



# Township of Langley Community Wildfire Resiliency Plan

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Cover Photo Credit: Louis Orieux; B.A. Blackwell & Associates Ltd.

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## EXECUTIVE SUMMARY

The Community Wildfire Resiliency Plan (CWRP) process (evolving from the Community Wildfire Protection Plan - CWPP) was created in British Columbia (BC) as a response to the devastating 2003 wildfire in Kelowna. As an integral part of the Community Resiliency Investment (CRI) Program, managed by the Union of BC Municipalities, CWRPs aim to develop strategic recommendations based on the seven FireSmart™ disciplines<sup>1</sup> to assist communities in improving safety and reducing the risk of damage to property and critical infrastructure from wildfires.

This CWRP provides Township of Langley (Township) with an action plan that can be used to guide the improvement and/or development of emergency plans, emergency response, evacuation plans, communication and education programs, bylaw development in areas of fire risk, and the management of potentially hazardous forest lands for the community's Wildland-Urban Interface (WUI).

Wildfire management requires a multi-faceted approach for greatest efficacy and risk reduction outcomes. A total of 30 recommendations and action items are presented in a tabularized format (Table 1) in this Executive Summary and are more thoroughly discussed in their appropriate sections within the document. Recommendations and action items within this plan should be considered a toolbox of options to help reduce the wildfire threat to the Township. The Township will have to further prioritize implementation based on resources, strengths, constraints, and availability of funding, and regularly update the prioritization and course of action as variables change through time.

Field work allowed for verified and updated fuel types and wildfire threat assessments to be combined with an office-based analysis to update the local wildfire threat for the Township's WUI (Section 4: Wildfire Risk Assessment; Appendix A: Local Wildfire Risk Process). A key subcomponent of this analysis is the *wildfire threat class* (analyzing fuels, weather, and topography sub-components), which has the following classes:

- **Very Low:** Waterbodies with no forest or grassland fuels, posing no wildfire threat;
- **Low:** Developed and undeveloped land that will not support significant wildfire spread;
- **Moderate:** Developed and undeveloped land that will support surface fires;
- **High:** Landscapes or stands that are continuous forested fuels that will support candling, intermittent crown or continuous crown fires. These landscapes are often steeper slopes, rough or broken terrain and/or south or west aspects. High polygons may include high indices of dead and downed conifers; and
- **Extreme:** Continuous forested land that will support intermittent or continuous crown fires.

The results of the wildfire threat class analysis are shown on Map 6 and in Table 12. Excluding private land, the analysis shows that (for the assessable area) the majority (95%) of the Township's WUI is

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<sup>1</sup> Education, Legislation and Planning, Development Considerations, Interagency Cooperation, Emergency Planning, Vegetation Management, and Cross-Training

classified as Low or Very Low wildfire threat. 5% is classified as moderate wildfire threat, and 0.2% of the WUI is classified as High wildfire threat. No area was classified as Extreme wildfire threat. This analysis reflects the low-relief topography of the Township's WUI, as well as the dominance of low-threat fuel types, specifically deciduous dominated forest stands (D-1/2 and M-1/2), grass (O1-a/b), and non-fuel (roads, water, etc.).

Township of Langley is one of the largest municipalities by area in BC (316 km<sup>2</sup>) and is characterized as a "community of communities" with a unique rural/agricultural and urban mix.<sup>2</sup> Over 19 separate and unique town centres of varying sizes are interspersed between farms, ranches, forested parkland, and undeveloped lots. Owing to the large amount of private land within the Township and the overall low fire behaviour risk determined on municipal parcels and within Metro Vancouver Regional Parks, there are only a few on-the-ground actions the Township can take to directly lower wildfire risk. Thus, mitigating key wildfire risks and vulnerabilities for the municipality will largely fall under education programs directed at residents/farmers and visitors to the Township, planning and development considerations aimed at building more fire resilient structures and neighbourhoods, emergency planning so that when a wildfire/large fire event occurs first responders are prepared, and home and critical infrastructure FireSmart vegetation management.

Recent studies completed by the Institute for Catastrophic Loss Reduction from the Fort McMurray and Lytton urban wildfire events showed that although wildfire conditions pass quickly (~60 seconds), homes will burn independently of the wildfire event, and for a long time. This means that although wildfire can cause structure ignition (most often via embers/firebrands which can travel up to 10km; less often via direct flame), this is concentrated to the wildland-urban interface edge for interface communities or throughout intermix communities. Fire then moving through an urban community becomes a structure-to-structure ignition/burning event – once these initial homes are on fire, they then transfer fire, through vegetation, convective heat, and flame contact to other structures, and so forth. This creates an urban conflagration which quickly overwhelms emergency response.

Supported by FireSmart education initiatives, residential-scale FireSmart landscaping of municipal critical infrastructure and private properties, in conjunction with developing more fire-resistant structures, will likely be the most effective actions that the Township can take to reduce wildfire risk within its WUI. Hazardous vegetation and/or building conditions on developed parcels can allow for an urban conflagration, while agricultural land can host aggressive fires if left poorly or completely unmanaged (depending on the amount, type, and dryness, of built-up vegetation).

The Township has begun planning and preparing for a wildfire emergency through available FireSmart resources (e.g., resident education), but should look to this CWRP on how to continue this process effectively.

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<sup>2</sup> Township of Langley Official Community Plan (bylaw No. 1842)

Table 1: Recommendations of the Township of Langley's Community Wildfire Resiliency Plan

Item	Priority	Recommendation	Rationale	Lead	Timeframe	Metric for Success	Funding Source / Est. Cost (\$) / Person Hours
				(Involved)			
<b>Education - Section 5.1</b>							
<b>Residents</b>							
1	High	Continue to promote FireSmart approaches for wildfire risk reduction to homeowners, businesses, and stakeholders through FireSmart workshops, open houses, and/or presentations. Supply FireSmart resources during these engagement campaigns and promote the FireSmart Begins at Home mobile app as a method of conducting home assessments.	FireSmart BC resources help present a unified message. Print resources are popular and easy to distribute. Take notes on what outreach methods have the most uptake and where, and adapt the program accordingly over time. Work with local businesses to advertise.	Public Safety and Community Risk /FireSmart	Ongoing	Continued growth in uptake and attendance of the FireSmart program	CRI FCFS funding resources for Education events (banners, brochures, promo items).
2	High	Promote the Farm and Ranch Wildfire Preparedness Program by offering free Hazard Assessments and holding workshops to assist farmers in completing a Wildfire Plan.	The Township has large rural areas with agricultural properties ranging from hobby farms to commercial farm operations. Previous large-scale emergencies have highlighted the importance of having a Wildfire Plan, especially when it comes to animal evacuation.	Public Safety and Community Risk /FireSmart  (Consultant)	Launch assessments within 2 years	Farms begin to have Wildfire Plans completed.	CRI FCFS funding for assessments
3	High	Provide FireSmart Home Ignition Zone (HIZ) assessments to residents as a tool to educate them on what are and aren't fire and wildfire risks on the home and property.	These assessments will detail specific FireSmart structure upgrade and landscaping recommendations private landowners and the municipal government can then action on.	Local FireSmart Representatives  (Consultant)	HIZ assessment registration open (1 year); assessments being completed (2 years)	HIZ assessments are being completed.	CRI FCFS funding for assessments (up to \$265/home)
4	High	Take the FireSmart message into local schools with presentations by FireSmart and fire services staff, and/or use of the FireSmart BC Education Kit materials.	FireSmart education for youth can lead to wildfire awareness being a normal part of their lives as well as bringing information home to their families.	Public Safety and Community Risk /FireSmart (Fire Department; BCWS)	Yearly	One FireSmart education day per school year in all high schools.	CRI FCFS funding available for presentations and materials

Item	Priority	Recommendation	Rationale	Lead	Timeframe	Metric for Success	Funding Source / Est. Cost (\$) / Person Hours
				(Involved)			
5	High	Launch a FireSmart social media campaign targeting platforms and online community groups used by the Township's residents.	This can be a cost effective and wide-reaching method used to continue FireSmart education within the municipality. [CRI FCFS funding is available to hire a consultant to develop FireSmart social media campaigns.]	Public Safety and Community Risk /FireSmart  (Consultant)	Campaign launched within 3 years	Increased FireSmart awareness among residents. Increase of people at FireSmart events	CRI FCFS funding  Contracted services to develop (~\$5,000 and deliver~\$2,000)
<b>Administration</b>							
6	High	a) Create a FireSmart Coordinator position to lead implementation of FireSmart activities and CWRP recommendations in the Township. The FireSmart Coordinator should be trained as a Local FireSmart Representative (LFR) and should also take the free online Wildfire Risk Reduction (WRR) course offered by FireSmart BC.  b) Have the FireSmart Coordinator (add other Community FireSmart and Resiliency Committee members, as wanted) attend FireSmart BC's annual WUI Symposium.	a) An internal FireSmart coordinator is an efficient way to deliver programs.  b) The WUI Symposium brings together FireSmart and wildfire professionals from across the province and provides great educational and networking opportunities.	If Internal: Public Safety and Community Risk /FireSmart  (External: Consultant)	a) 1 year  b) Yearly	a) Internal or external person acting as the Township's FireSmart Coordinator  b) FireSmart Coordinator attends WUI Symposium annually	CRI FCFS funding available for both the FireSmart Coordinator position and for persons to attend the WUI Symposium
7	High	Make this plan available on the Township's website. Once approved, hold public meeting(s) to present the plan and generate buy-in.	Plan implementation will be most successful with buy-in from the public, as significant action on private land is required.	Public Safety and Community Risk /FireSmart	1 year from approval date	Residents aware of the CWRP	Township of Langley
8	High	Develop a FireSmart page on the Township of Langley's municipal webpage. Advertise it to residents and use it as the place for them to go to see what FireSmart activities are happening where, when, and how they can participate.	Residents use the Township's webpage as a source for information – this should be utilized to educate for FireSmart and wildfire awareness.	Township of Langley  (Consultant)	3 years	Webpage active and promoting FireSmart events, hosting assessment registrations, etc.	CRI FCFS funding available  (~\$3000 contracted service. ~40 hours for set-up. Additional hours for updates as required)

### Legislation, Planning and Development - Section 5.2

9	High	Complete or schedule periodic updates of the CWRP. The frequency of updates is dependent upon major changes which would impact local wildfire risk, funding changing that may lead to new opportunities or the rate at which wildfire risk reduction efforts are implemented.	A current (i.e., no more than 5 years old) CWRP is a requirement for further funding under the CRI Program. Reassess and reprioritize proposed and complete.	Public Safety and Community Risk /FireSmart  (Consultant)	5 years from adopting this CWRP document	Township of Langley always has an up-to-date CWRP and action plan	CRI FCFS funding up to \$32,000. Incremental staff hours for project management (40-80)
10	High	Consider adopting a Wildfire Landscaping Bylaw to restrict flammable landscaping. Example: prohibit conifer vegetation in the Immediate Zone of a residence or structure (0-1.5 m) and prohibit the planting of new conifer vegetation in Priority Zone 1 (1.5-10 m).	Highly flammable landscaping plants (ex., cedar hedges) were noted throughout the Township, especially on more densely populated streets. Other jurisdictions (District of Squamish, City of Nelson) have successfully implemented a similar bylaw, which can be an effective communication tool regardless of enforcement capacity.	Public Safety and Community Risk /FireSmart	3 Years	A Wildfire Landscaping Bylaw is being considered by Council	Incremental staff hours. CRI FCRS up to \$10,700 per bylaw for development considerations
11	High	Implement draft Interface Wildfire DPA policies that are part of Community Plans currently in development. Monitor DPA implementation with a goal of amending these policies into additional neighbourhoods.	The most effective option to further encourage FireSmart principles in development is through Interface Wildfire Hazard Development Permit Areas. Other jurisdictions (District of West Vancouver, District of Squamish) have successfully done so.	Public Safety and Community Risk /FireSmart  (Consultant)	5 Years	Draft DPAs assessed for effectiveness and applied into other Community Plans	Incremental staff hours. CRI FCRS up to \$10,700 for DPA development
12	High	Complete FireSmart Critical Infrastructure Assessments of critical infrastructure, prioritizing those that are the most important towards responding to, and recovering from, a wildfire emergency (see Table 7). Note: Update this table, as needed, to include other critical infrastructure.	For more effective response to and recovery from a wildfire emergency. Plan to implement high priority recommendations (can be funded through CRI FCFS). Update	Public Safety and Community Risk /FireSmart  (Consultant)	3 Years	Identified priority critical infrastructure listed in Table 7 have completed FireSmart Assessments	Incremental staff hours. CRI FCRS up to \$850 per assessment
13	Moderate	Update the Township of Langley OCP and associated Community and Neighbourhood Plans through a wildfire lens, incorporating FireSmart principles where needed. Include a policy to require the construction of municipal assets and critical infrastructure to adhere to FireSmart principles.	To promote wildfire resiliency in development. To make additional community assets (i.e., community centres) safe refuges during a wildfire emergency.	Public Safety and Community Risk /FireSmart  (Consultant)	5-10 Years	FireSmart language and policies amended into the OCP, Community, and Neighbourhood Plans	Incremental staff hours. CRI FCRS up to \$10,700 per OCP amendment for development considerations



