# Wildfire Risk Assessment Report

44390 Bayview Road Fraser Valley Regional District

September 25, 2020

Submitted to: Harrision Production Inc 101-2544 Douglas Road Burnaby, BC V5C 5W7





The following Diamond Head Consulting staff performed the site visit and prepared the report. All general and professional liability insurance and individual accreditations have been provided below for reference.

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Review

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Errors & Omissions:	Lloyds Underwriters – Policy #1010615D, \$1,000,000

# **Table of Contents**

1.0	Introduction1			
1.1	Site Planning Documents Reviewed1			
1.2	Qualifications2			
2.0	Methodology3			
2.1	Field Review			
2.2	Office Review			
3.0	Site Description			
4.0	Hazardous Fuels and Wildfire Threat Assessment			
4.1	Forest Fuel Types and Expected Fire Behaviour6			
4.2	Current Forest Fuel Threat Assessment			
5.0	FireSmart Wildfire Threat Mitigation Recommendations9			
5.1	Building Construction and Siting			
5.2	2 Site Layout and Servicing for Defensible Space and Suppression			
5.3	Fuel Hazard Mitigation13			
5.4	FireSmart Landscaping Recommendations13			
5.5	Ongoing Maintenance			
6.0	Future Condition FireSmart Structure and Hazard Assessment15			
7.0	Final Remarks17			
Appen	dix 1 Wildland Urban Interface Plots			
Appen	dix 2 Fuel Type Descriptions			
Appen	dix 3 Generic Description of Coastal Fuel Types25			
Appen	dix 4 Additional Fire Behaviour and Fuel Treatment Resources			
Appen	dix 5 Limitations			

# List of Figures

Figure 1. Location of proposed development	5
Figure 2: Photogrammetry of the site	5
Figure 3: Assessment of fuels at a landscape level	6
Figure 4.Fuel type map	7
Figure 5. Wildfire threat mapping and plot locations	8
Figure 6. FireSmart Priority Zones	9
Figure 7. Wildfire Threat Plots	8

## **List of Tables**

Table 1. Recommendations for building construction	11
Table 2. Recommendations for site layout and servicing.	12
Table 3. Requirements for Landscaping	13
Table 4. Recommendations for ongoing maintenance	14
Table 5. FireSmart Structure and Hazard Assessment Form	15
Table 6. D1 general stand characteristics	21

## 1.0 Introduction

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

Civic address:	44390 Bayview Road, Fraser Valley Regional District Electoral Area E
Legal Address:	Lot 2 Plan NWP57252 Section 21, Township 3, Range 30.
Client name:	Harrison Productions Inc.
Date of site visit:	September 24, 2020

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. Specific goals for this project are:

- To assess interface fuel hazards using an accepted fuel hazard assessment procedures and present a summary of results
- To map the location of hazardous fuel types relative to the planned subdivision
- To identify mitigation or compensation measures that may be specified as development permit or rezoning conditions including, but not limited to, recommendations for:
  - Building materials
  - Establishing and maintaining defensible space
  - Improving suppression access
  - Managing combustible construction debris
  - FireSmart fuel treatments to mitigate hazard in existing landscapes and natural areas
  - FireSmart landscaping for the planned development as well as ongoing maintenance of vegetation fuels

#### 1.1 Site Planning Documents Reviewed

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

• Conceptual Plan – Bayview Film Studio and Retreat. 44390 Bayview Road, Lake Errock

Detailed architectural drawings were not available for review at the time of assessment. This preliminary assessment will assume the buildings and landscape will follow the recommendations from this report. Any changes to these site plans should be provided to Diamond Head Consulting so that this wildfire report can be updated accordingly.

#### 1.2 Qualifications

Michael Harrhy is a Registered Professional Forester who has worked as an urban forestry consultant for the past five years. In the past four years, Michael has been completing Wildfire DP Applications for a variety of developments in Maple Ridge and North Vancouver. His experience with vegetation management on a diverse portfolio of development and infrastructure projects makes him qualified to undertake Wildfire Hazard Assessments.

