation of combustible material, using 3- mm, non-combustible wire mesh, and vent assemblies will use fire shutters or baffles.

Decks, porches, balconies, and patios will use fire resistive decking materials and will conform to all recommendations in the project's Wildfire Hazard Report

PROPOSED DETACHED SECONDARY SUITE EXTERIOR CLADDING

Walls:
- Stucco with K-lath
- Painted Aluminum 1/4" thick
- Glazing with anodized aluminum frame
- Concrete, architectural finish

Roof:
- 3" of 1" angular ballast over 2-ply torched on membrane
- Concrete pavers over adjustable pedestals over 2-ply torched on membrane

Windows and Doors:
-Aluminum frame

All eaves, attics, roof vents, and openings under floors will be screened to prevent the accumulation of combustible material, using 3- mm, non-combustible wire mesh, and vent assemblies will use fire shutters or baffles.

Decks, porches, balconies, and patios will use fire resistive decking materials and will conform to all recommendations in the project's Wildfire Hazard Report

No.	Date	Issue Notes
1	9/9/21	Wildfire Development
2	9/22/21	Wildfire Development Permit revision

MCLEOD BOVELL MODERN HOUSES

293 Columbia Street
Vancouver BC V6A 2R5
info@mcleodbovell.com
604 723 4645

TRUE NORTH
PROJECT NORTH

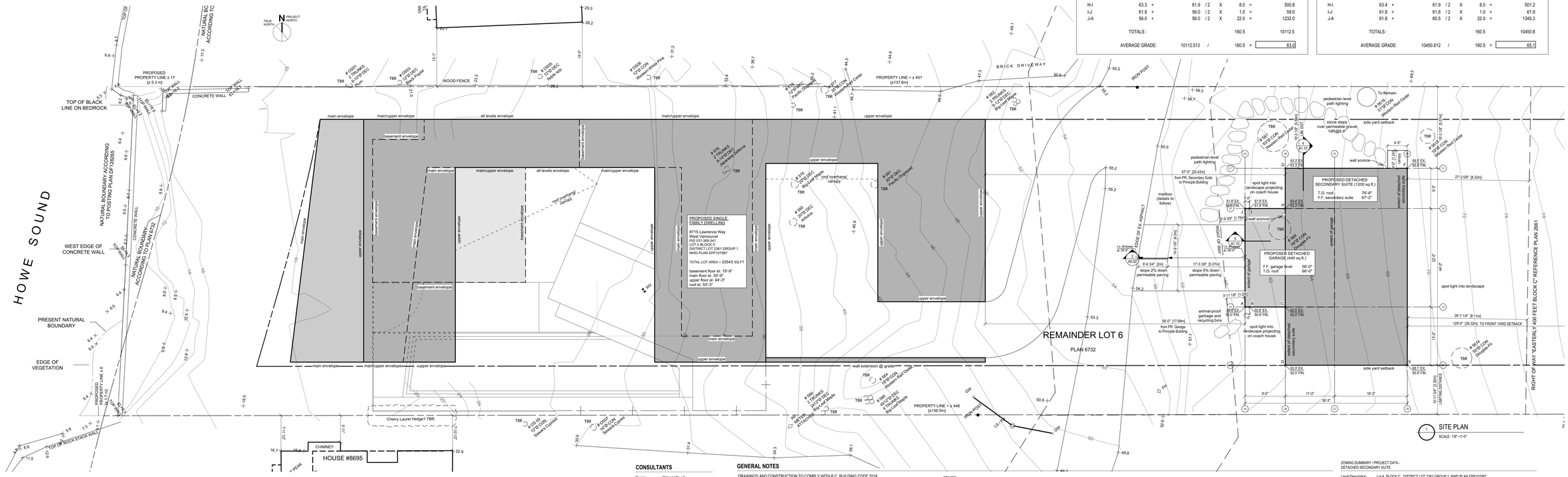
8715 Lawrence Way
West Vancouver
BC V7W 2T7

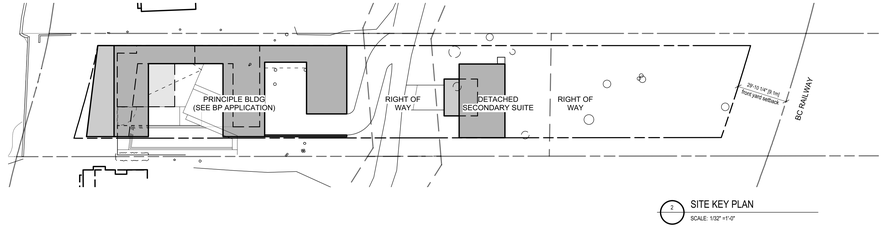
scale	drawn by
1/8" = 1'-0"	YN
date	reviewed by
SEP 22, 2021	DM
project code	status
LAWR	DD

Widlfire Hazard Site Plan / Landscape Plan

A0.00

Schedule C -
DP 21-129





DETACHED SECONDARY SUITE
AVERAGE FINISH GRADES CALCULATIONS

					LENGTH		AVERAGE ELEV.
A-B	56.0	+	60.8	/2 X	1.0	=	58.4
B-C	60.8	+	62.0	/2 X	8.0	=	491.2
C-D	62.0	+	62.0	/2 X	13.0	=	806.0
D-E	62.0	+	65.8	/2 X	27.3	=	1741.3
E-F	65.8	+	65.8	/2 X	44.0	=	2895.2
F-G	65.8	+	63.3	/2 X	27.3	=	1759.0
G-H	63.3	+	63.3	/2 X	9.0	=	569.7
H-I	63.3	+	61.9	/2 X	8.0	=	500.8
I-J	61.9	+	56.0	/2 X	1.0	=	59.0
J-A	56.0	+	56.0	/2 X	22.0	=	1232.0
	TOTALS :				160.5		10112.5
	AVERAGE GRADE:		10112.513	/	160.5	=	63.0