Interagency Cooperation - Section 5.3

14	High	Continue hosting Township of Langley Community FireSmart and Resiliency Committee (CFRC) meetings, incorporating recommended FireSmart, wildfire, and land managers as recommended.	The committee is an opportunity to share information on planned activities and learn from other stakeholders, and will help efficiently to plan and deliver the Township's FireSmart program. An active CFRC is an impending requirement for CRI FCFS funding.	Public Safety and Community Risk /FireSmart  (Identified stakeholders)	Yearly and ongoing	At least one committee meeting held annually	At least 8 internal hours per meeting to prepare, participate and debrief; CRI FCFS up to \$2,140 per meeting
15	High	Engage with additional agencies that own or manage high ignition risk infrastructure (BC Ministry of Transportation and Infrastructure, Canadian Pacific and Canadian National Railways, Langley Regional Airport, etc.) specifically about managing the grass and other vegetative fuel loads within their right-of-ways or on their properties.	These transportation corridors and infrastructure represent a considerable fire ignition risk within the Township's WUI. They are often lined with grass (rail-lines, highways) or have large areas of grass within them (airport). The recent Lytton wildfire disaster showed how wildfire can move quickly through urban areas in un-managed or poorly managed grass-dominated fuel network, creating an urban conflagration scenario that quickly overwhelmed local Fire Departments and response agencies. Ensuring grass and other fuels associated with these infrastructures are managed properly, especially during fire season, can greatly limit a fire's ability to spread quickly and becoming a wildfire/urban conflagration emergency.	Public Safety and Community Risk /FireSmart  (Identified stakeholders)	Engage with all within 2 years	Grass and other fuels associated with high ignition risk infrastructure are being managed	Internal hours, amount dependent on level of engagement
16	High	Engage with the Katzie First Nation, Kwikwetlem (Kwantlen) First Nation, and Matsqui First Nation about collaborative opportunities for FireSmart program development and delivery.	To encourage FireSmart throughout the Township of Langley. To provide efficiencies in delivering FireSmart programs, as well as consistency in FireSmart messaging.	Public Safety and Community Risk /FireSmart  (Identified First Nations)	Engage with all within 2 years	Collaborative FireSmart Programs underway within 5 years	Internal hours, amount dependent on level of engagement

Cross Training & Fire Department Resources - Section 5.4

Training

17	High	<p><i>For Township of Langley Fire Department staff:</i></p> <p>a) Work towards all staff should be trained, at minimum with S-100 (basic fire suppression and safety). Furthermore, staff should look to be trained in the more comprehensive SPP-WFF1 (Wildland Firefighter Level 1).</p> <p>b) Other training to be considered includes S-231 (Engine Boss Course), and S-185 (Structural Protection Unit Deployment).</p>	SPP-WFF-1 is specific for structural fire fighters who respond to wildland fires in their service area.	TLFD	1 year and ongoing	All members are trained in SPP-WFF1 and refresh the course annually	Compensation for course instructor/facilitation of spring training courses; CRI FCFS funding
18	High	Continue offering training opportunities for municipal staff and TLFD staff, including Emergency Operations Centre (EOC) and Incident Command System (ICS) courses, as well as First Nation cultural sensitivity training.	ICS-100 is an online course that provides an introduction to effective control of an emergency site; other levels of ICS provide more detailed training. BCWS uses the ICS system. TLFD has response agreements with local First Nation reservation communities – sensitivity training is important for further education and awareness of First Nation considerations while working in their traditional territories and communities.	TLFD Public Safety and Community Risk /FireSmart	1 year and ongoing	Increased numbers TLFD and municipal staff have additional identified training.  All Public Safety and Community Risk members have First Nation cultural sensitivity training.	CRI FCFS: staff time and course cost (ICS-100 \$25 online)
19	Moderate	TLFD should schedule regularly (bi-annually at least) practical training with wildland firefighting equipment, and if possible cross-training with BCWS (Fraser Fire Zone – Cultus/Haig fire base).	Cross-training enhances the abilities of crews to work together on an interface fire.	TLFD	Training every second year (minimum)	TLFD and BCWS are conducting training sessions	In-house staff time and costs
<b>Equipment</b>							
20	High	TLFD should look to acquire (and train with) wildland firefighting equipment, including mobile sprinkler units. TLFD should prioritize the purchase of a trailer so that the equipment can be deployed to where it is needed most, quickly.	The Township should consult with BCWS Fraser Fire Zone (Cultus/Haig fire base) staff on what equipment should be prioritized, and then schedule training sessions with it. Prioritizing the purchase of a trailer allows for wildland firefighting	TLFD	5 Years	Trailer with equipment (including mobile sprinklers) has been acquired. Training using	Up to \$45,000/per year. Four year/phases identified as part of CRI FCFS funding

			equipment and mobile sprinklers to be stored in one location that can be mobilized to where it is needed most. Training is available for setting up and running mobile sprinkler units.			mobile sprinklers has been provided to TLFD staff	
<b>Response</b>							
21	High	TLFD should continue to uphold both Commission of Fire Accreditation International and Superior Tanker Shuttle Service accreditations.	These accreditations provide TLFD with ongoing department reviews with action plan outcomes to facilitate continued response and service improvements.	TLFD	Ongoing	Accreditations upheld	In-house hours and costs specific to each (neither funded through CRI FCFS)
<b>Emergency Planning - Section 5.5</b>							
22	High	Hold wildfire specific tabletop emergency scenarios with emergency management partners. Consider fires approaching from likely directions (i.e., from the south across the Canada/USA border) and how that would affect communication, evacuations, response, etc.	Tabletop exercises provide an opportunity to identify weak spots in a plan and collaborate.	Public Safety and Community Risk /FireSmart  CFRC	Every 2 years	A wildfire specific table-top exercise is completed every two years	CRI FCFS Emergency Planning: up to \$2,140 per meeting. Possibly CRI CEMF
23	High	Develop and action a Wildfire Response Preparedness Condition Guide (Table 19). Tailor this guide to the municipality's specific structure and edit it after mock-exercises/table-top drills.	To guide risk management primarily during times of High and Extreme wildfire danger levels.	Public Safety and Community Risk /FireSmart  CFRC BCWS	5 years	A Wildfire Response Preparedness Condition Guide has been developed	CRI FCFS Emergency Planning funds available
24	Moderate	Develop a specific Wildfire Pre-Incident Plan with associated maps.	To save valuable time during fire suppression operations. The plan should be developed and tested using tabletop simulations.	Public Safety and Community Risk /FireSmart  CFRC BCWS	5 years	A Wildfire Pre-Incident Plan has been developed	CRI FCFS Emergency Planning funds available
25	Low	Ensure that all critical infrastructure (water pumpstations, fire halls, community halls, identified EOCs) have back-up generators.	Back-up generators for pumphouses, treatment plants, and community buildings would facilitate both emergency response (water supply for suppression) and rapid community return and recovery following a fire.	Public Safety and Community Risk /FireSmart  Municipality Engineering	5 years	All water infrastructure, at a minimum, has back-up power	Cost varies - \$50,000+ per required generator

Vegetation Management - Section 5.6

Residential FireSmart

26	High	Implement a community chipper program. Education of FireSmart yard and landscaping principles, including chipping specifications, should be incorporated into the program. Owing to the large geographical area of the municipality and the large number of properties, plan to implement the program on a community/neighbourhood by community/neighbourhood basis.	To reduce fire and wildfire hazards on private property within the WUI and promote FireSmart vegetation management knowledge and education. The intent is for landscaping/yard vegetation to be included, not farm or agriculture vegetation.	Public Safety and Community Risk /FireSmart	2 years	Chipper program has been trialed in a community with the intent to expand across the municipality	CRI FCFS funding available to cover calculated costs of program
27	High	Implement a FireSmart rebate program across the municipality.	To incentivize property owners to conduct FireSmart structure and vegetation management changes to their homes and landscaping, reducing fire and wildfire risk.	Public Safety and Community Risk /FireSmart	3 years	Rebate program has been implemented.	CRI FCFS funding: Rebates are limited to 50% of the total cost of eligible activities and up to \$1,000 per property

FireSmart Vegetation Management in Municipal Programs and Plans

28	High	Implement recommended vegetation management recommendations from FireSmart Critical Infrastructure Ignition Zone Assessments, when completed, on a priority basis.	To reduce fire behavior and risks to critical infrastructure most important to fire and wildfire fighting and post-wildfire recovery.	Township of Langley municipal departments  (Public Safety and Community Risk /FireSmart)	5 years	High priority critical infrastructure has had FireSmart vegetation management completed	CRI FCFS funding up to \$53,500 per municipal infrastructure (vegetation management included)
29	High	Incorporate FireSmart vegetation management principles into relevant municipal programs and plans (i.e., green roof program; Climate Action Strategy, Climate Action Strategy).	Plans and policies can be used to both educate residents on FireSmart as well as direct FireSmart principles into development and plans, working towards a lower fire risk WUI.	Township of Langley municipal departments  (Public Safety and Community Risk /FireSmart)	5 years	FireSmart vegetation management principles incorporated into stated plans/strategies and considered for others, where applicable	In-house time and associated costs
30	High	Assess greenspace/greenway trails that are adjacent to structures (primarily residential	To reduce the risk of fire moving from municipal greenspaces to	Township of Langley Parks	5 years	Trails assessed – pruning work has	In-house time and associated costs

		areas) and identify areas where conifer trees should be pruned with the intent to create more ground-to-canopy spacing and increase spacing between branches and structures.	structures/homes, as well as from structures/homes, through greenspaces, to other structures/homes	(Public Safety and Community Risk /FireSmart)		commenced where necessary	
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## FREQUENTLY USED ACRONYMS

AOI	Area of Interest
BC	British Columbia
BCWS	British Columbia Wildfire Service
BEC	Biogeoclimatic Ecosystem Classification
CFFDRS	Canadian Forest Fire Danger Rating System
CRI	Community Resiliency Investment
CWRP	Community Wildfire Resiliency Plan
CWPP	Community Wildfire Protection Plan
DPA	Development Permit Area
EMBC	Emergency Management British Columbia
EPA	Emergency Program Act
FBP	Fire Behavior Prediction System
FCFS	FireSmart Community Funding and Supports: Stream 1 of the UBCM CRI Program
HIZ	Home Ignition Zone
ICS	Incident Command System
MOF	Ministry of Forests
MOTI	Ministry of Transportation and Infrastructure
NDT	Natural Disturbance Type
PSTA	Provincial Strategic Threat Assessment
TLFD	Township of Langley Fire Department
UBCM	Union of British Columbia Municipalities
VAR	Values at Risk
WUI	Wildland-Urban Interface

## SECTION 1: INTRODUCTION

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In June 2022, B.A. Blackwell and Associates Ltd. was retained by Township of Langley (Township) to develop their first Community Wildfire Resiliency Plan (CWRP). A CWRP is both a localized risk assessment and an action plan to improve wildfire resiliency within the district municipality. This plan takes advantage of the newest community wildfire planning framework in BC, with a strong focus on the seven FireSmart™ disciplines.<sup>3</sup>

Recent wildfire disasters like those experienced in Slave Lake, Alberta (2011), Washington State (2014, 2015), Fort McMurray, Alberta (2016), BC (2017, 2018, 2021), and California (2017, 2018, 2020) all display the vulnerability of communities and the potential toll of wildfires on families, neighbourhoods, public health, and the economy of entire regions. These events, along with important advances in loss prevention programs, have spurred the need for greater consideration and due diligence concerning fire risk in the wildland-urban interface (WUI).<sup>4</sup> CWRPs are an invaluable opportunity to proactively manage wildfire risk and increase community resilience to wildfire.

### 1.1 PLAN PURPOSE AND GOALS

The purpose of this CWRP is to identify the level of interface wildfire risk to the Township by providing a current and accurate understanding of the threats to human life, infrastructure, and values at risk from wildfire. This CWRP is intended to serve as a framework to guide the implementation of specific actions and strategies to:

- 1) Increase the efficacy of fire suppression and emergency response,
- 2) Reduce potential impacts and losses to property and critical infrastructure from wildfire, and
- 3) Reduce wildfire behavior threat within the community.

To help guide and accomplish the above strategies, this CWRP will provide the Township with:

- 1) An assessment of values at risk and potential consequences from wildfire,
- 2) An assessment of wildfire risk to the community,
- 3) Maps of fuel types and fire threat,
- 4) An assessment of emergency response capacity, and
- 5) Options and strategies to reduce wildfire risk in the seven FireSmart disciplines: education, legislation and planning, development considerations, interagency cooperation, cross-training, emergency planning, and vegetation management.

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<sup>3</sup> Education, Legislation & Planning, Development Considerations, Interagency Cooperation, Cross-Training, Emergency Planning and Vegetation Management

<sup>4</sup> Wildland-urban interface is defined as the presence of structures in locations in which conditions result in the potential for their ignition from flames and firebrands/embers of a wildland fire (National Fire Protection Association).