Conor Corbett is a Registered Professional Forester with a decade of wildfire experience. Conor's experience as a supervisor with the Wildfire Branch has provided operational firefighting experience and an understanding of fire behavior in various fuels. His graduate studies focused on community wildfire planning and hazard abatement in British Columbia. Conor has been completing Wildfire DP Applications for a variety of developments in Maple Ridge, North Vancouver, West Vancouver, and Chilliwack for the past 3 years. This diverse experience has provided the background knowledge necessary to perform Wildfire Hazard Assessments.

## 2.0 Methodology

#### 2.1 Field Review

Diamond Head Consulting Ltd. completed a field assessment of the natural areas within 200m of the development site. In these areas detailed descriptions of the ecology and the fuel characteristics were collected for each polygon. This data can be found in Appendix B. Data collected at each fuel plot included:

- Biogeoclimatic classification
- 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:

• Current forest fuel threat in and adjacent to the proposed development using the 2020 Wildfire Threat Assessment Guide and Worksheets (MFLNRO, 2020)

#### 2.2 Office Review

Diamond Head Consulting Ltd. completed an office review using the field data collected, site planning documents (Section 1.1.), GIS parcel layers and orthophotography, and the FVRD's online mapping tool (<u>https://maps.fvrd.ca/portal/home/</u>). The following reference documents were also consulted to assess hazard and develop appropriate recommendations:

- FireSmart Homeowners Manual (Partners in Protection and Province of BC, 2016)
- <u>2020 Wildfire Threat Assessment Guide and Worksheets</u> (MFLNRO, 2020).

### 3.0 Site Description

The subject site (Figure 1) is 44390 Bayview Road in the Fraser Valley Regional District, BC. The 5.26 hectare site is located on the slopes of Harrison Hill. The site is above a bay in the Harrison River, near its confluence with the Fraser. The site has a moderate slope and a north aspect. A CN railroad forms the north boundary of the site, downslope at the edge of the water. To the south the site's forest continues unbroken into the adjacent crown land. An existing dwelling is located on the western quarter of the site. The dwelling is located on a flat bench which has been excavated out of the hillside. A narrow, rough road traverses the slope and is the only other infrastructure present on the property.

Forests in the assessment area are a continuous stand of mature deciduous trees. The stand appears to be homogenous until the height of the land on Harrison Hill. Mature bigleaf maple dominates the stand; with a mix of bitter cherry, red alder, and paper birch occupying the intermediate and codominant layers in the forest. Native conifers including western redcedar and Douglas fir are present in the forest but are scattered and infrequent – less than 5% of the overall forest. Understory vegetation is predominantly sword fern with some vine maple and salmon berry. Very little ladder fuel or coniferous regeneration was observed. Overall, the vegetation in the assessment area has a low flammability.

Around the existing dwelling there are a few mature conifers at the forest's edge. All of these conifers are more than 30m from the existing building. Few fuels are found in landscape around the building, which is either short grass, gravel, or wood mulch.

The proposed development (**Error! Reference source not found.**) is to redevelop the site into a studio and retreat. The proposed studio will occupy the same space as the existing dwelling and have a larger footprint. Most of the site will remain undeveloped.



Figure 1. Location of proposed development (red outline) and preliminary site plan.



Figure 2: Photogrammetry of the site showing the local topography and the assessment area, roughly outlined in red. The subject slope has northern aspect. Image courtesy of Google Earth.

## 4.0 Hazardous Fuels and Wildfire Threat Assessment

#### 4.1 Forest Fuel Types and Expected Fire Behaviour

Forested areas within approximately 200 m of the proposed development site were classified into the fuel types mapped in Figure 3. 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. Two fuel types were identified and are described in Appendix 2. The plot characteristics are summarized in Appendix 1. Note that a majority of the cleared areas are occupied by managed grass and/or pasture. These are not considered potential fuel as management and grazing limits flammability.



Figure 3: Assessment of fuels at a landscape level.



Figure 4.Fuel type map. Note that the property lines are approximate and have been traced from other documentation.