DETACHED SECONDARY SUITE
AVERAGE NATURAL GRADES CALCULATIONS

					LENGTH		AVERAGE ELEV.
A-B	60.5	+	60.8	/2 X	1.0	=	60.7
B-C	60.8	+	62.5	/2 X	8.0	=	493.2
C-D	62.5	+	62.0	/2 X	13.0	=	809.3
D-E	62.0	+	68.1	/2 X	27.3	=	1772.6
E-F	68.1	+	69.5	/2 X	44.0	=	3027.2
F-G	69.5	+	63.3	/2 X	27.3	=	1809.4
G-H	63.3	+	63.4	/2 X	9.0	=	570.2
H-I	63.4	+	61.9	/2 X	8.0	=	501.2
I-J	61.9	+	61.8	/2 X	1.0	=	61.9
J-A	61.8	+	60.5	/2 X	22.0	=	1345.3
	TOTALS :				160.5		10450.8
	AVERAGE GRADE:		10450.812	/	160.5	=	65.1

CONSULTANTS

Design	Mcleod | Bovell 293 Columbia Street Vancouver, BC, V6A 2R5 Yvan Nadeau 604.802.3446 yvan@mcleodbovell.com
Structural	Wihlfi Structural Engineers 2227 Douglas Road Burnaby, BC, V5C 5A9 Dan Wicke 604.484.2859 dwicke@wihlmengineers.com
Contractor	Postle Construction PO Box 18114 Port Moody, BC, V3H 0A2 Nick postle 604.805.6657 nick@postleconstruction.com
Civil	Creus Engineering 221 Esplanade West Unit 610 East Tower North Vancouver, BC, V7M 3J3 Fred Ciambrelli 604.987.9070 fciambrelli@creus.ca
Geotechnical	Davies Geotechnical Inc. #2 - 1520 Chrysler Avenue Delta, BC, V4M 3L7 Paul Davies 604.454.7519 pauldavies@daviesgeotechnical.com
Envelope	Integris Building Science 13825 668 Avenue Surrey, BC, V3W 9L6 Cory Legge 604.445.5385 cory@integrisbuildingscience.com
Survey	Bennett Land Surveying Ltd. #201 - 275 Fell Avenue North Vancouver BC, V7P 3R5 John Franko 604.980.4868 john@bennettsurveys.com
Wildfire & Arborist	Diamond Head Consulting 3559 Commercial Street Vancouver, BC, V5N 4E8 Mike Harrity 604.733.4886 mikeharrity@diamondheadconsulting.com
Flood & Septic	Horizon Engineering Inc. 200 - 18 Gostick Place North Vancouver, BC, V7M 3G3 Karim Karimzadegan 604.990.0546 karim@horizoneng.ca
Landscape	Botanica Design 342 East 19 Avenue Vancouver, BC, V5V 1J5 Karin + Otto 604.841.1908 info@botanicadesign.com

GENERAL NOTES

DRAWINGS AND CONSTRUCTION TO COMPLY WITH B.C. BUILDING CODE 2018

EXCAVATIONS
1. Geotechnical Engineer is to certify a site is safe for workers when the slope of the excavations exceeds 3/4 horizontal to one vertical or excavation exceeds 48".
2. Inspections can only be done if site is posted as safe by Professional Engineer.

FOUNDATIONS
1. Pad footings are required to have a minimum footing area of 4.3sf supporting 1 floor, 8sf supporting 2 floors, & 10.7sf supporting 3 floors.
2. Footings are to extend 18" below grade minumum.
3. Foundation walls of basement below grade and crawl spaces must be insulated with R12 to 24" below grade.
4. Provide 1/2" dia. anchor bolts @ 6'-0" o.c.
5. Anchor posts to footings to resist uplift.

CRAWL SPACE
1. Provide crawl space access of 1'-6" x 2'-4", min. 18" clearance and ventilate to 1/500th of area.
2. Groundcover of 2" concrete over 6 mil U.V. poly required.

VENTILATION
1. Uniformly distribute ventilation to flat and vaulted roofs to 1/150 of insulated ceiling area. Venting is required to be two-way.
2. Min. 2x2 cross-purlins to flat, vaulted ceilings, and decks over living areas to conform to #9.19.1.2.
3. Provide min. 2.12" clearance between roof sheathing and insulation #9.19.1.3. Provide min 1" clearance between insulation and top of roof joists.
4. Ventilate attics to 1/300 of insulated ceiling area.
5. Roof vents must be uniformly distributed with a minimum of 25% at base and 25% in rooftop.
6. Provide attic hatch of 3.4sf in area with no dimension less than 1'-10".
7. Submit Mechanical Ventilation/Air Conditioning design and letter supervision by Professional Engineer, certified HRAI or HVC Technician at frame and final inspection.
8.Continuous or intermittent exhaust fans are required to all bathrooms and kitchens as per #9.32.3.3.