CWRPs are funded in BC by the Union of BC Municipalities (UBCM) under the Community Resiliency Investment (CRI) FireSmart Community Funding and Supports (FCFS) Program. As per funding requirements, this CWRP is completed according to the 2021 CRI template.

## 1.2 PLAN DEVELOPMENT SUMMARY

The planning for this CWRP is based on the Wildland-Urban Interface (WUI) of the Township. The WUI is traditionally understood as the zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels.<sup>5</sup> For the purpose of this CWRP, the WUI is defined as a one-kilometer buffer around the administrative boundary of the Township of Langley.<sup>6</sup> Further information on the Township and its WUI is found in Section 3.

The CWRP process consists of five general phases:

- 1) Formation of the Township's Community FireSmart Resiliency Committee (CFRC); see Section 5.3. Consultation with the CFRC and information sharing with stakeholders and First Nations occurred throughout the plan's development;
- 2) Review of relevant plans and legislation regarding emergency response and wildfire (Section 2);
- 3) Community description and identification of values at risk (Section 3);
- 4) Assessment of the local wildfire risk (Section 4); and
- 5) Analysis and action plan for each of the seven FireSmart disciplines (Section 5).

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<sup>5</sup> FireSmart Canada. 'What is the wildland urban interface?' <https://www.firesmartcanada.ca/what-is-firesmart/understanding-firesmart/what-is-the-wui/>

<sup>6</sup> CRI FCFS WUI determination is a 1km buffer of structure density 6 or more structures per square kilometre within the administrative boundary. A 1km buffer of Township of Langley's municipality fulfills boundary CRI FCFS funding requirements as all areas within the Township exceed a structure density of six or more structures per square kilometre.

## SECTION 2: RELATIONSHIP TO OTHER PLANS AND LEGISLATION

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This section reviews all local community plans relevant to wildfire and emergency management, as well as the Township’s bylaws, higher-level plans and legislation to identify linkages and content that is relevant to community wildfire planning.

### 2.1 LINKAGES TO CWPPS/CWRPS

This CWRP is the first community wildfire plan for the Township of Langley. At the time of writing, no immediately adjacent jurisdictions have completed community-scale wildfire plans.

### 2.2 LOCAL AUTHORITY EMERGENCY PLAN

Emergency preparedness and response is guided by higher level emergency management legislation such as the provincial Emergency Program Act.<sup>7</sup> The Emergency Program Act describes the various roles and administrative duties of the Province and local governments with regards to emergency, the implementation of higher-level emergency plans, the processes of declaring a state of emergency, and coordinating post disaster relief programs and assistance.

The Township’s emergency management has previously been provided by the municipality in conjunction with Langley City. However, at the time of this plan’s writing, the Township has decided to have their own emergency program for itself. Response to an interface wildfire event will be coordinated and directed through the Township’s emergency plan. As such, it should be reviewed, tested, and updated to ensure such an event will be properly actioned. Interagency cooperation is discussed in Section 5.3 of this CWRP, cross-training and fire department resources in Section 5.4, and emergency planning in Section 5.5.

### OTHER LOCAL PLANS

Table 2 lists additional local plans relevant to wildfire management, emergency planning, and evacuation planning for the Township. It describes these plans and their relation to the CWRP.

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<sup>7</sup> British Columbia Provincial Government. 2020. *Emergency Program Act*. Retrieved from: [Emergency Program Act \(gov.bc.ca\)](https://www2.gov.bc.ca/gov/content/soc/comm/emergency/emergency-program-act)

**Table 2: Other Local Plans and relationship to CWRP**

Local Plans	Description and Relation to CWRP
<p><b>Township of Langley Official Community Plan (Bylaw 1842)</b></p>	<p><b>1.8 Vision</b> The Vision of the Township of Langley Official Community Plan is: The Township of Langley is a self-contained “community of communities” evolved through thoughtful renewal and sustainable development practices, in order to provide the best possible quality of life for residents in the rural and urban areas.</p> <p>- <i>“Thoughtful renewal and sustainable building practices” should include consideration of wildfire risks and opportunities to incorporate wildfire resiliency.</i></p> <p><b>1.9 Goals</b> The goals of the Township of Langley Official Community Plan are:</p> <ol style="list-style-type: none"> <li>1) Manage sustainable growth.</li> <li>2) Promote agriculture and enhance farm viability.</li> <li>3) Provide flexible, affordable, and mixed housing options.</li> <li>4) Maintain a balance between local job opportunities and labour force growth.</li> <li>5) Encourage high-quality urban design.</li> <li>6) Identify infrastructure needs and ensure efficient delivery of services.</li> <li>7) Increase biodiversity and natural capital.</li> <li>8) Pursue a low-carbon lifestyle.</li> <li>9) Protect and manage heritage resources.</li> <li>10) Ensure fiscal accountability.</li> <li>11) Support meaningful community engagement.</li> </ol> <p>- <i>All goals relating to development, growth, sustainability, infrastructure, and urban-design can account for wildfire as a risk that can be planned for, managed, and mitigated. Section 5.2 of this CWRP provides recommendations within legislation and planning and development.</i></p> <p><b>3.4 Emergency Response and Public Safety</b> A community’s resiliency helps its residents recover from emergencies or disasters, and proactively attempts to prevent or diminish negative effects from these events. This includes essential emergency responder services such as ambulance, fire, police, and emergency response programs. These services save lives, reduce suffering, protect property, mitigate damage to the environment, and control the economic consequences of emergencies and disasters.</p> <p><b>3.4.8</b> Support and encourage initiatives that reduce the number of deaths, injuries, and property loss, such as ensuring the use of working smoke alarms and sprinklers (including in single-family houses).</p> <p><b>3.4.9</b> Support preventable safety programs and initiatives, as opposed to reactive responses (e.g., dike mitigation work, neighbourhood watch, community Emergency Preparedness educational programs, fire safety and other public education programs).</p> <p><b>3.4.10</b> Continue to support programs such as the Fire Department Superior Tanker Shuttle Accreditation and large-diameter hose program that assist in reducing fire insurance costs for residents living in rural areas.</p> <p><b>3.4.12</b> Facilitate mitigation measures such as natural hazard Development Permit Areas to reduce risks arising from landslides, flood, debris flow, and forest interface wildfire.</p> <p><b>3.4.14</b> Continue to support the Langley Emergency Program for community notification and emergency response and recovery procedures and facilitate community preparedness.</p>

	<p>- The FireSmart program and wildfire risk management promote safety programs and initiatives that can be incorporated into the Township’s public safety framework as means to lower wildfire and fire risk to persons, infrastructure, and neighbourhoods. Interface Wildfire Development Permit Areas can help accomplish structural wildfire risk reduction measures beyond those within the BC Building Code. Recommendations speaking to legislation and planning and development are provided in Section 5.2 of this CWRP, and emergency planning is addressed in Section 5.5. The FireSmart program as a whole makes up the framework for Section 5.</p>
<p><b>Township of Langley Community and Neighbourhood Plans</b></p>	<p>“Community” and “Neighbourhood” plans have been developed for specific, identifiable consolidated urban areas and act as a declaration of the goals, objectives and policies which will guide the future development of them. Their purpose is to provide: long range orderly development in accordance with stated objectives; a guide for day-to-day decision-making in the development process of the area; the basis for the preparation and adoption of the capital works program based on need; and, the basis for the preparation and adoption of land use regulating bylaws and amendments to them.</p> <p>- Community and Neighbourhood Plans can be used to specify wildfire risk reduction and FireSmart principles within the Township’s most populated areas, while still trying to maintain each community’s character. Recommendations speaking to legislation and planning and development are provided in Section 5.2 of this CWRP.</p>
<p><b>Township of Langley Fire Department Standards of Cover and Deployment Plan</b></p>	<p>As part of the Township of Langley Fire Department’s continued accreditation with the Center on Fire Accreditation International (CAFI), all areas of the Fire Department’s organization, administration, community risk, and historical response data be needs to be researched, studied, and evaluated – accomplished and summarized in this document.</p> <p><b>4.4.2 Interface Fire Risk</b> – states interface fire risk as low but should still be considered. Three recommendations are provided:</p> <p>[1] Recommendation: A BC Forest Professional specializing in interface fire risk analysis should be engaged to determine the likelihood of an interface fire occurring in the Township of Langley so the Township of Langley Fire Department can ensure it is prepared for such an occurrence.</p> <p>[2] Recommendation: The Township of Langley Fire Department requires an operations response Operating Guideline that is specific to interface fires.</p> <p>[3] Recommendation: The Township of Langley Fire Department firefighters should be trained to National Fire Protection Association 1051 Standard for Wildland Firefighter Personnel Professional Qualifications or equivalent.</p> <p>- Recommendation [1] is addressed specifically by the development of this CWRP. A wildfire risk assessment is completed in Section 4.</p> <p>- Recommendation [2] is additionally proposed within this CWRP, addressed in Section 5.5.</p> <p>- Recommendation [3] is additionally proposed within this CWRP, addressed in Section 5.4.</p>

<p><b>Township of Langley Climate Action Strategy</b></p>	<p>Highlights the need to proactively address climate risk. The Township recognizes that a changing climate will likely lead to more droughts and more wildfires. The strategy identifies greenspaces and ecosystems (including tree canopy cover) as features that can limit climate change impacts. Identified actions to residents include planting drought tolerant trees and shrubs.</p> <p><i>- Residential-scale FireSmart landscaping can lower fire risk to structures and infrastructure. It can also be applied by the municipality throughout its municipal land and is addressed in Section 5.6 of this CWRP.</i></p>
<p><b>Township of Langley Water Management Plan</b></p>	<p>Without action, rapid population growth, expanding industrial and commercial developments, intensification of agricultural practices, and potentially adverse climate change effects will exacerbate demands on this vulnerable resource. Currently, groundwater withdrawal is essentially unregulated across the province: an individual can extract as much water as they want without consideration for it being a shared and limited resource. Approximately 80% of the Township’s water supply is provided from municipal and private wells. Analysis of data indicates dropping water levels are not due to changes in precipitation but are the result of groundwater overuse. To meet the planning objectives and the targeted 30% reduction in groundwater use, 30 recommendations were identified and agreed to.</p> <p><i>- Access to sustainable and continuous water sources is a key component towards lowering wildfire risk (through irrigation in the summer dry season), as well as wildfire suppression by the fire department and wildfire crews.</i></p>
<p><b>Township of Langley Community Forest Management Strategy</b></p>	<p>The Community Forest Management Strategy provides a comprehensive vision for the Township’s trees. It captures the state of the community forest and sets goals, targets, and actions through an implementation plan all in effort to protect and steward the community forest for generations to come. Five key stated goals of the strategy are:</p> <ol style="list-style-type: none"> <li>1. Plan for a more connected and climate resilient network of trees and natural assets.</li> <li>2. Grow the community forest equitably and sustainably by planting more trees.</li> <li>3. Protect the community forest to retain more trees and natural assets during development.</li> <li>4. Manage trees to maintain a safer and healthier community forest.</li> <li>5. Engage citizens to increase participation in community forest stewardship.</li> </ol> <p><i>- Targets and actions within this strategy should consider FireSmart landscaping and fire-resistant tree species in their implementation, especially when adjacent to or within areas more densely populated (i.e., identified communities and neighbourhoods). Less of an emphasis can be placed on agriculturally dominated areas. Residential-scale (“community”) vegetation management recommendations are provided in Section 5.6.</i></p>

## 2.3 LOCAL BYLAWS

Table 3 below lists the Township of Langley’s municipal bylaws and their relation to the CWRP, and identifies any gaps relating to wildfire management, emergency planning, and evacuation planning. Recommendations relating to legislation and planning and development are addressed in Section 5.2.