#### 4.2 Current Forest Fuel Threat Assessment

Each fuel type and distinct stand was assessed for wildfire threat using the Wildfire Urban Interface worksheet (MFLNRO 2020). Based on this ranking system, most of the surrounding fuel types pose a **low wildfire threat to the subject site**. **Figure 5** outlines the wildfire threat in context with the preliminary building plans for the subject property. The wildfire threat ratings and plot forms are summarized in Appendix 1.

The fuels in the D1 fuel type found around the subject site have a low risk due primarily to the limited flammability of the fuel. The lack of coniferous vegetation is the critical factor in determining the risk. Slope and aspect are other factors that affect the wildfire risk. The slope is steep but the structure is near the base of the slope, minimizing the likelihood of fire spreading from below. A northern aspect typically results in cooler temperatures and higher moisture content in the vegetation.



Figure 5. Wildfire threat mapping and plot locations. Note that the property lines are approximate and have been traced from other documentation.

## 5.0 FireSmart Wildfire Threat Mitigation Recommendations

This section provides recommendations to mitigate the risk of wildfire to the proposed development based on the current condition of hazardous fuels and wildfire threat, site planning documents, FireSmart standards within the prioritized zones defined in the FireSmart Homeowners Manual (Partners in Protection and Province of BC, 2016); Figure 6). All structures must be designed to mitigate the risk of embers spotting; including specifications for roofing decking and landscaping. Structures that are directly adjacent to forested areas require additional measures for exterior cladding and windows to mitigate the risk of radiant heat.



Figure 6. FireSmart Priority Zones defined in the FireSmart Homeowners Manual (Partners in Protection and Province of BC, 2016).

During a wildfire homes are ignited as a result of:

- Sparks or 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 causing a fire close to a structure.
- Extreme radiant heat from flames within 30 m of a structure that melts or ignites siding or breaks windows.
- Direct flame from nearby flammable materials such as bushes, trees, or woodpiles.

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. If a wildfire does threaten the area, suppression capability is improved with good access, defensible space and water supply. The following recommendations address:

- Building construction standards
- Site layout and servicing for defensible space and suppression
- Fuel hazard mitigation
- FireSmart landscaping
- Ongoing maintenance

#### 5.1 Building Construction and Siting

A goal of this report is to make recommendations to ensure that all interface structures are constructed with materials that will resist ignition from radiant heat and/or ember showers from a wildfire event. A landscape plan was not provided with the preliminary site plan. It is recommended that buildings either be located 10m from the nearest forest edge, or modify the vegetation within 10m to reduce wildfire hazard (See section 5.3 and 5.4).

# It is critical that the structure be designed and built to meet the specifications required to achieve FireSmart standards.

Roofing must 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 Re-sistance 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.

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 if product specifications and certified testing is provided. Notwithstanding the recommendations in Table 1, all building must also meet or exceed the requirements of the BC Building Code.

Table 1. Recommendations for building construction.