INSULATION
1. Insulation where subject to mechanical damage is to be covered as per #9.25.2.3.(7) with drywall or equivalent (eg. crawl storage areas).
2. Wall insulation to be R20 minimum if dwelling is not heated by natural gas.
3. Minimum insulation values R20 walls, R28 for flat or vaulted ceilings, and R40 for attic spaces.
4. Ceiling and walls to have 6 mil U.V. poly fully caulked as per #9.25.
5. R10 rigid insulation required around unheated slabs on grade; 20" vertical or horizontal from bottom edge of slab.
6. R12 rigid insulation required under entire slab area and a thermal break at the exterior walls for slabs with radiant heating.

STAIRS
1. Straight stair: Rise min. 5" max. 7.87" Run min. 8.25" max. 14"
2. Maximum 1" nosing on stair treads.
3. Minimum headroom is 6'-5" from a line through nosings, measured vertically.
4. Handrail to be between 32" to 36" from a line, measured vertically, through nosing.
5. Winders to conform to 9.8.4.5.
6. Primary stair minimum width 2'-10".
7. Stairs 43° in width or greater require 2 handrails.
8. Handrail reqd. on interior stairs with three or more risers, and exterior stairs with four or more risers.
9. Handrail as a guard is to be between 36" and 38".

CHIMNEY & FIREPLACES
1. Minimum 2" clearance between chimney and combustible framing.
2. Minimum 4" clearance between fireplace and combustible framing.
3. Masonry fireplace hearths must conform to #9.22.5.1.
4. Hard wired C.O. detectors are required in each bedroom or within 5 meters of each bedroom door in conformance with #9.32.4.2.

GUARDRAILS
1. Guardrails to be minimum 42" exterior and 36" interior height.
2. No members facilitating climbing permitted from 5.5" to 36" above the floor or walking surface (in all guards)
3. Maximum 4" opening in all stair, deck and balcony guards (interior and exterior).
4. All glass guards to have top cap unless approved by Prof. Engineer.
5. A minimum of 36" in height is permitted for decks within 5'-11" of grade.
6. Guard required to all drops exceeding 24" where access is provided (eg. window wells)
7. Guard required where the adjacent surface within 1.2 m of the walking surface has a slope of more than 1 in 2.

GLAZING
1. Glass in windows and doors to be double-glazed.
2. Glass in entrance, shower and sliding doors, and windows within 8" of floors and within 36" of deadbolts are all to be safety glass.
3. Sidelights 20"+ in width are to be safety glass.
4. Windows in walls enclosing showers or tubs are to be safety glass and be located above the waterproof wall finish height.
5. The bottom of an openable window in a bedroom is not to exceed 4'-11" above the floor, and have a min. opening width of 15" with an area of 3.75sf, unless the house is sprinklered.
6. Windows over stairs, ramps and landings that extend to less than 36" above the surface shall be protected with guards or be non-openable and designed to #4.1.5.15.
7. Window wells are to be 22" minimum width when required as a bedroom egress.
8. Bedroom windows required as exits must maintain the required opening during an emergency without the need for additional support in conformance with #9.7.1.2.2.b.
9. Where a protective enclosure is installed

MASONRY VENEER WALLS
1. Provide masonry/veneer wall flashing ties and weep holes as per #9.20.

GARAGES
1. Doors between garage and dwelling are to be a self-closing and weather-stripped solid core door.
2. Thicken slab at garage entry to 18" below grade.

MOISTURE PROTECTION
1. Provide flashing between horizontal intersections of differing wall finishes. All flashing to slope away from the building a minimum of 6%.
2. Provide flashing at all wall-roof junctions, including parapets for solid guards on decks.
3. Rainscreen assembly required for all buildings, with a minimum capillary break of 3/8".
4. All platforms are roofs.
5. All roofs must slope 1 in 50 AWAY from walls, this includes parapet walls surrounding decks.
6. 6" clearance required between deck membranes & floor.

MISCELLANEOUS
1. Cross bridging requird @ 7'-0" o.c. maximum for floor and roof joists.
2. Lino or equal required to bathroom floors.
3. Waterproof wallboard required as tile base around tubs and showers.
4. 5/8" Drywall required to ceiling members at 24" o.c.
5. Provide 8" clearance between grade and siding.
6. Damp-proofing slabs, including crawl spaces, are to be 6 mil "UV" poly.
7. Furnace and laundry room door width of 2'-6" min.
8. N.R.P. hinges required for outswing exterior doors.
9. Hardwired and interconnected smoke alarms required on every floor level differing by 36", within 5 meters of bedroom doors, and within 15 meters of each other.
10. A 5lb A.B.C. dry chemical fire extinguisher is required near the kitchen.
11. Heating and air conditioning equipment must be secured to the building to resist overturning and displacement.

ZONING SUMMARY / PROJECT DATA -
DETACHED SECONDARY SUITE

Legal Description P.I.D. Civic Address	Lot A, BLOCK C, DISTRICT LOT 2361 GROUP 1, NWD PLAN EPP107987 (031-369-341 8715 Lawrence Way, West Vancouver, BC V7W 2T7	
Site Area: Lot Width:	31'16.15 sq. m. (33,543 sq. ft.) 22.327 m (73.25')	
	Required Min./ Permitted	**Proposed**
# of Storeys	2	1
Site Coverage - Principle Building (see BP application) Detached Secondary Suite TOTAL (for the property)	 934.84 sq. m. (10,062.9 sq. ft.)	 521.22 sq. m. (5,610.63 sq. ft.) 129.88 sq. m. (1,398.00 sq. ft.) 651.10 sq. m. (7008.63 sq. ft.)
Detached Secondary Suite Area Detached Garage Area	111.5 sq. m. (1,200 sq. ft.) -	111.5 sq. m. (1,200 sq. ft.) 40.9 sq. m. (440 sq. ft.) (garage exemption: 440 sq. ft.)
Building Height (single storey)	4.57 m. (15'-0")	4.17 m. (13'-8")
Building Setbacks Side Yard - North (10% site width) Side Yard - South (10% site width) Combined (25% site width) To Right-of-Way From Principle Building	2.23 m. (7'-3 7/8") 2.23 m. (7'-3 7/8") 5.58 m. (18'-3 5/8") - 4.9 m.	5.57 m. (18'-3") 3.35 m. (10'-11 3/4") 8.92 m. (29'-2 3/4") 1.2 m. (3'-11 1/8") to 1.76m. (5'-9 3/8") 20.42 m. (67'-0")
Parking Spaces	1 off-street	1 off-street