**Table 3: Township of Langley Bylaws (paraphrased) and their relation to the CWRP**

Bylaws	Section	Description and <i>Relation to CWRP</i>
<b>Fire Prevention Bylaw No. 5690 (2021)</b>	2.06.01 (Reiterated in Bylaw No. 4835, Section 7.6)	<p>Outlines multiple powers that the Fire Chief has (e.g., identifying dangerous/hazardous fire conditions on a property and forcing the removal/mitigation).</p> <p style="text-align: center;"><i>- Provides an enforceable avenue to require hazards from vegetation or buildings to be mitigated.</i></p>
	2.11.01 2.42.01	<p>Governs open burning restrictions and permitting within the Township, and provides legal enforcement for disposing of burning substances in combustible areas.</p> <p style="text-align: center;"><i>- Burning permits are not required through this Bylaw for resource management fires, or where permits have been issued in compliance with the Open Burning Smoke Control Regulation.</i></p>
	2.12.01	<p>Allows the Fire Chief to restrict or prohibit open burning, burning for cooking / heating, and/or smoking near woodland areas or parks as a result of the weather or drought conditions.</p> <p style="text-align: center;"><i>- The Fire Chief has local knowledge of fire risks and current response capabilities beyond that of local BCWS.</i></p>
	2.28.01	<p>Enforces the owner of vacant / unoccupied premises to remove and prevent the accumulation of combustible materials or flammable substances on the premises.</p> <p style="text-align: center;"><i>- Provides an enforceable avenue to require fire ignition hazards be removed/mitigated.</i></p>
	2.38.01	<p>Regulates the use of fireworks throughout the Township.</p> <p style="text-align: center;"><i>- Limits the potential for fireworks to be discharged, especially during periods of high / extreme fire danger, thus reducing the likelihood of related ignitions in vegetated areas.</i></p>
<b>Tree Protection Bylaw No. 5478 (2021)</b>	13.1 a)	<p>Enforces that tree parts and wood waste shall be properly disposed of by chipping or removal from site.</p> <p style="text-align: center;"><i>- In combination with the Fire Prevention Bylaw, ensures that combustible materials from tree maintenance / yard clearing will not be illegally burned and/or left to accumulate on a property.</i></p>
<b>Community Standards Bylaw No. 5448 (2019)</b>	3.1 (b)	<p>Prohibits a property owner or occupant from allowing cut trees or bushes, tree branches, or unstacked firewood to accumulate on their property.</p> <p style="text-align: center;"><i>- Limits fire ignition and propagation risks associated from accumulated fuel loads.</i></p>

## 2.4 HIGHER-LEVEL PLANS AND LEGISLATION

Table 4 below lists higher-level plans and legislation relevant to wildfire planning and risk mitigation within the Township. Land and resource use plans help guide where and how activities like resource extraction and infrastructure development occurs on the landscape, which affects both wildfire threat and consequence. Fuel management prescriptions, FireSmart vegetation plans, and burn plans must also address these plans as they relate to on-the-ground restrictions and policies for forest modification.

*Table 4: Higher-Level Plans*

Issuing Government	Plan/Legislation	Description and <i>Relationship to CWRP</i>
Province of BC	<b>BC Provincial Open Burning Smoke Control Regulation</b>	Governs open burning relating to land clearing, forestry operations and silviculture, wildlife habitat enhancement, and community wildfire risk reduction.  <i>- All of the Township of Langley's WUI is within a High Smoke Sensitivity Zone. Approved projects for Community Wildfire Risk Reduction are eligible to burn under Division 2 of OBSCR.</i>
Metro Vancouver	<b>Greater Vancouver Regional District Air Quality Management Bylaw</b>	Governs / restricts open burning throughout Metro Vancouver, without a proper permit / approval.
Province of BC	<b>BC Building Code (2018)</b>	Governs how new construction, building alterations, repairs and demolitions are completed; establishes minimum requirements for safety, health, accessibility, fire/structural protection of buildings and water/energy efficiency.  <i>- Applies to the construction and development of residential housing and other community infrastructure throughout the Township.</i> <i>- The Code does not include FireSmart standards, which must be defined at a local level.</i>

## SECTION 3: COMMUNITY DESCRIPTION

This section defines the planning area for this CWRP and provides general demographic information about the Township of Langley. An understanding of population trends, land use patterns, and values at risk can help best direct FireSmart outreach and risk mitigation activities.

### 3.1 WILDLAND-URBAN INTERFACE

The Wildland-Urban Interface (WUI) is defined by FireSmart Canada as the zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels. For the purpose of the FireSmart Community Funding and Supports (FCFS) program, the 'eligible WUI' is

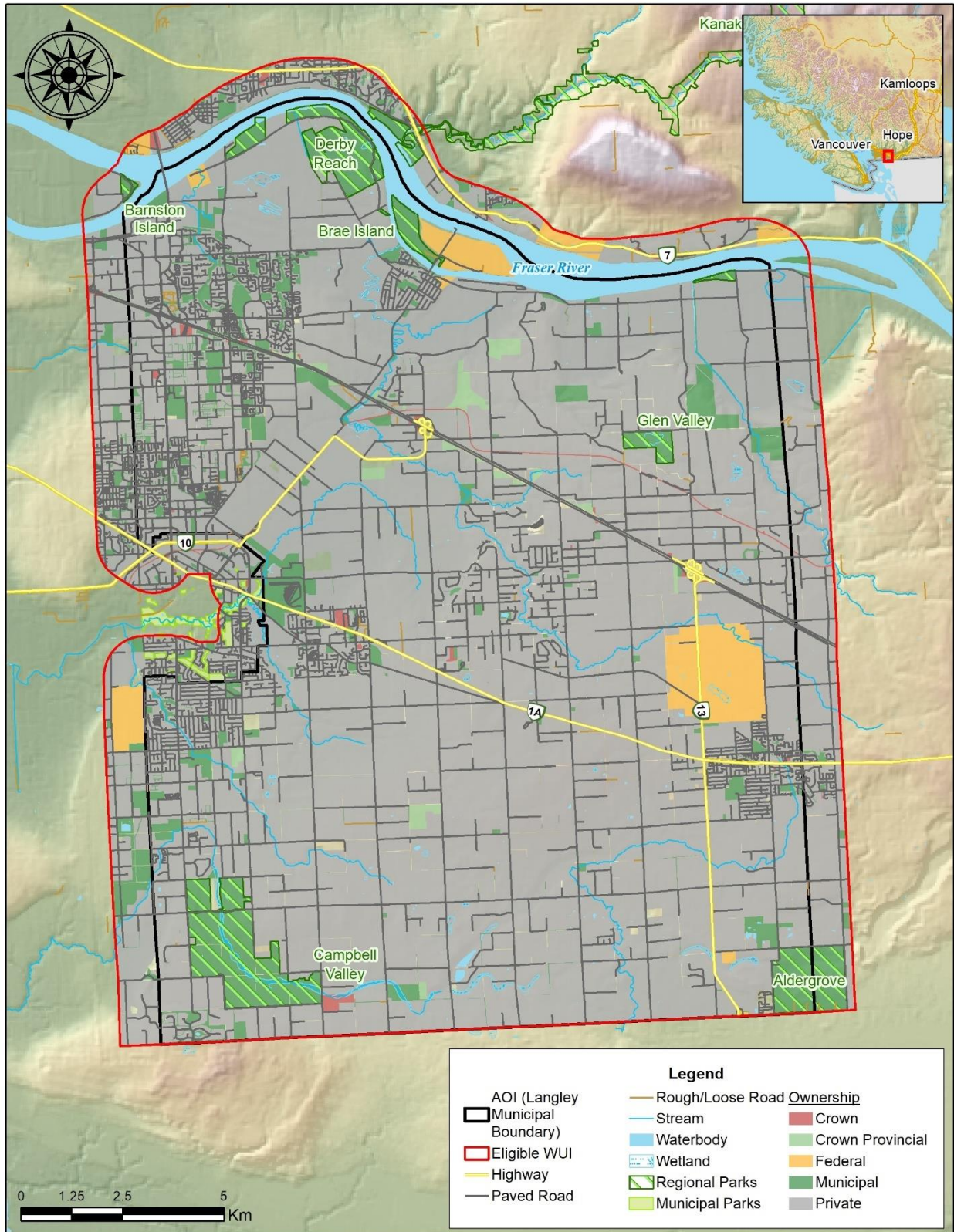
considered only as the area one kilometre from a structure density class greater than six structures per square kilometre. BC Wildfire Service generates WUI Risk Class maps, eligible Wildland-Urban Interface boundaries, and other associated spatial data to assist with initiatives related to wildfire risk reduction, including the FCFS program.<sup>8</sup> Field work and GIS analyses for this CWRP cover only the one kilometer ‘eligible WUI’ surrounding the Township’s municipal boundary, a total of 38,284 hectares.

A breakdown of area by ownership type is listed in Table 5. The majority (77%) of the Township’s WUI is private land. Municipal land accounts for approximately 8% of the remaining area, with another 8% being Crown land (mostly major roads and their associated right-of-ways). Additional small areas fall under Crown agency, Federal, and mixed ownership. The Township of Langley’s municipal boundary, WUI, and land ownership types are illustrated in Map 1.

**Table 5: Land Ownership within the WUI**

Land Ownership	Area (Ha)	Percent of WUI (%)*
Private	26,649.4	77%
Municipal	3,007.3	8%
Crown Provincial	3,233.7	8%
Federal	826.4	2%
Crown Agency	162.1	<1%
Mixed Ownership	0.5	<1%
Large Waterbodies	1405.0	4%

<sup>8</sup> [Wildland Urban Interface Risk Class Maps - Province of British Columbia \(gov.bc.ca\)](https://www2.gov.bc.ca/gov/content/safety/wildfire/wildfire-risk-reduction/wildland-urban-interface-risk-class-maps)



Map 1: Township of Langley's Wildland-Urban Interface

### 3.2 COMMUNITY INFORMATION

The lands now known as the Township of Langley have been inhabited since time immemorial by the Katzie, Kwantlen, Matsqui, and Semiahmoo peoples. Located approximately 40 kilometres east of Vancouver, the incorporated municipality lies between the Fraser River on its north edge, the Canada/USA border (Washington State; identified by 0 Avenue) on its south edge, Abbotsford on its east edge, and Surrey on its west edge. In 1808, Simon Fraser travelled the Fraser River and reached present-day Langley. Shortly thereafter, the Hudson’s Bay Company arrived, and in 1827 Fort Langley was constructed. The fertile valley land soon led to widespread agriculture, and soon after logging became a critical industry in the region. Today, the Township is one of the largest municipalities by area in BC (316 km<sup>2</sup>) and is characterized as a “community of communities” with a unique rural/agricultural and urban mix.<sup>9</sup> Over 19 separate and unique town centres of varying sizes are interspersed between farms, ranches, forested parkland, and undeveloped lots.

The Township is most easily accessed by Highway 1, the main regional highway connecting Lower Mainland communities. Additional main access routes include the Fraser Highway and Highway 13, the latter of which provides Canada/USA border access to Washington State.

Due to the Township’s proximity to Vancouver, the municipality has seen rapid continued growth since the construction of both the Port Mann Bridge and Highway 1 in the 1960’s. Continued development and growth is projected to continue into the future. Shown below in Figure 1, the Township’s population has increased an average of 11% every five years over the last 20 years, with the most significant population change being a 13% increase occurring between 2016 and 2021.<sup>10</sup>

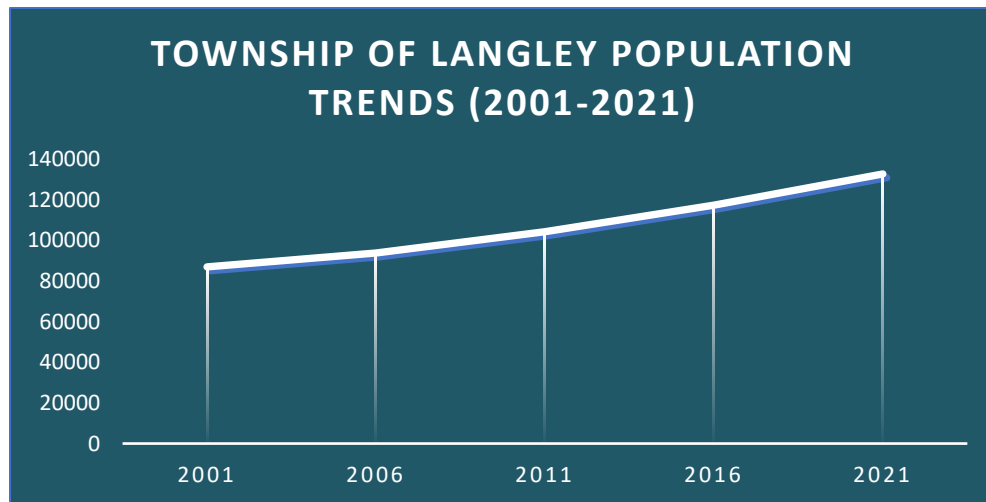


Figure 1: Population trends for the Township of Langley (2001-2021)

<sup>9</sup> Township of Langley Official Community Plan (bylaw No. 1842)

<sup>10</sup> Statistics Canada census data compiled and summarized at: <https://townfolio.co/bc/langley-township/demographics>

Additional relevant socio-economic statistics for the Township are shown below in Table 6.

**Table 6: Township of Langley Socio-Economic Statistics<sup>11</sup>**

Metric	Value
<b>Population</b>	
Total Population	132,603
Number of people <15 years old	24,095
Number of people 15-64 years old	85,520
Number of people >65 years old	22,990
Median Age (years)	40.8 <sup>12</sup>
<b>Housing</b>	
Total private dwellings	49,011
Average Taxable Property Value	\$1,148,000
<b>Income and Employment</b>	
Median Total Income of Households <sup>13</sup>	\$90,594
Employment Rate	64.3%
Unemployment Rate	4.4%
<b>Education</b>	
No certificate, diploma or degree	17.4%
Secondary school or equivalent	39.4%
Post-secondary college, apprenticeship, diploma, etc.	16.8%
Post-secondary university degree	22.1%

The Township provides garbage collection, water and sewer services (within developed town/urban centres), an emergency program, roads and infrastructure, permits, and bylaw enforcement. The Township of Langley Fire Department (TLFD) is responsible for municipal fire protection and police services are provided by the Royal Canadian Mounted Police. Langley Memorial Hospital, operated by Fraser Health, provides a range of primary, secondary and some specialty services, including 24/7 emergency care<sup>14</sup> to municipal residents and visitors.