	Lots	Recommendation		
Roofing and gutters	ALL	<ul> <li>All structures must be constructed of Class A or B rated roofing materials* as defined in the current BC Building Code, as amended, must be used. Examples of typical Class A roofing products include (but are not limited to) asphalt shingles, metal, concrete tile, clay tile, synthetic, slate and hybrid composite materials. Note: Wood shakes and shingles are not acceptable, unless certified to Class A or B.</li> <li>Roofs have closed or screened gutters.</li> <li>Any spaces between roof decking and covering must be blocked.</li> </ul>		
Exterior Cladding, Windows and Doors	ALL	<ul> <li>Exterior doors and garage doors shall be constructed of non-combustible materials (i.e., metal clad, solid core wood or have a 20 minute fire protection rating), and must meet the requirements of the North American Fenestration Standards (NAFS). Doors with glazing are treated as windows.</li> <li>Skylights shall be tempered glass, multi-layer glazing or have a fire protection rating of not less than 20 minutes, and must meet the requirements of the NAFS.</li> <li>Exterior cladding shall be constructed of ignition-resistant or non-combustible materials* such as stucco, metal siding, brick, cement shingles, cement board, concrete block, poured concrete, concrete composite, rock and logs or heavy timber. Decorative construction features such as fascia, trim board materials and trim accents are exempted from this requirement, to a maximum of 10% per elevation.</li> <li>Ensure that ignition-resistant materials extend from the foundation to the roof.</li> <li>Exterior windows and glazing shall be tempered glass, multi-layer glazing or have a fire protection rating of not less than 20 minutes, and must meet the requirements of the NAFS.</li> </ul>		
Eaves, Soffits and Vents	ALL	<ul> <li>All eaves and ventilation openings in exterior walls, roofs and soffits shall be covered with non-combustible, 3 millimetre corrosion-resistant wire mesh, or be designed to prevent flame or ember penetration into the structure (e.g., aluminium perforated soffits).</li> <li>Eaves and soffits shall be constructed of ignition-resistant or non-combustible materials.</li> </ul>		
<ul> <li>Overhanging projections attached to buildid porches, structural columns and beams) sh resistant or non-combustible materials succe poured concrete, concrete composite, rock</li> <li>The underside of all exposed floors (i.e., un sheathed or skirted the fire-resistant materiale deck surfaces are slotted, provide access be</li> <li>The underside of all cantilevered floors (i.e. be protected with fire-resistant materials a exterior wall plane.</li> </ul>		<ul> <li>Overhanging projections attached to buildings and their support (i.e., decks, balconies, porches, structural columns and beams) shall be constructed of or sheathed in ignition-resistant or non-combustible materials such as stucco, metal, brick, cement, concrete block, poured concrete, concrete composite, rock and logs or heavy timber.</li> <li>The underside of all exposed floors (i.e., underside of balconies, decks and porches) shall be sheathed or skirted the fire-resistant materials similar to those listed in the previous point. If deck surfaces are slotted, provide access below for cleaning out litter accumulations.</li> <li>The underside of all cantilevered floors (i.e., bay windows, hutches, and window seats) shall be protected with fire-resistant materials and have the floor system fire-blocked at the exterior wall plane.</li> </ul>		
Chimney	ALL	Spark arrestor screens are required on all wood-burning appliances.		

	Lots	Recommendation
Accessory Buildings	ALL	Accessory buildings must meet the same building standards as the principal residence.
During Construction	ALL	<ul> <li>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.</li> <li>Prior to and 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.</li> </ul>

\* 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.
 Non-combustible materials: means that a material meets the acceptance criteria of CAN/ULC 4-S114 (Standard Method of Test for Determination of Non-combustibility in Building Materials), or other standard acceptable to the District
 Ignition-resistant materials: means that a material meets the acceptance criteria of CAN/ULC-S101, (Fire Endurance Tests of Building Construction and Materials), or other standard acceptable to the District

#### 5.2 Site Layout and Servicing for Defensible Space and Suppression

Site design affects both the fire resistance of the development and, in the event a wildfire does occur, the suppression capability and safety of first responders. Recommendations for site layout and servicing are made in Table 2 to address:

- Building siting
- Separation between buildings
- Access
- Water supply

Table 2. Recommendations for site layout and servicing.

Feature	Recommendation	Anticipated Deficiencies
Building Siting	The immediate forest edge in this area is made up of generally deciduous species lowering the risk of fire spreading. A 10m fuel free is recommended between buildings and forest edge	None
Separation between buildings	As per the FireSmart Manual (BC edition) accessory structures within 10 m of house structures must have the same FireSmart considerations as the primary building/ studio. Recommendations in Table 1 must be followed to ensure all buildings achieve FireSmart standards.	None
Access road passing width and turn- around distance	The site is accessed by Bayview Road. There is ample room on the site for vehicles to turn around. However, the access road lacks width for passing, especially with larger emergency vehicles.	Current access road may not accommodate passing of vehicles

Feature	Recommendation	Anticipated Deficiencies
Water supply	There are no hydrants that service the site. Consider providing water service that can contribute to fire suppression.	We anticipate a water supply limitation.