DRAWING LIST

A0.01	Site Plan
A0.02	Landscape Plan
A1.10	Floor and Roof Plans Building Sections
A1.11	Exterior Elevations Spatial Separation

No.	Date	Issue Notes
1	9/10/21	Iss for DP
3	5/01/22	Iss for DP
4	21/01/22	Iss for DP

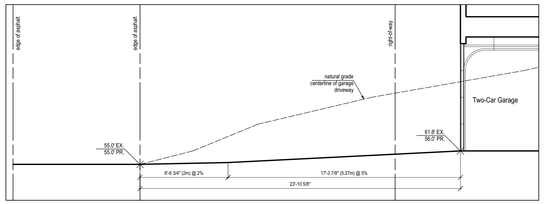
MCLEOD BOVELL MODERN HOUSES
293 Columbia Street
Vancouver BC, V6A 2R5
info@mcleodbovell.com
604 723 4645

8715 Lawrence Way
West Vancouver
BC V7W 2T7

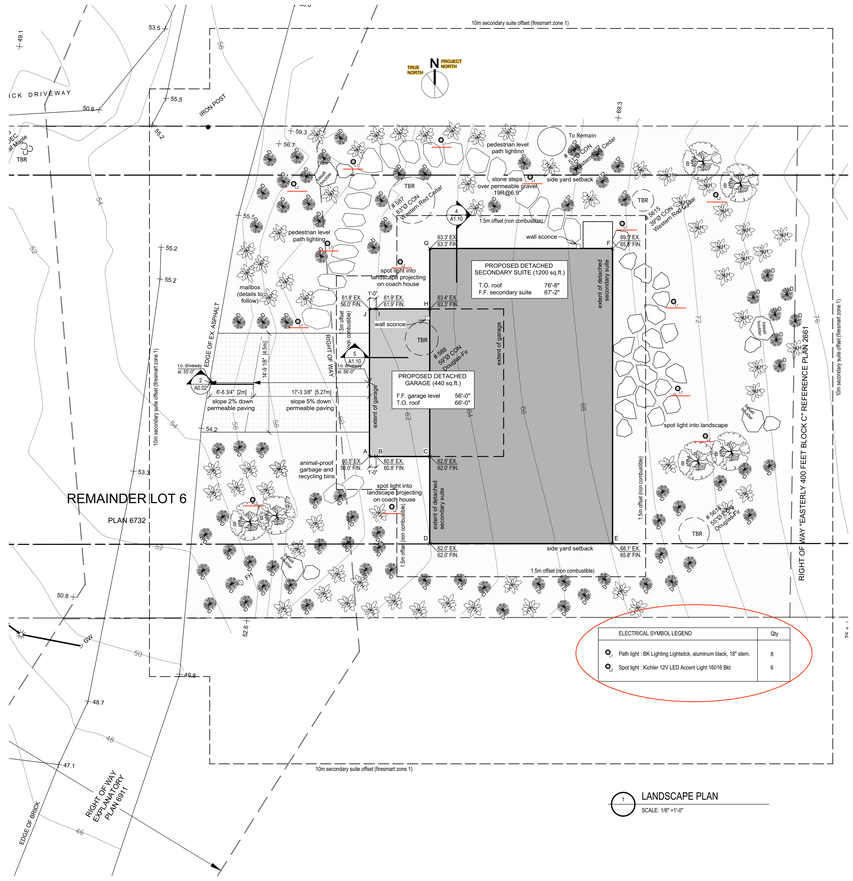
scale AS NOTED	drawn by MC
date JAN 21, 2022	reviewed by YN
project code LAWR	status DD

Detached Secondary Suite Site Plan

A0.01



1 DRIVEWAY CROSS-SECTION
SCALE: 1/4" =1'-0"



1 LANDSCAPE PLAN
SCALE: 1/8" =1'-0"

PLANTING

PLANT ID	LATIN NAME	COMMON NAME	SIZE
B	Acer circinatum	Vine Maple	5cm caliper specimen
D	Aster divaricatus	Whitewood Aster	#1 pot
F	Polystichum munitum	Sword Fern	#1 pot
G	Gaultheria Shallon	Salal	#3 pot
H	Rhododendron macrophyllum	Pacific rhododendron	#3 pot

SYMBOLS

landscape rock

permeable pavers

rip rap reinforcement of foreshort bd

FIRESMART LANDSCAPE GUIDELINES

Non-Combustile Zone (0.0m to 1.5m Offset from Dwelling)
- crushed basalt aggregate ground cover (3" to 6")
- no new or retained planting

Zone 1 (1.5m to 10.0m Offset from Dwelling)
- crushed basalt aggregate ground cover (3" to 6")
- no new or retained conifer shrubs or trees