The Township is comprised mostly of subdued rolling and flat terrain interspersed by streams, some with prominently sloped banks and associated riparian features. Forested land is mostly contained to Metro Vancouver Regional Parks (Derby Reach, Campbell Valley, Aldergrove, Brae Island, and Glen Valley) and some municipal parks. The Township has a coastal and temperate climate resulting in cold, wet, and cloudy winters accompanied by a three-month warm season (mid-June through mid-September). The Township is within the BC Wildfire Service (BCWS) Fraser Fire Zone which is part of the greater Coastal

<sup>11</sup> Statistics Canada census data compiled and summarized at: <https://townfolio.co/bc/langley-township/demographics>

<sup>12</sup> The median age for BC is 43.0.

<sup>13</sup> In 2015, pre-tax. BC median is \$69,995.

<sup>14</sup> <https://www.fraserhealth.ca/Service-Directory/Locations/Langley/langley-memorial-hospital#.Y9MNEHbMLb0>

Fire Centre. The closest BCWS fire base is the Cultus/Haig base located approximately 45 kilometres east of the Township.

### 3.2.1 CRITICAL INFRASTRUCTURE

Critical infrastructure can be defined as assets that are essential for the functioning of government and society, namely: water, food, transportation, health, energy and utilities, safety, telecommunications and information technology, government, finance, and manufacturing.

Owing to the level of development and population within the Township, there are a significant number of infrastructure features that qualify as “critical infrastructure”. As such, Table 7 (and displayed on Map 3) lists the infrastructure deemed most critical for responding to and recovering from an interface wildfire event (fire stations, hospital, emergency operation centres, etc.). Emergency Operation Centres (EOC) were established as part of the Langley Emergency Response Plan. Water and electric systems are discussed in more detail in Sections 3.2.2 and 3.2.3. This table should be updated as necessary so that any associated FireSmart assessments and activities wanted for unlisted, municipal critical infrastructure are funded with support from this CWRP.

*Table 7: Township of Langley Wildfire Response and Recovery Critical Infrastructure*

Map ID:	Type	Name	Address	Jurisdiction
1	EOC; Fire Hall	Township of Langley EOC (Township Fire Hall #6)	Township Fire Hall #6, 22170 50 Avenue (2nd Floor)	Township of Langley
2	Fire Hall	Fire Hall 2 – Fort Langley	23137 96 Ave, Langley Twp, BC	Township of Langley
3	Fire Hall	Fire Hall 3 – Aldergrove	26316 30a Ave, Aldergrove, BC	Township of Langley
4	Fire Hall	Fire Hall 4 – Willoughby	20253 72 Ave, Langley, BC	Township of Langley
5	Fire Hall	Fire Hall 5 – Brookwood	20355 32 Ave, Langley, BC	Township of Langley
6	Fire Hall	Fire Hall 7 – Otter	3876 248 St, Langley, BC	Township of Langley
7	Fire Hall	Fire Hall 8 – Walnut Grove	9580 208 St, Langley, BC	Township of Langley
8	Health Care	Langley Memorial Hospital	22051 Fraser Hwy, Langley Twp, BC	Fraser Health
9	Government	Township of Langley Civic Facility	20338 65 Ave, Langley, BC	Township of Langley
10	Airport	Langley Regional Airport (YNJ)	305, 5385 - 216 Street Langley, BC	Township of Langley
10	Water/Sewage	Water Treatment Plant	West Langley Water Treatment Plant	Metro Vancouver
12	Water/Sewage	Aldergrove Water Treatment Plant	2761 276 Street Langley BC	Township of Langley
13	Engineering	Operations Buildings	4700 224 St, Langley, BC	Township of Langley

Map ID:	Type	Name	Address	Jurisdiction
14	Police	Langley RCMP Main Detachment	22180 48a Ave, Langley	RCMP
n/a	Water	10 x Booster Pump Stations	n/a	Township of Langley
n/a	Water	8 x Storage Reservoirs	n/a	Township of Langley
n/a	Sewage	34 x Pump Stations	n/a	Township of Langley

### 3.2.2 ELECTRICAL POWER

A large fire has the potential to impact electrical service by causing disruption in network distribution through direct or indirect processes. For example, heat from flames or fallen trees associated with a fire event may cause power outages. Additionally, vegetation encroachment on power lines can be a wildfire ignition source – a tree branch lying between two conductors can produce high-temperature electrical arcs. BC Hydro overhead power lines service the Township of Langley, with multiple transmission lines traversing the municipality.

Secondary power sources for critical infrastructure are important to reduce community vulnerability in the event of an emergency that cuts power for days, or even weeks. Vulnerabilities for secondary power sources include mechanical failure, potentially insufficient power sources should a wide-scale outage occur, and fuel shortage in the event of long outages or road closures. Many of the Township’s critical infrastructure stations have dedicated generators and the Township also has mobile generators wired for those facilities lacking dedicated generators.

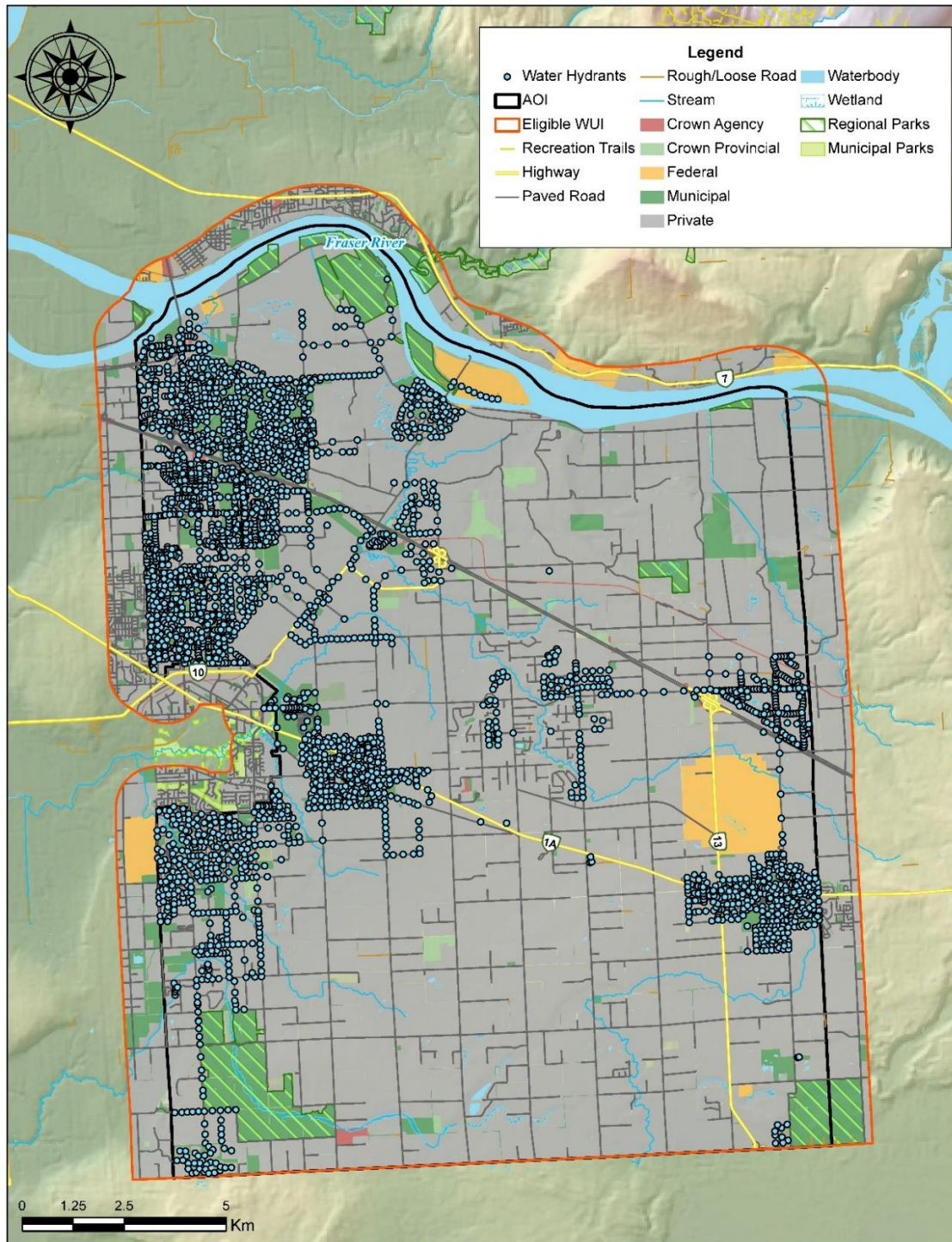
### 3.2.3 WATER AND SEWAGE<sup>15</sup>

The Township’s water system for potable water and fire suppression consists of 13 groundwater wells, one water treatment plant, 10 booster pump stations, eight storage reservoirs and three connections to the Greater Vancouver Water District (GVWD). The majority of the Township’s rural southern and northeastern areas are not connected to the municipal water supply. Areas that are connected support a fire hydrant network, shown below on Map 2. When all wells are in operation, they supply approximately 30 – 40% of the municipality’s water demand, with the remainder supplied by the GVWD via the aforementioned connections. Due to increasing demand there are concerns of water supply that arise in the hot summer months, but these are typically mitigated by the GVWD activating one of their pumping stations. The majority of the Township’s water supply and pumping infrastructure have emergency backup power generation through diesel generators – though not all of the groundwater wells do, which could introduce challenges in filling water reservoirs in the event of a prolonged power outage.

<sup>15</sup> Water and sewage system descriptions provided by Township of Langley municipal staff.



Map 2: Township of Langley Fire Hydrant Locations



The Township’s Sanitary Sewer Collections system consists of 34 pumping stations that collect wastewater from the community and pump it to gravity systems that flow to one of Metro Vancouver’s sewer treatment plants. As with the water system, the majority of rural south and northeastern areas are not connected to this municipal wastewater collection system.

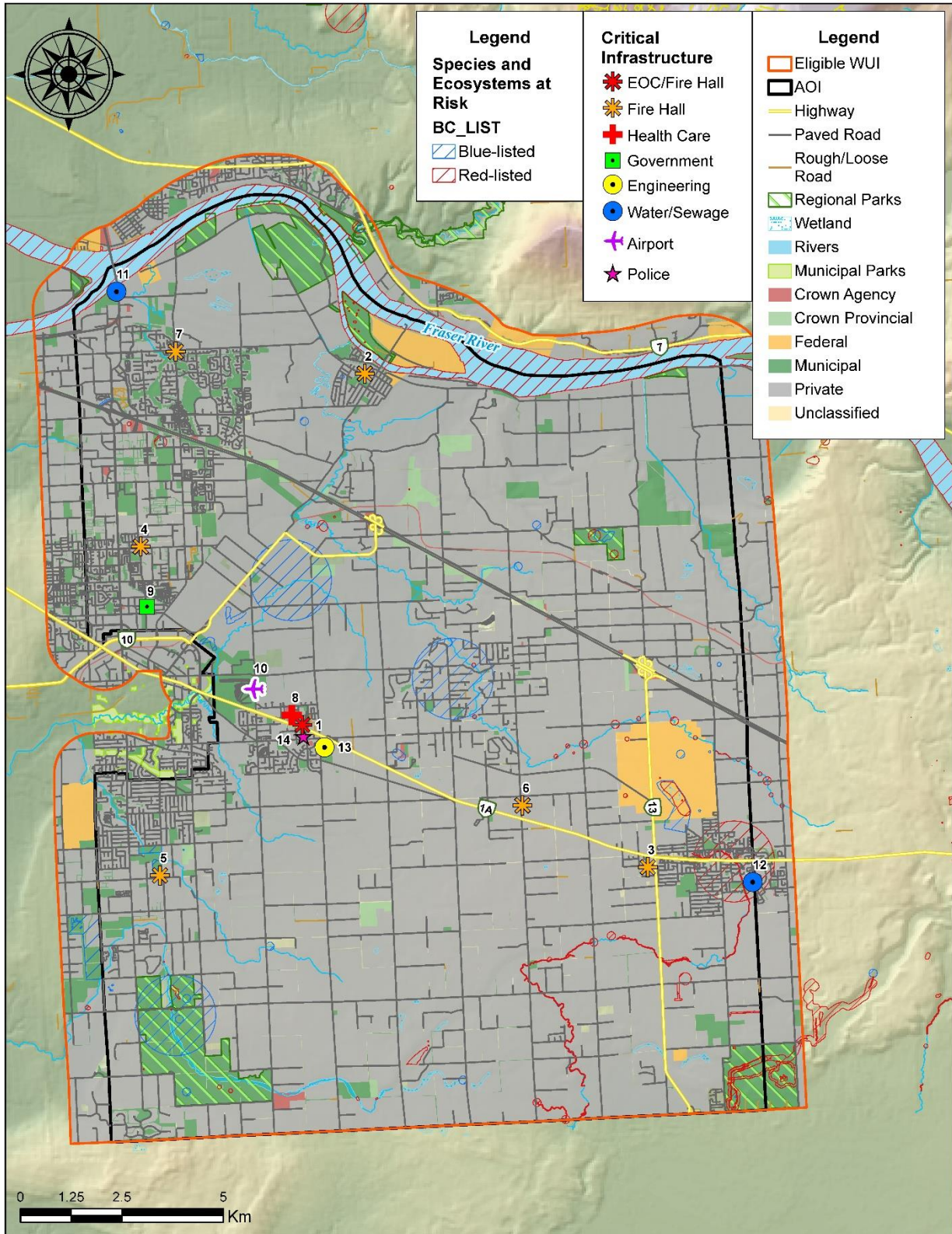
### 3.2.4 HAZARDOUS VALUES

Hazardous values are defined as values that pose a safety hazard to emergency responders and include large propane facilities, landfills, rail yards, storage facilities containing explosives, pipelines, etc. Anywhere combustible materials, explosive chemicals, or gas/oil is stored can be considered a hazardous value. As well, pre-identifying hazardous infrastructure/areas where ignitions may be more likely (e.g., adjacent to railway lines and/or Highway 1) can help prioritize mitigation efforts and increase preparedness. Protecting hazardous values from fires is important in preventing interface fire disasters. The following are examples of hazardous values identified by the Township of Langley Fire Department:

- Railway lines:
  - Canadian Pacific (to/from Deltaport); private
  - Canadian National (to/from Fraser River); private
- Commercial chemical applications:
  - Brenntag Canada Inc.; private
- Airports:
  - Langley Regional Airport; municipal
- Major Trucking Routes:
  - Highway 1

Maintaining FireSmart vegetation surrounding these values as well as using FireSmart (non-combustible) construction materials for any structures adjacent to them would greatly reduce those structures' and values' fire risk (for fire ignition, but more so for their ability to propagate and exacerbate a fire) – further addressed in Section 5.3.