#### 5.3 Fuel Hazard Mitigation

Fuel treatments can effectively alter fire behavior and reduce wildfire threat when they:

- Reduce surface fuels
- Increase the height to the base of tree crowns
- Increase spacing between tree crowns
- Keep fire-resistant deciduous trees

Fuel management for forests on this site is not recommended. The forests are mostly a low wildfire threat, with mostly low flammability deciduous trees. Wildfire hazard mitigation is best achieved through FireSmart building materials and landscaping.

#### 5.4 FireSmart Landscaping Recommendations

Landscaping and maintenance for the site should follow FireSmart principles (Ministry of Forests Wildfire Management Branch, FireSmart Program). Planning and maintenance on each lot should follow the priority zone 1 (<10m from structures) guidelines outlined in the FireSmart program. The goal in priority zone 1 is to remove hazardous fuels and convert vegetation to fire resistant species. Table 3 contains recommendations for landscaping and maintenance.

#### Table 3. Requirements for Landscaping.

Feature	Recommendations		
Planting	• Remove all highly flammable vegetation and other combustibles from around the building. Note the forest edge currently host several mature confiners. If the proposed building is closer than 10m to the trees, prune the trees so that no part is closer than 10m from the building, and/or prune the lower limbs to raise the height of the lowest branches		
	<ul> <li>No conifer trees should be planted within 10m of any buildings.</li> <li>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<sup>1</sup>.</li> </ul>		
	<ul> <li>Ensure that vegetation will not grow to touch or overhang buildings.</li> <li>No vegetation should be placed within 10 m of glazed openings unless there are solid shutters to cover the glazing.</li> <li>Irrigation sprinklers should be installed in landscaping.</li> </ul>		
Maintenance	<ul> <li>Grass should be kept mowed to 10 centimeters or less and watered regularly during the summer months.</li> <li>Ground litter and downed trees should be removed regularly and prior to the fire season.</li> </ul>		

#### 5.5 Ongoing Maintenance

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

Table 4. Recommendations for ongoing maintenance.

	Owner	Recommendation	Anticipated Deficiencies
Zone 1	Homeowners	<ul> <li>Regularly remove debris from roofs, gutters and beneath overhanging projections.</li> <li>Grass and landscaping should be kept mowed to 10 cm or less and watered regularly during the summer months.</li> <li>Landscaping should be irrigated during the summer months.</li> <li>Remove any local accumulations of woody or combustible material (e.g., no woodpile or yard waste accumulations).</li> <li>Remove any over mature, dead or dying shrubs and trees.</li> <li>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).</li> </ul>	None

## 6.0 Future Condition FireSmart Structure and Hazard Assessment

The forms below provide an assessment of the proposed development using the FireSmart Structure and Hazard Assessment form. The scoring has been calculated for the proposed studio. Assessment ratings are made <u>assuming</u> that the recommendations outlined in Section 5 are adhered to and incorporates deficiencies anticipated in Section 5.

Table	5.	<b>FireSmart</b>	Structure	and	Hazard	Assessment	Form.
IUNIC	<b>J</b> •	i ii Comart	Junucuic	unu	IIuzuiu	ASSESSMENT	101111

ZONE 1			RATING FOR PROPOSED DEV.	
Home/10 m	Criteria	Rating Options		
What type of roofing	Metal, clay tile, asphalt shingle or ULC rated shakes ( (may be affected by the condition of your roof)		0	
	Unrated Wood Shakes	30		
	No needles, leaves or other combustible materials	0		
How clean is your roof?	A scattering of needles and leaves	2	2	
	Clogged gutters and extensive leaves	3		
What is the exterior of	Non-combustible material, stucco, metal siding or brick	0		
your home built of?	Logs of heavy timbers	1	0	
	Wood, vinyl siding or wood shakes	6		
	Tempered glass in all doors/windows	0	0	
	Double-pane glass - small/medium (smaller than 1 metre x 1 metre)	1		
How fire-resistant are your windows and	Double-pane glass - large (greater than 1 metre x 1 metre)	2	2	
doors?	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	Closed eaves, vents screened with 3-millimetre wire mesh	0		
up and your vents screened?	Closed eaves, vents without mesh	1	1 0	
	Open eaves, vents not screened	6		
Have you sheathed-in	Sheathed with fire-resistant materials	0		
the underside of your	Sheathed with combustible materials	2	0	
or open foundation?	Not sheathed	6		