Zone 2 (10.0m to 30.0m Offset from Dwelling)
- no new conifer shrubs or trees
- remove existing combustible material from forested areas
- prune existing tree branches min 2m above finished grade

No.	Date	Issue Notes
1	9/10/21	Iss for DP
2	5/01/22	Iss for DP
5	21/01/22	Iss for DP

MCLEOD
BOVELL
MODERN
HOUSES

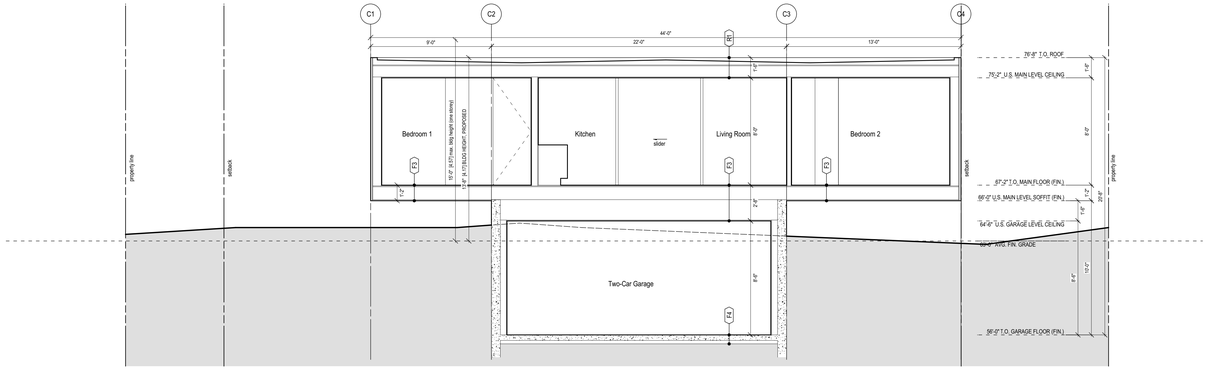
293 Columbia Street
Vancouver BC. V6A 2R5
info@mcleodbovell.com
604 723 4645

8715 Lawrence Way
West Vancouver
BC V7W 2T7

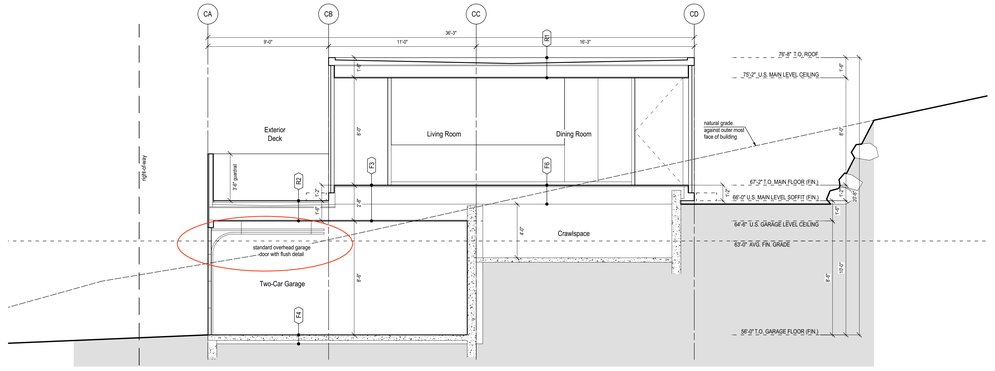
scale	drawn by
AS NOTED	DM
date	reviewed by
JAN 21, 2021	YN
project code	status
LAWR	DD