Map 3: Values at Risk in Township of Langley's Wildland-Urban Interface



### 3.2.5 CULTURAL AND HIGH ENVIRONMENTAL VALUES

Cultural values have the potential to be impacted by wildfire or wildfire suppression activities through physical damage or alteration. There are 97 documented historic and/or archeological sites within the Township’s WUI. Known archeological sites are protected under the Heritage Conservation Act, which applies on both private and public lands. Prior to any forest management or landscaping for fire hazard reduction (i.e., FireSmart vegetation management – recommended in Section 5.6), archeological assessments may be required to ensure that known or unknown cultural resources are not inadvertently damaged or destroyed.

Table 8 below lists the ecosystem or species at risk occurrences that have been identified through the B.C. Conservation Data Center (CDC) and/or have been specifically observed and recorded within the WUI boundary. Many of these species are also Federally listed species at risk, with Critical Habitat occurrences in the WUI (denoted with an asterisk in Table 9). Through consultation with the CDC and a biologist or qualified professional, any future site-level operational plans must identify and mitigate potential impacts to ecosystems or species at risk. Blue and Red listed occurrences are shown above on Map 3.

**Table 8: Species and Ecosystems at Risk in the WUI – BC Conservation Data Center. Asterisks mark Federally listed species at risk with critical habitat identified in the WUI.**

Common Name	Scientific Name	Category	BC List	Habitat Type
Salish Sucker	<i>Castomus spp.</i>	Vertebrate Animal	Red	Swamp, shrub wetland, creek
Nooksack Dace	<i>Rhinichthys cataractae - Chehalis</i>	Vertebrate Animal	Red	Creek
Oregon Forestsnail*	<i>Allogona townsendiana</i>	Invertebrate Animal	Red	Forest mixed
Vancouver Island Beggarticks	<i>Bidens amplissima</i>	Vascular Plant	Blue	Temporary pool
Green Heron	<i>Butorides virescens</i>	Vertebrate Animal	Blue	Terrestrial / riparian
Northern Red-legged Frog	<i>Rana aurora</i>	Vertebrate Animal	Blue	Herbaceous wetland, forest needle-leaf
Roell’s Brotherella*	<i>Brotherella roellii</i>	Nonvascular Plant	Red	Forest needle-leaf, coarse woody debris
Pacific Water Shrew*	<i>Sorex bendirii</i>	Vertebrate Animal	Red	Herbaceous wetland, marsh / roadside
Northern Painted Turtle*	<i>Chrysemys picta</i>	Vertebrate Animal	Red	Herbaceous wetland
Trowbridge’s Shrew	<i>Sorex trowbridgii</i>	Vertebrate Animal	Blue	Forest mixed / riparian
Great Blue Heron	<i>Ardea Herodias fannini</i>	Vertebrate Animal	Blue	Forest broadleaf, cropland / hedgerow

American Bittern	<i>Botaurus lentiginosus</i>	Vertebrate Animal	Blue	Herbaceous wetland
Georgia Basin Bog Spider	<i>Gnaphosa snohomish</i>	Invertebrate Animal	Red	Bog / fen, swamp
White Sturgeon – Lower Fraser River Pop	<i>Acipenser transmontanus</i>	Vertebrate Animal	Red	Big river / river mouth
Western Screech-Owl	<i>Megascops kennicottii</i>	Vertebrate Animal	Blue	Woodland mixed, riparian
Barn Owl*	<i>Tyto alba</i>	Vertebrate Animal	Federally Threatened	Foraging: agricultural fields, roadside, marshes Habitat: tree cavities, human structures
Oregon Spotted Frog*	<i>Rana pretiosa</i>	Vertebrate Animal	Federally Endangered	Large wetlands, floating vegetation in forests

## SECTION 4: WILDFIRE RISK ASSESSMENT

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This section summarizes the factors that contribute to local wildfire risk throughout the Township of Langley. Section 4.1 discusses the wildfire environment in the WUI: topography, fuel, and weather, and includes climate change projections affecting the wildfire environment of the area. Section 4.2 discusses wildfire history in the area. Section 4.3 describes the analysis used to classify the local wildfire threat for the Township.

The local wildfire risk assessment helps to identify the parts of the WUI that are most vulnerable to wildfire so that wildfire risk reduction actions can be implemented effectively.

The relationship between wildfire risk and wildfire threat is defined as follows:

$$\text{Wildfire Risk} = \text{Probability} \times \text{Consequence}$$

Where:

**Wildfire risk** is the potential losses incurred to human life and values at risk within a community in the event of a wildfire.

**Consequences** are the repercussions associated with fire occurrence in an area. Higher consequences are associated with densely populated areas, areas of high biodiversity, etc.

**Probability** is the threat of wildfire occurring in an area and is expressed by the ability of wildfire to ignite and then consume fuel on the landscape – its *wildfire threat*. Wildfire threat is driven by three major components of the wildfire environment:

- 1) *Topography* – slope and terrain (increase/decrease rate of spread), and aspect (fuel dryness)
- 2) *Fuel* – loading, size and shape, arrangement (horizontal and vertical), compactness, chemical properties, and fuel moisture.
- 3) *Weather* – temperature, relative humidity, wind speed and direction, and precipitation.

### 4.1 WILDFIRE ENVIRONMENT

Topography, fuel, and weather are generally referred to as the ‘fire behaviour triangle’ (Figure 2); the ways in which they individually influence the wildfire environment of the WUI is detailed below. *Fuel is the only component of the fire triangle that can be realistically managed.*



Figure 2: Graphic display of the fire behaviour triangle, and a subset of characteristics within each component.<sup>16</sup>

#### 4.1.1 TOPOGRAPHY

Slope steepness influences a fire’s trajectory and rate of spread; slope position relates to the ability of a fire to gain momentum uphill. Other factors of topography that influence fire behaviour include aspect, elevation, and configuration of features on the landscape that can restrict (i.e., water bodies, rock outcrops) or drive (i.e., valleys, exposed ridges) the movement of a wildfire.

Table 9 shows the percent of the WUI by slope steepness class, with corresponding fire behavior implications. Almost all the Township’s WUI (97%) is on slopes <20% and would experience little flame and fuel interaction driven by slope. Of the remaining 3% area, half (1.7%) are on slopes between 20% and 30% and would experience some fire behavior driven by slope.

Table 9: Slope Percentage and Fire Behaviour Implications

Slope	Percent of WUI	Fire Behaviour Implications
<20%	97.4%	Very little flame and fuel interaction caused by slope, normal rate of spread.
21-30%	1.7%	Flame tilt begins to preheat fuel, increase rate of spread.
31-40%	0.6%	Flame tilt preheats fuel and begins to bathe flames into fuel, high rate of spread.
41-60%	0.2%	Flame tilt preheats fuel and bathes flames into fuel, very high rate of spread.
>60%	<0.1%	Flame tilt preheats fuel and bathes flames into fuel well upslope, extreme rate of spread.

When slope percentage is considered in context with a value’s slope position, that value’s risk to increased fire behaviour can change dramatically – i.e., a value located in the upper 1/3 of a steep slope will be

<sup>16</sup> Province of Alberta.

exposed to fires downslope travelling very quickly uphill towards it as well as be impacted by increased amounts of preheating (convective heat). Table 10 summarizes the fire behaviour implications for slope position. A value located at the bottom of a slope is equivalent to a value on flat ground.

**Table 10: Slope Position of Value and Fire Behaviour Implications**

Slope Position of Value	Fire Behaviour Implications
Bottom of Slope/ Valley Bottom	Impacted by normal rates of spread.
Mid Slope - Bench	Impacted by increased rates of spread. Position on a bench may reduce the preheating near the value (value is offset from the slope).
Mid Slope – Continuous	Impacted by fast rates of spread. No break in terrain features affected by preheating and flames bathing into the fuel ahead of the fire.
Upper 1/3 of slope	Impacted by extreme rates of spread. At risk to large continuous fire run, preheating and flames bathing into the fuel.

Almost all homes and critical infrastructure in the Township are located on subdued relief agricultural plains and rolling hills. The small areas that do account for steep slopes are most often associated with river and creek draws, of which homes and critical infrastructure are located above but set back from the slope-break edges which limits their exposure to higher fire behaviour implications and thus lowers their fire risk associated with slope.



## 4.1.2 FUEL

Fuel structure varies throughout the Township, but it is generally discontinuous given the amount of land that has been cleared and developed. Historical logging and land clearing for development or agriculture have affected fuel characteristics in the WUI, though areas that are devoid of forests can present a fire hazard. Hazardous vegetation and/or building conditions on developed parcels can allow for an urban conflagration, while agricultural land can host aggressive fires depending on the amount, type, and dryness, of built-up vegetation. The Township of Langley's Community Forest Management Strategy (2022) notes that warmer, drier summers in the future are expected to result in increasing moisture stress and declining tree health in some species, which is a condition that was noted in multiple areas already.<sup>17</sup> Dead trees add to fuel loads when their branches and eventually whole tree fall to the ground.

The Canadian Forest Fire Behaviour Prediction (FBP) System outlines sixteen fuel types based on characteristic fire behaviour under defined conditions.<sup>18</sup> Fuel types (confirmed or updated by field work verification) within the WUI are detailed in Table 11 and are shown on Map 4 below. Due to funding requirements, fuel typing and subsequent assessments for this CWRP were not completed on private or First Nation Reservation Federal land, which amounts to approximately 78% of the Township's WUI. Of the remaining approximately 22% of assessable area, just over half of that (58%) is represented as "Non-fuel" or water, 20% is represented as deciduous-dominated forest stands (D-1/2 fuel type), 10% are grassy areas (O-1a/b fuel type), 10% are mixed conifer/deciduous forest stands (M-1/2 fuel type), and only 2% are conifer-dominated forest stands (C-5 and C-3 fuel types). Many natural and man-made fuel breaks exist across the Township on both private and public land, most notably by riparian features (i.e., rivers, creeks, wetlands), roadways, agricultural land, and well maintained (mowed) grassy areas.

D-1/2 fuel type stands are deciduous-dominated and generally considered as the least hazardous forest type because of their higher moisture content and lack of flammable ladder fuels. The hazard of a D-1/2 stand can greatly increase if there is an accumulation of surface fuels or flammable shrubs. Recent spring cross-over conditions<sup>19</sup> on the coast have allowed for destructive forest fires in deciduous-dominated stands. The Squamish valley has experienced a number of these human-caused fires since 2018 which destroyed multiple homes in the valley. M-1/2 fuel type stands are a mix of conifer and deciduous trees, often with conifers in the overstory or with considerable densities of conifers regenerating in the understory. O-1a/b grass fuel types, when left unmanaged, can support a rapidly spreading grass or surface fire capable of damage or destruction of property and jeopardizing human life, although it is recognized as a highly variable fuel type dependent upon the level of curing.

Where fuel types could not be updated from imagery with a high level of confidence, the original Provincial Strategic Threat Analysis (PSTA) fuel type determination was retained. Detailed fuel type

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<sup>17</sup> Diamond Head Consulting Ltd. 2022. Township of Langley Community Forest Management Strategy.

<sup>18</sup> Forestry Canada Fire Danger Group. 1992. Development and Structure of the Canadian Forest Fire Behavior Prediction System: Information Report ST-X-3.