Is your home set back	Building is located on the bottom or lower portion of a hill	tom or lower portion 0		
slope?	Building is located on the mid to upper portion of a hill or the crest of a hill	6	0	
	ZONE 1 HOME SCORE		4	

ZONE 2			RATING FOR PROPOSED DEV.
YARD/10 - 30 m	Criteria	Rating Options	
	Deciduous trees	0	
What type of forest	Mixed wood trees (deciduous and conifer)	10	10
surrounds your nome:	Conifer trees separated	10	
	Conifer trees continuous	30	
What kind of surface	Well-drained lawn or non-combustible landscaping material	0	
vegetation grows within	Uncut grass or shrubs	5	
10-30 metres of your home and around your	Scattered twigs, branches and tree needles on the ground	5	5
buildings?	Abundant twigs, branches and tree needles on the ground	30	
	None within 10-30 metres	0	
Are there shrubs and low branches (within 2 metres of the ground) in	Scattered within 10- 30 metres of buildings	5	0
the surrounding forest?	Abundant within 10-30 metres of buildings	30	
	ZONE 2 YARD SCORE		15

	TOTAL SCORE	RATING FOR PROPOSED
		DEV.
ZONE 1/ Home and	Home	
Yard	10 metres from home	4
ZONE 2 / Yard		15
	TOTAL	19

Following the recommendations in this report will achieve a FireSmart hazard score of Low for the proposed building. Note that the existing dwelling and yard follows the FireSmart guidelines and is a good example of a successful implementation of the guidelines.

### 7.0 Final Remarks

Diamond Head Consulting was given the subdivision plan with no specific information on building materials and the landscape plan. The information provided was used to develop recommendations for wildfire risk mitigation that can be incorporated into future detailed plans for the development.

Following the recommendations in this report will ensure that the development is consistent with FireSmart standards. If the recommendations made within this report are followed, wildfire risk to life and property will be substantially reduced. The recommendation within this report does not guarantee that the site or structures are safe from wildfire, only that the risk level of the site is within acceptable standards and that fire hazards have been identified and appropriate mitigation measures taken.

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 Biologist in Training



## Appendix 1 Wildland Urban Interface Plots

Figure 7. Wildfire Threat Plots. Note that the property lines are approximate and have been traced from other documentation.

Wildfire Threat Assessment Worksheet - Fuel Setting Scoring			
Location	Plot 94	Date	24-Sep
Assessor	мн		
Crown species composition (species %)		Mb60 Dr20 Vb20 Fd* cw*	

Wildfire Threat Assessment Worksheet - Fuel Setting Scoring				
Location	Plot 95	Date	24-Sep	
Assessor	мн			
Crown species composition (species %)		Vb50 mb50 dr*		

Component/subcomponent	PULLDOWNS	SCORE		
Depth of organic layer	1-<5	3		
Surface a	and ladder fuel (.1-3m in he	eight)		
Surface fuel composition	deciduous shrubs	4		
Dead and down material				
continuity (<7cm)	Scattered <10% coverage	4		
Ladder fuel composition	Deciduous	0		
Ladder fuel horizontal				
continuity	Sparse <10% coverage	2		
Stems/ha (understory)	<900	2		
Stand structure an	Stand structure and compostion (dominant and co-dominant)			
	Deciduous (<25%			
Overstory composition/CBH	conifer)	0		
Crown closure	41-60%	2		
Fuel strata gap	6-9	3		
Stems/ha (overstory)	401-600	2		
Dead and dying (% of dominant and co-dominant stems)	Standing dead/partial down <20%	2		
Comments:	TOTAL	24		
	RATING	LOW		
Mostly mature big leaf maple with intermediate cherry alder and birch. Few scattered Douglas fir. North aspect 30 to 40 degree slope.				