Detached Secondary Suite Landscape Plan

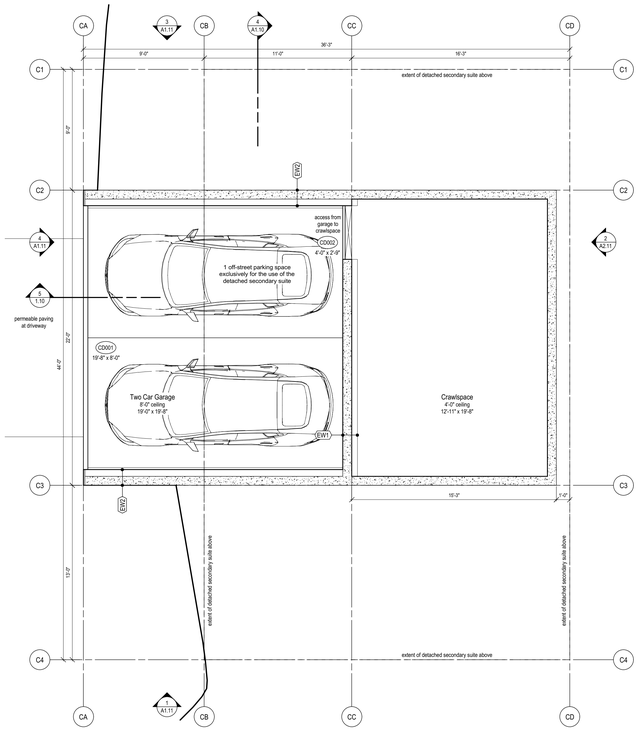
A0.02



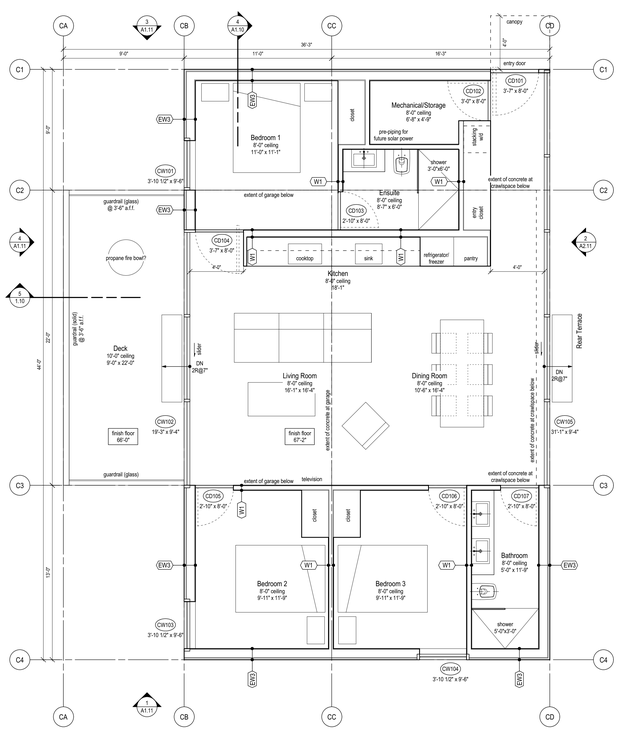
4 BLDG SECTION -
SCALE: 1/4" = 1'-0"



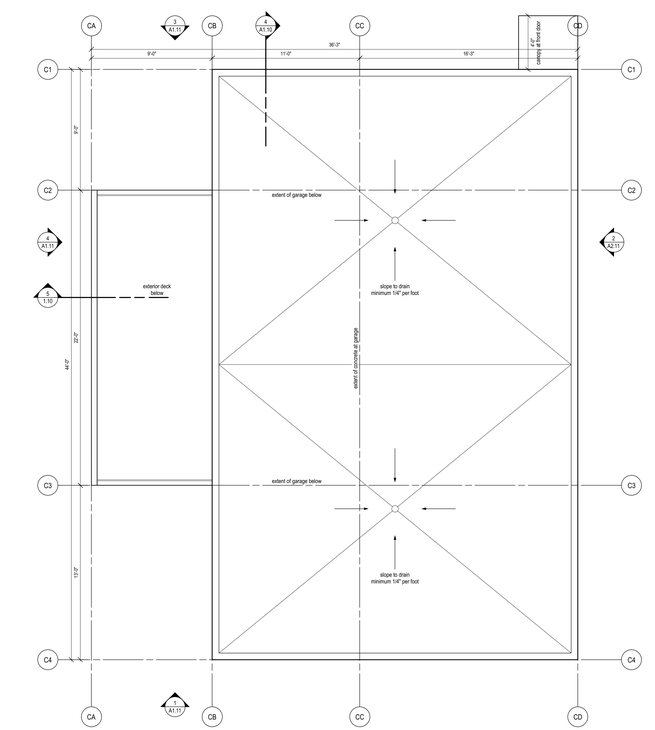
5 BLDG SECTION -
SCALE: 1/4" = 1'-0"



1 FLOOR PLAN - GARAGE LEVEL (440 SQ. FT.)
SCALE: 1/4" = 1'-0"



2 FLOOR PLAN - MAIN LEVEL (1,200 SQ. FT.)
SCALE: 1/4" = 1'-0"



3 ROOF PLAN (SITE COVERAGE = 1398 sq. ft. = 129.88 sq. m.)
SCALE: 1/4" = 1'-0"

FLOOR ASSEMBLIES

F1 Basement Slab-on-Grade
concrete finish slab; smooth finish; no saw cuts;
max 1/8" radius; reinforcement and mix specifications per struct.
10 mil. poly vapour / air barrier
concrete slab on grade; reinforcement and mix specifications per struct.
10 mil. poly vapour / air barrier
8" XPS insulation; R40
6" layer of 3/4" drain rock over engineered fill as req'd

F2_Floors Over Interior Space
3/4" finish layout as per A1 Series floor finish plans
1 3/4" concrete topping
3/4" plywood subfloor
TJI joists per structural
2x dropped ceiling framing at 16" o.c. to suit ceiling finish

F3_Floor Over Exterior Space
3/4" finish layout as per A1 Series floor finish plans
1 3/4" concrete topping
3/4" plywood subfloor
TJI joists per structural
2lb BASF Walltite closed cell Spraytoam Insulation R28
2x dropped ceiling framing at 16" o.c. to suit soffit finish

F4_Garage Slab on Grade
concrete slab-on-grade sloped to drain 1/8" in 1'
reinforcement and mix specifications per struct.
10 mil. poly vapour / air barrier
3" XPS rigid insulation; R15
6" layer of 3/4" drain rock over engineered fill as req'd

F5_Patio over slab on grade
Finish layout as per A1 Series floor finish plans
XL format tile finish per 'Material Specifications'
adjustable pedestal system; specifications and o.c. spacing tbd
concrete slab-on-grade sloped to drain 1/8" in 1'
reinforcement and mix specifications per struct.
6" layer of 3/4" drain rock over engineered fill as req'd

F6_Floor Over Crawl Space
3/4" finish layout as per A1 Series floor finish plans
1 3/4" concrete topping
3/4" plywood subfloor
TJI joists per structural
2lb BASF Walltite closed cell Spraytoam Insulation R28
crawl space
concrete slab on grade; reinforcement and mix specifications per struct.