<sup>19</sup> Cross-over conditions refer to a point where air temperature drops below the relative humidity (e.g., 20°C / 15% humidity), providing conditions for potentially severe fire behaviour.

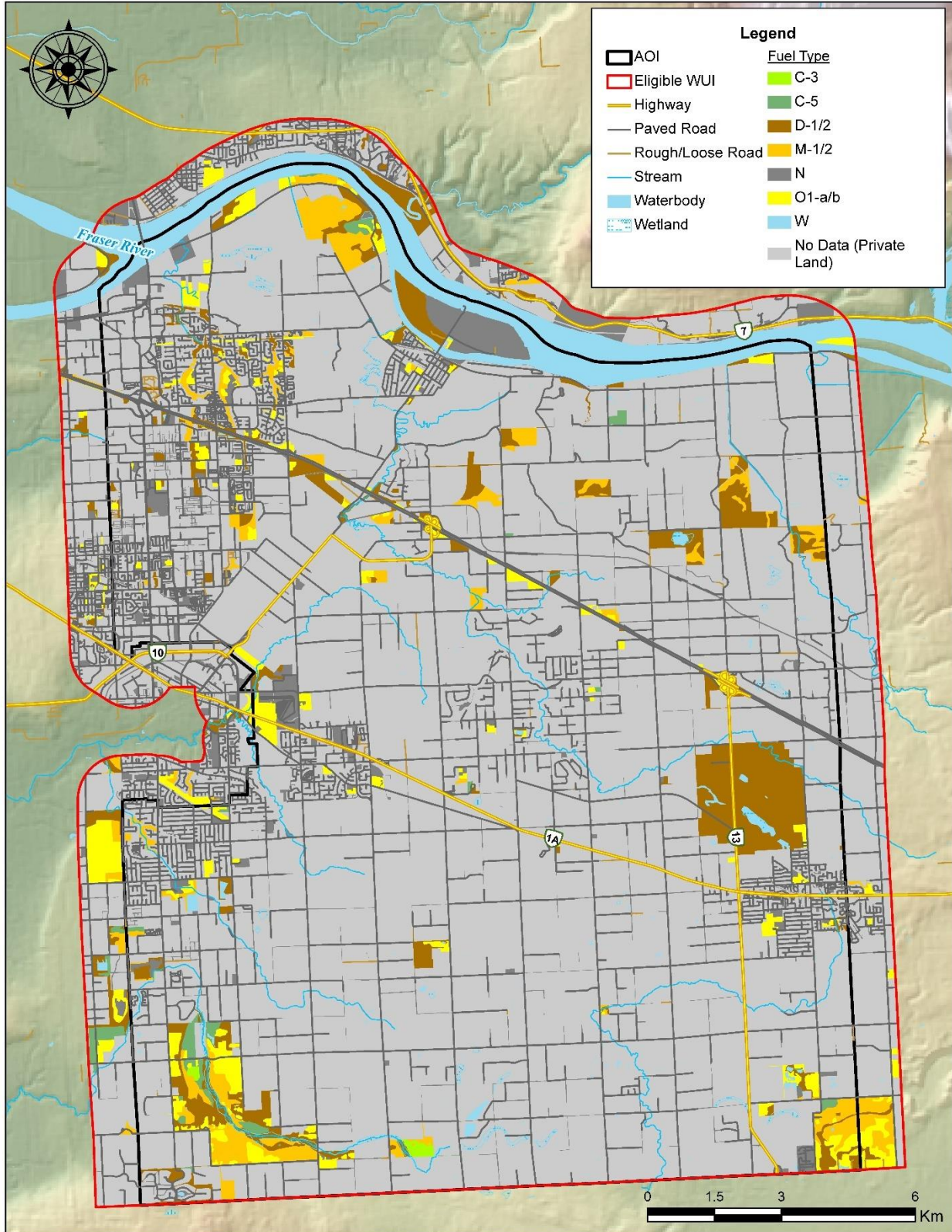
descriptions and their associated wildfire risk can be found in Appendix A-1: Fuel Typing Methodology and Limitations.

**Table 11: Fuel types in the Wildland-Urban Interface**

Fuel Type	Percent of Assessable WUI	Fuel Type Description within WUI
D-1/2	19.2%	Deciduous stands/forest. Hazard increases with the amount of deadfall and/or establishment of a flammable shrub layer.
M-1/2	9.8%	Moderately well-stocked mixed stands/forest of conifers and deciduous species, low to moderate dead stems and down woody fuels. Often transition to become more conifer dominated as pioneer deciduous species die out. No more than a 70% conifer overstory component.
C-5	1.8%	Lower density mature / old conifer leading forest (hemlock, cedar, Douglas-fir) with open canopies, high crown base heights, and a low-flammability (shrub) understory.
C-3	0.3%	Fully stocked (i.e., moderate to high density), late young or mature forest (Douglas-fir leading), with high crown closure and crowns well separated from the ground. Often the result of stands established (planted or natural) post-clearcut logging.
O-1a/b	10.6%*	Open grasslands, either matted (a) or standing (b). Hazard increases with the percent of curing and is considerable whenever > 10 cm in height.
Non-fuel / Water	58.3%	Non-fuel: roadways, Indian Reserves, gravel pits, cleared parking areas, irrigated fields (sports/parks), lakes, rivers, ponds

\*Note: all grass fields and grassy areas, regardless of managed or not, were included within this fuel type classification. Thus, playing fields (such as baseball fields and soccer fields) are included, but within the Township these are almost always managed (mowed), which lowers their hazard.

Map 4: Updated fuel types in the Township of Langley's WUI



### 4.1.3 WEATHER

The Township has a coastal and temperate climate resulting in cold, wet, and cloudy winters accompanied by a three-month warm season (mid-June through mid-September). Temperatures rarely exceed 29°C, with monthly averages in the low to mid 20’s. The Township typically experiences a six-month dry season (late April through September) with only a 10 – 20% chance of any daily precipitation through July and August.<sup>20</sup>

Fire weather data for the WUI was summarized from the UBC Research Forest weather station, operated by the BC Wildfire Service (BCWS).<sup>21</sup> This weather station is approximately seven kilometers to the north of the Township’s northern edge, in a valley bottom with a wetter and cooler biogeoclimatic zone than the Township of Langley. It is thus likely that consistently higher fire danger conditions occur in the Township across the fire season than are reported by this station.<sup>22</sup> Figure 3 shows the average number of fire danger days during the fire season (April – October). At this station, fire weather peaks in August with an average of 11 moderate, 11 high, and two extreme fire danger days. High fire danger days do occur from June through October, with extreme fire danger days present in July, August, and September.

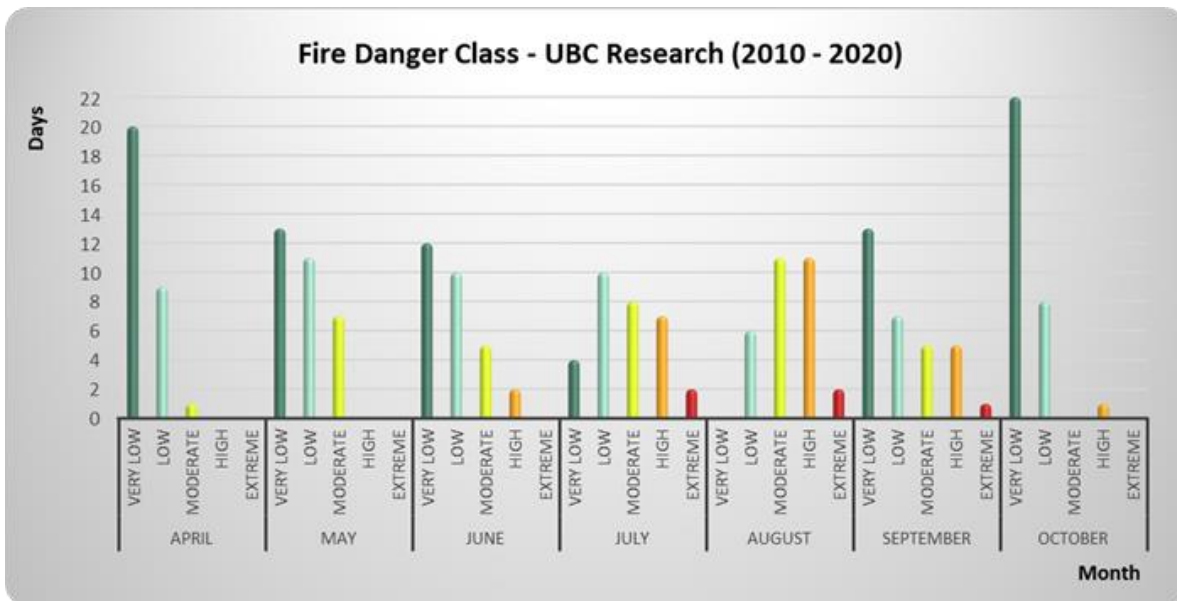


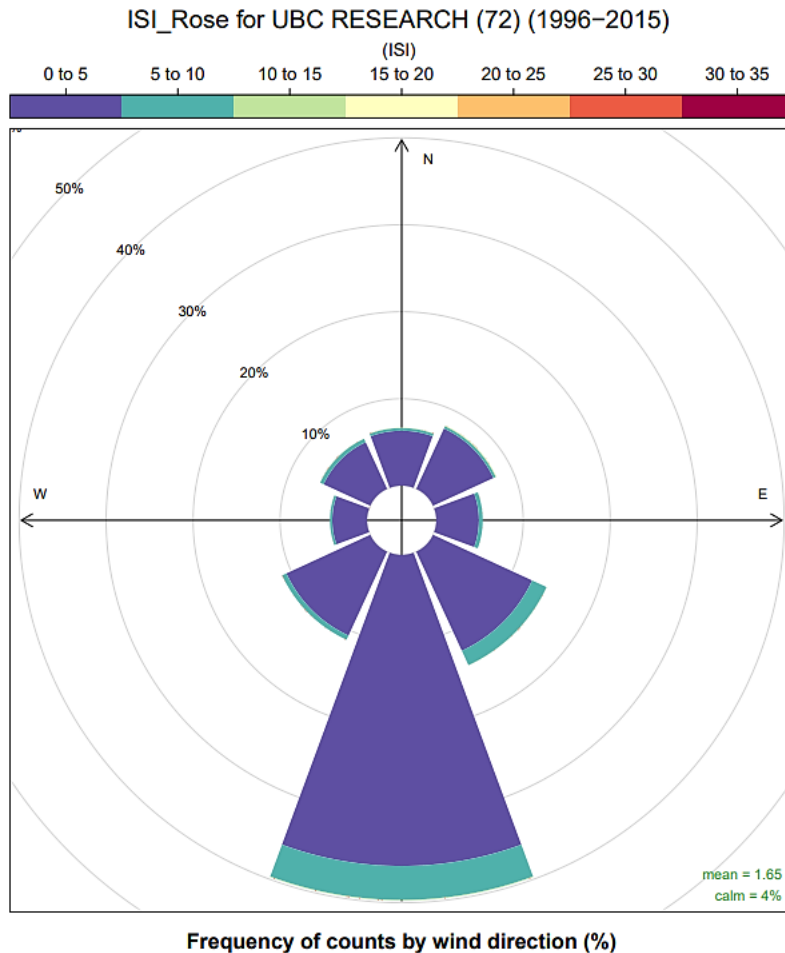
Figure 3: Average number of danger class days during the fire season for the UBC Research weather station (2010-2020)

<sup>20</sup> Climate data retrieved from Weather Spark: <https://weatherspark.com/y/1009/Average-Weather-in-Langley-Canada-Year-Round>

<sup>21</sup> BCWS identified the Benson fire weather station as more closely approximating Well’s fire weather (excluding wind direction), despite it being further away from Wells than the Big Valley fire weather station. The Big Valley fire weather station was noted as being wetter and higher in elevation.

<sup>22</sup> Comparing the CWHdm (UBC Research) to the CWHxm1 and CDFmm (Township WUI), mean summer precipitation drops from 408 mm to 285 and 198 mm respectively, while the summer heat to moisture ratio increases from 42 to 62 and 89 respectively. Data from the [UBC Center for Forest Conservation Genetics – Subzone/variant climate data](#).

Hourly wind speed and direction are also recorded at BCWS weather stations. Data is publicly available in the form of average Initial Spread Index (ISI) roses.<sup>23</sup> The ISI is a numeric rating of the expected rate of fire spread that combines the effects of wind speed and fine fuel moisture (controlled by temperature, relative humidity, precipitation, and wind). ISI roses can help planners or first responders to protect values at risk based on the predominant wind direction and frequency of higher ISI values. Wildfire that occurs upwind of a value poses a more significant threat to that value than one which occurs downwind.



Analysis of ISI data from the UBC Research station is best for inferring potential fire spread patterns within the Township of Langley. Data shows that during the fire season (April – October) predominant winds originate from the south/southeast, driving fires in a north/northwest direction. This predominant wind direction is largely paired with low ISI values (between one and ten), which infrequently result in predicted fire intensities that exceed ground-based first responder capabilities.<sup>24</sup> Wind direction on high ISI days (greater than 15) is variable, which makes expected fire spread difficult to predict and plan for.