Component/subcomponent	PULLDOWNS	SCORE		
Depth of organic layer	1-<5	3		
Surface	and ladder fuel (.1-3m in he	eight)		
Surface fuel composition	deciduous shrubs	4		
Dead and down material				
continuity (<7cm)	Scattered <10% coverage	4		
Ladder fuel composition	Deciduous	0		
Ladder fuel horizontal				
continuity	Absent	0		
Stems/ha (understory)	<900	2		
Stand structure and compostion (dominant and co-dominant)				
	Deciduous (<25%			
Overstory composition/CBH	conifer)	0		
Crown closure	41-60%	2		
Fuel strata gap	6-9	3		
Stems/ha (overstory)	401-600	2		
Dead and dying (% of dominant	Standing dead/partial	-		
and co-dominant stems)	down 21-50%	5		
Comments:	TOTAL	25		
	RATING	LOW		
Dominant big leaf maple with u	niform intermediate cherry	and alder. No conifers.		
Understory all sword fern. No la	dder fuels. Plot is on smal	l bench with north aspect.		

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Wildfire Threat Assessment Worksheet - Fuel Setting Scoring			
Location	Plot 96	Date	24-Sep
Assessor	мн		
Crown species composition (species %)		Mb90 Dr5 Hw5	

Component/subcomponent	PULLDOWNS	SCORE
Depth of organic layer	1-<5	3
Surface a	and ladder fuel (.1-3m in he	eight)
Surface fuel composition	deciduous shrubs	4
Dead and down material		
continuity (<7cm)	Scattered <10% coverage	4
Ladder fuel composition	Deciduous	0
Ladder fuel horizontal		
continuity	Absent	0
Stems/ha (understory)	<900	2
Stand structure an	d compostion (dominant ar	nd co-dominant)
	Deciduous (<25%	
Overstory composition/CBH	conifer)	0
Crown closure	41-60%	2
Fuel strata gap	6-9	3
Stems/ha (overstory)	401-600	2
Dead and dying (% of dominant	Standing dead/partial	
and co-dominant stems)	down 21-50%	5
Comments:	TOTAL	25
	RATING	LOW
Dominant and codominant big l	eaf maple with spare inter	mediates. Understory all
sword fern. No ladder fuels. Plot	t on slope above existing d	welling.

Threat Rating Category		
	Low	0-43
	Moderate	44-59
	High	60-72
	Extreme	73-110

## Appendix 2 Fuel Type Descriptions

#### FUEL TYPE D1 – DECIDUOUS DOMINATED STANDS

The northern slope of Harrision Hill appears to be a unbroken forest with a D1 fuel type. The forest is predominantly bigleaf maple with smaller components of birch, cherry, and red alder. Coniferous trees are present but very infrequent. The ground cover is mostly sword fern and vine maple. D1 fuel types have a low flammability and would not support a fast spreading, high intensity wildfire. D1 stands pose a low wildfire risk and are expected to act as fuel breaks decreasing the overall wildfire threat to the site.

Table 6 outlines the general stand characteristics of D1 stands.

Characteristic	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) (%	Low-Med	10-25% coverage
cover)	LOW MICO	
Live conifer canopy closure (%)	Very low	< 20% crown closure
Live deciduous closure (%)	Very low	>80% or <40% coniferous crown closure
Live and dead conifer crown height (m)	Very low	5m+ or <20% conifer crown closure
Live and dead suppressed and understory	Verylow	0-500 stems/ba
conifer (stems/ha)	VETYLOW	

Table 6. D1 general stand characteristics



Photo 1. Ground cover and understory in the assessment area is mostly sword fern and vine maple – this vegetation has low flammability.



Photo 2. Crowns of the deciduous stand. This stand type is homogenous across the assessment area.



Photo 3: A large, vegetation-free buffer has been cleared on the site. Coniferous trees like the cedar in the background are scattered across the site and generally isolated.



Photo 4: The canopy of the forest typically has 40-60% closure.



Photo 5: Viewing the existing dwelling from above

## 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 redcedar (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 redcedar (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 redcedar (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.

#### 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 redcedar (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 Additional Fire Behaviour and Fuel Treatment Resources

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