WALL ASSEMBLIES

EW1_Exposed Concrete Wall @ Interior Space
drainage rock @ below grade portions only
1/2" dimple drainage mat @ below grade portions only
fully reinforced 80 mil. E-pro damp-proofing @ below grade portions only
6" rigid insulation @ below grade portions only
fully reinforced 80 mil. E-pro damp-proofing @ below grade portions only
architectural concrete wall

EW2_Exterior Concrete Wall @ Interior Space
drainage rock @ below grade portions only
1/2" dimple drainage mat @ below grade portions only
fully reinforced 80 mil. E-pro damp-proofing @ below grade portions only
concrete wall (see structural), tie holes plugged and parged
2" rigid insulation
2x6 wood framing @ 16" o/c
2lb BASF Walltite closed cell Spraytoam Insulation 5 1/2" @ R6/in
1/2" gypsum wallboard
vapour retarding primer paint

EW3_Exterior Aluminum or Stucco Clad Wall
3/16" or 1/4" Aluminum panel (bronze anodized), or
3/8" or 1/2" Stucco with K-lath
Vertical 3/4" wood strapping @ 16" o.c. or aluminum hat track
Vaproshield+ 'smart' vapour / air barrier
1/2" exterior grade plywood sheathing
2 x 8 wood framing @ 16" o/c
2lb BASF Walltite closed cell Spraytoam Insulation 7 1/4" @ R6/in
1/2" gypsum wallboard
vapour retarding primer paint

ROOF ASSEMBLIES

R1_Roof Over Interior Space (unvented)
3" or 1" dia. angular ballast (confirm w/ structural for allowance)
drip mat, soprema (tbd)
2-ply sbs Soprema Sopralene system
protection board: spec TBD
taper package varies from 1/2" to 3 1/2" sloped to drain
3" XPS insulation; R15
self adhered air / vapour barrier sopravap'r
3/4" ext grade t&g plywood sheathing
TJI joists per structural
2lb BASF Walltite closed cell Spraytoam Insulation R28
2x dropped ceiling framing at 16" o.c. to suit ceiling finish

R2_Typical Deck Over Interior Space (unvented)
Finish layout as per A1 Series floor finish plans
XL format tile finish per 'Material Specifications'
adjustable pedestal system; specifications and o.c. spacing tbd
2-ply sbs Soprema Sopralfe system
protection board; spec tbd
taper package varies from 1/2" to 3 1/2" sloped to drain
self adhered air / vapour barrier sopravap'r
3/4" ext grade T&G plywood sheathing
11 7/8" joists per structural
2lb BASF Walltite closed cell Spraytoam Insulation R28
2x dropped ceiling framing at 16" o.c. to suit ceiling finish

R3_Patio Over Suspended slab (unvented)
Finish layout as per A1 Series floor finish plans
XL format tile finish per 'Material Specifications'
adjustable pedestal system; specifications and o.c. spacing tbd
2-ply sbs Soprema Sopralfe system
protection board; spec tbd
taper package varies from 1/2" to 3 1/2" sloped to drain
concrete slab-on-grade
reinforcement and mix specifications per structural
2lb BASF Walltite closed cell Spraytoam Insulation R28
2x dropped ceiling framing at 16" o.c. to suit ceiling finish

W1_Typical Interior Wall
1/2" gypsum wallboard
2x4 or 2x6 wood framing @ 16" o/c
acoustic batt insulation
1/2" gypsum wallboard

No.	Date	Issue Notes
1	9/10/21	Iss for DP
2	5/01/22	Iss for DP
4	21/01/22	Iss for DP

MCLEOD BOVELL MODERN HOUSES
293 Columbia Street
Vancouver BC V6A 2R5
info@mcleodbovell.com
604 723 4645

TRUE NORTH / PROJECT NORTH

8715 Lawrence Way
West Vancouver
BC V7W 2T7

scale	drawn by
1/4" = 1'-0"	MC
date	reviewed by
JAN 21, 2022	YN
project code	status
LAWR	DD

Detached Secondary Suite - Bsmt and Main Plans Building Sections

A1.10

m1 Board and batten pattern stained wood,wire brushed, open system (Western Red Cedar or Accoya)

m2 Flush tight pattern stained wood, wire brushed, open system (Western Red Cedar or Accoya)

m3 White Painted Aluminum, 1/4" thick, exposed fastener, open system

m4 Glazing, bronze anodized aluminum frame

m5 Concrete architectural finish

m6 Painted aluminum vertical screen/guard rail

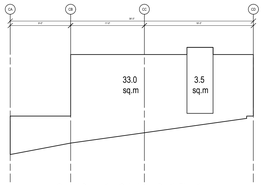
m7 Aluminum panel (bronze anodized)

m8 Bronze painted steel canopy

m9 Glass guardrail

m10 Conventional stucco

No.	Date	Issue Notes
1	9/10/21	Iss for DP
3	5/01/22	Iss for DP
5	21/01/22	Iss for DP



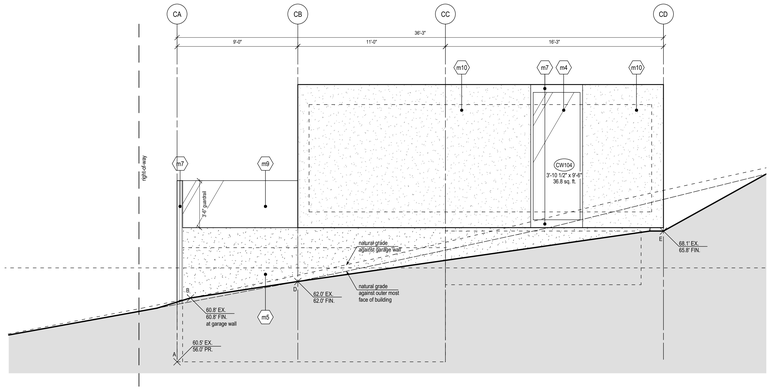
Spatial Separation Calculation South Elevation

Total area of exposed building face = 33.0 sq.m.
Total area of glazed openings = 3.5 sq.m
% glazed openings proposed = 10.6%

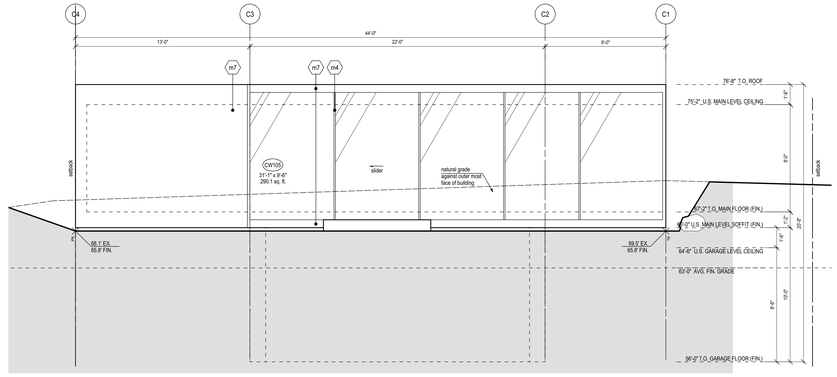
% of exposing building face
allowable as per BCBC table 3.2.3.1.D
@ (10'-11 3/4") 3.35m limiting dist. = 53.75%
(note: all spaces sprinklered to NFPA 13R)

glazing target = 17.75 sq.m

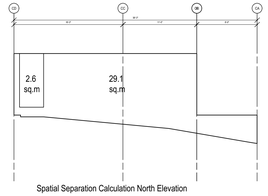
5 SPATIAL SEPARATION - SOUTH ELEVATION
SCALE: 1/8" =1'-0"



1 BLDG ELEVATION - SOUTH
SCALE: 1/4" =1'-0"



2 BLDG ELEVATION - EAST
SCALE: 1/4" =1'-0"



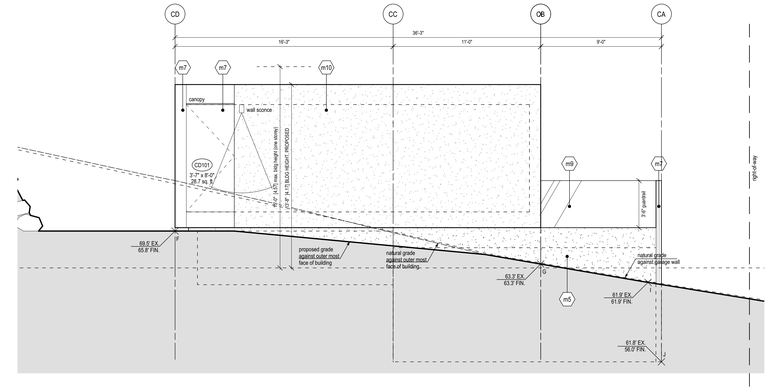
Spatial Separation Calculation North Elevation

Total area of exposed building face = 29.1 sq.m.
Total area of glazed openings = 2.6 sq.m
% glazed openings proposed = 8.9%

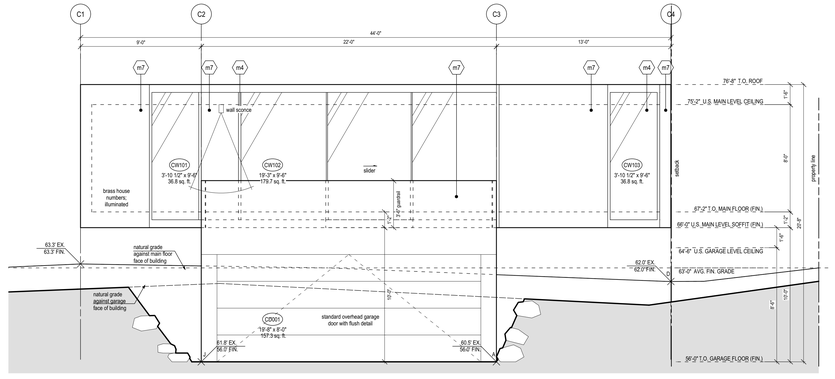
% of exposing building face
allowable as per BCBC table 3.2.3.1.D
@ (18'-3 1/8") 5.56m limiting dist. = 100%
(note: all spaces sprinklered to NFPA 13R)

glazing target = 29.1 sq.m

6 SPATIAL SEPARATION - NORTH ELEVATION
SCALE: 1/8" =1'-0"



3 BLDG ELEVATION - NORTH
SCALE: 1/4" =1'-0"



4 BLDG ELEVATION - WEST
SCALE: 1/4" =1'-0"

MCLEOD
BOVELL
MODERN
HOUSES

293 Columbia Street
Vancouver BC. V6A 2R5
info@mcleodbovell.com
604 723 4645

8715 Lawrence Way
West Vancouver
BC V7W 2T7

scale	drawn by
1/4" = 1'-0"	MC
date	reviewed by
JAN 21, 2022	YN
project code	status
LAWR	DD

Detached Secondary Suite - Exterior Elevations / Spatial Separation

A1.11