Figure 4: Daily average initial spread index rose for the UBC Research weather station during the fire season (April – October)

<sup>23</sup><https://www2.gov.bc.ca/gov/content/safety/wildfire-status/prevention/vegetation-and-fuel-management/fire-fuel-management/fuel-management>

<sup>24</sup> Predicted fire intensities in common fuel types in the Township (as per the Field Guide to the Canadian Forest Fire Behaviour Prediction System [FBP]) rarely exceed Rank 3

## Climate Change

The Township of Langley 2021 Climate Action Strategy highlights the need for the municipality to proactively address climate risk. The Township recognizes that a changing climate will likely lead to more droughts and more wildfires. Figure 5 below displays select climate projections from the 2021 report, which have considerable implications for local fire weather conditions. Climate change is a serious and complex aspect to consider in wildfire management planning. Numerous studies outline the nature of climate change impacts on wildland fire across Canada, and globally.<sup>25</sup> Although there are uncertainties regarding the extent of these impacts on wildfire, the frequency, intensity, severity, duration, and timing of wildfire and other natural disturbances is expected to be altered significantly with the changing climate.<sup>26</sup> Despite the uncertainties, trends within the data are visible.



Figure 5: Climate projections from the Pacific Climate Impacts Consortium (2018), summarized in the Township's Climate Action Strategy.

Climate scientists expect that the warming global climate will trend towards wildfires that are increasingly larger, more intense, and more difficult to control; it is likely that these fires will be more threatening throughout the WUI due to increased potential fire behaviour, fire season length, and fire severity. Researchers studying the relationship between climate change and potential impacts of wildfires to Canadian forests have found that:

<sup>25</sup> Flannigan, M.D et al. 2009. *Implications of changing climate for global wildland fire*. International Journal of Wildland Fire 18, 483-507.

<sup>26</sup> Dale, V., L. Joyce, S. McNulty, R. Neilson, M. Ayres, M. Flannigan, P. Hanson, L. Irland, A. Lugo, C. Peterson, D. Simberloff, F. Swanson, B. Stocks, B. Wotton. 2001. *Climate Change and Forest Disturbances*. BioScience 2001 51 (9), 723-734.

- Fuel moisture is sensitive to temperature change, and projected spring precipitation increases will be insufficient to counteract the impacts of the projected summer precipitation decreases and increases in temperature. Results conclude that future conditions will include drier fuels and a higher frequency of extreme fire weather days.<sup>27</sup>
- The future daily fire severity rating (a seasonally cumulative value) is expected to have higher peak levels, and head fire intensity is expected to increase significantly in western Canada. The length of fire seasons is expected to increase, and the increase will be most pronounced in the northern hemisphere. Fire season severity seems to be sensitive to increasing global temperatures; larger and more intense fires are expected, and fire management will become more challenging.<sup>28, 29</sup>

## 4.2 WILDFIRE HISTORY

### Historic Fire Regime and Wildfire Occurrences

Based on the biogeoclimatic zones that make up the Township, the WUI is categorized as having a natural disturbance type (NDT) of 'NDT2': ecosystems that historically had infrequent stand-initiating events. Wildfires were often of moderate size (20 – 1000 hectares), with larger fires occurring after long droughts. Historic ecosystems were mature forests with patches of younger forest resulting from disturbance. The mean disturbance return interval for these ecosystems is approximately 200 years. NDTs are less relevant for the Township today as few (if any) of the historic ecosystems still exist and as the potential for disturbances caused by humans has increased with population growth and industrial activity.

Based on BCWS's historical wildfire datasets, wildfires in the Township's WUI are infrequent and ignitions rarely result in a wildfire event. Forty-seven wildfires have been recorded since the 1950's, with none of these growing larger than one hectare in size. All of the wildfires in this dataset were human-caused, emphasizing the importance of fire education and regulation. Provincial datasets show that over 8,900 hectares burned in 91 unique fires in Township in the 1920's, but only one decade since has had fires totaling over 100 hectares. With the exception of the 78 hectare Burns Bog fire in 2016 (which was human-caused), no notable wildfires have occurred in adjacent jurisdictions since the 1920s. Comparable to Burns Bog, the Langley Bog is an important ecological area that is largely within Derby Reach Regional Park, but current forest conditions in the Langley Bog are not as likely to support a comparable fire. These conditions can change with time if the bog continues to infill with conifer trees as it matures. Historical fire ignition and perimeter data for the WUI is depicted on Map 5.<sup>30</sup>

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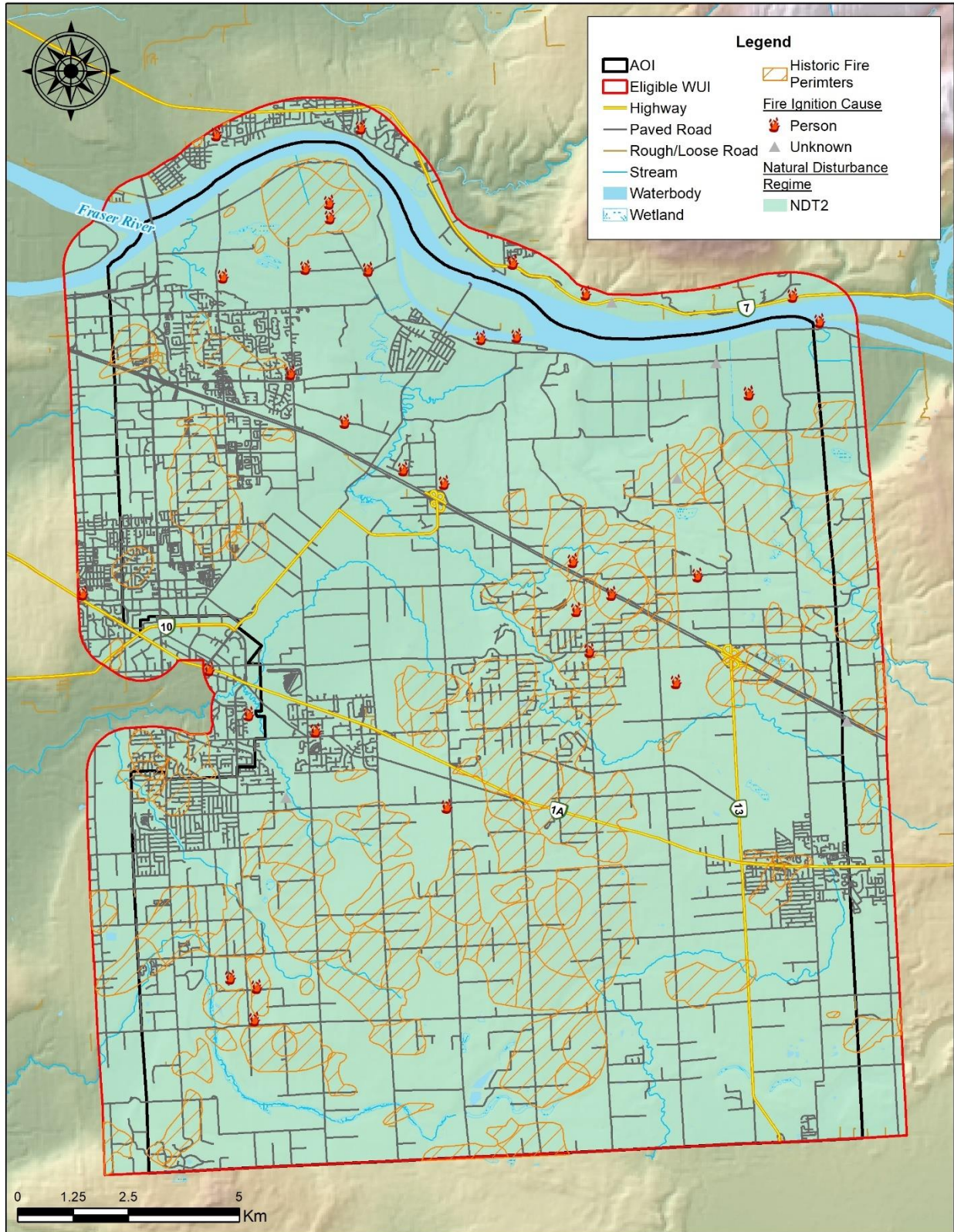
<sup>27</sup> Flannigan, M.D., B.M. Wotton, G.A. Marshall, W.J. deGroot, J. Johnston, N. Jurko, A.S. Cantin. 2016. *Fuel moisture sensitivity to temperature and precipitation: climate change implications*. *Climatic Change* (2016) 134: 59-71. Retrieved from: <https://link.springer.com/content/pdf/10.1007%2Fs10584-015-1521-0.pdf>.

<sup>28</sup> Flannigan, M.D., A.S. Cantin, W.J. de Groot, M. Wotton, A. Newbery, L.M. Gowman. 2013. *Global wildland fire season severity in the 21<sup>st</sup> century*. *Forest Ecology and Management* (2013) 294: 54 - 61.

<sup>29</sup> Jandt, R. 2013. *Alaska Fire Science Consortium Research Brief*. 2013-3.

<sup>30</sup> Fire ignition data is available from 1951-2020 and fire perimeter data is available from 1919-2020.

Map 5: Natural disturbance regimes and historical fire ignitions and occurrences within the Township's WUI





### 4.3 LOCAL WILDFIRE THREAT ASSESSMENT

There are two main components of the local risk assessment: the *wildfire behaviour threat class* (fuels, weather, and topography sub-components) and the *WUI risk class* (structural sub-component). The local wildfire threat assessment process includes several key steps as outlined in Appendix A: Local Wildfire Risk Process and summarized as follows:

- *Fuel type attribute assessment* – ground truthing/verification and updating as required to develop a local fuel type map.
- *Consideration of the proximity of fuel to the community* – recognizing that fuel closest to the community usually represents the highest hazard.
- *Analysis of predominant summer fire spread patterns* – using wind speed and wind direction during the peak burning period (ISI Roses from BCWS weather station(s); Figure 4). Wind speed, wind direction, and fine fuel moisture condition influence wildfire trajectory and rate of spread.
- *Consideration of topography in relation to values* (Table 9 and Table 10) – slope percentage and slope position of the value are considered, where slope percentage influences the fire’s trajectory and rate of spread and slope position relates to the ability of a fire to gain momentum uphill.
- *Stratification of the WUI* – according to relative wildfire threat based on the above considerations, other local factors, and field assessment of priority wildfire risk areas.

A total of 14 Wildfire Threat Assessment (WTA) plots were completed and 116 other field stops (e.g., fuel type verification, qualitative notes, and/or photograph documentation) were made across the WUI (see Appendix A-4: Wildfire Threat Plot Locations and Map 6) over a number of field days in November of 2022. WTA plots were completed in interface (i.e., abrupt change from forest to residential development) and intermix (i.e., where forest and structures are intermingled) areas of the WUI, on public land, to support the development of potential treatment areas.

#### Wildfire Threat Class Analysis

Classes of the wildfire threat class analysis are as follows:

- Very Low: Waterbodies with no forest or grassland fuels, posing no wildfire threat;
- Low: Developed and undeveloped land that will not support significant wildfire spread;
- Moderate: Developed and undeveloped land that will support surface fires that are unthreatening to homes and structures;
- High: Landscapes or stands that are continuous forested fuels that will support candling, intermittent crown fires, or continuous crown fires. These landscapes are often steeper slopes, rough or broken terrain and/or south or west aspects. High polygons may include high indices of dead and downed conifers; and
- Extreme: Continuous forested land that will support intermittent or continuous crown fires.

The results of the wildfire threat class analysis are shown on Map 6 and in Table 12 below. Excluding private land, the analysis shows that (for the assessable area) the majority (95%) of the Township’s WUI

is classified as Low or Very Low wildfire threat. 5% is classified as moderate wildfire threat, and 0.2% of the WUI is classified as High wildfire threat. No area was classified as Extreme wildfire threat. This analysis reflects the low-relief topography of the Township’s WUI, as well as the dominance of low-threat fuel types, specifically deciduous dominated forest stands (D-1/2 and M-1/2), grass (O1-a/b), and non-fuel (roads, water, etc.).

*Table 12: Wildfire threat summary for the WUI, not including private land*

Wildfire Threat	
Threat Class	% of Assessable WUI Area
Extreme	0.0%
High	0.2%
Moderate	5.0%
Low	78.5%
Very Low/No Threat (Water)	16.3%

It is important to note that the threat assessment quantifies threat as it relates to forest fuels, and does not include the ignition potential of residential landscaping, structures, or other infrastructure. Structure fires and structure-to-structure spread in a wildfire scenario are largely attributable to hazardous conditions in the Home Ignition Zone of a structure (most importantly, the area within 30 metres of the principal building and/or its attachments).

### 4.3.1 WUI RISK CLASS ANALYSIS

WUI risk classes are quantified when the wildfire threat (see above) is assessed as High or Extreme, causing potential unacceptable wildfire risk when near communities and developments (i.e., structures and values at risk). WUI risk classes are described below:

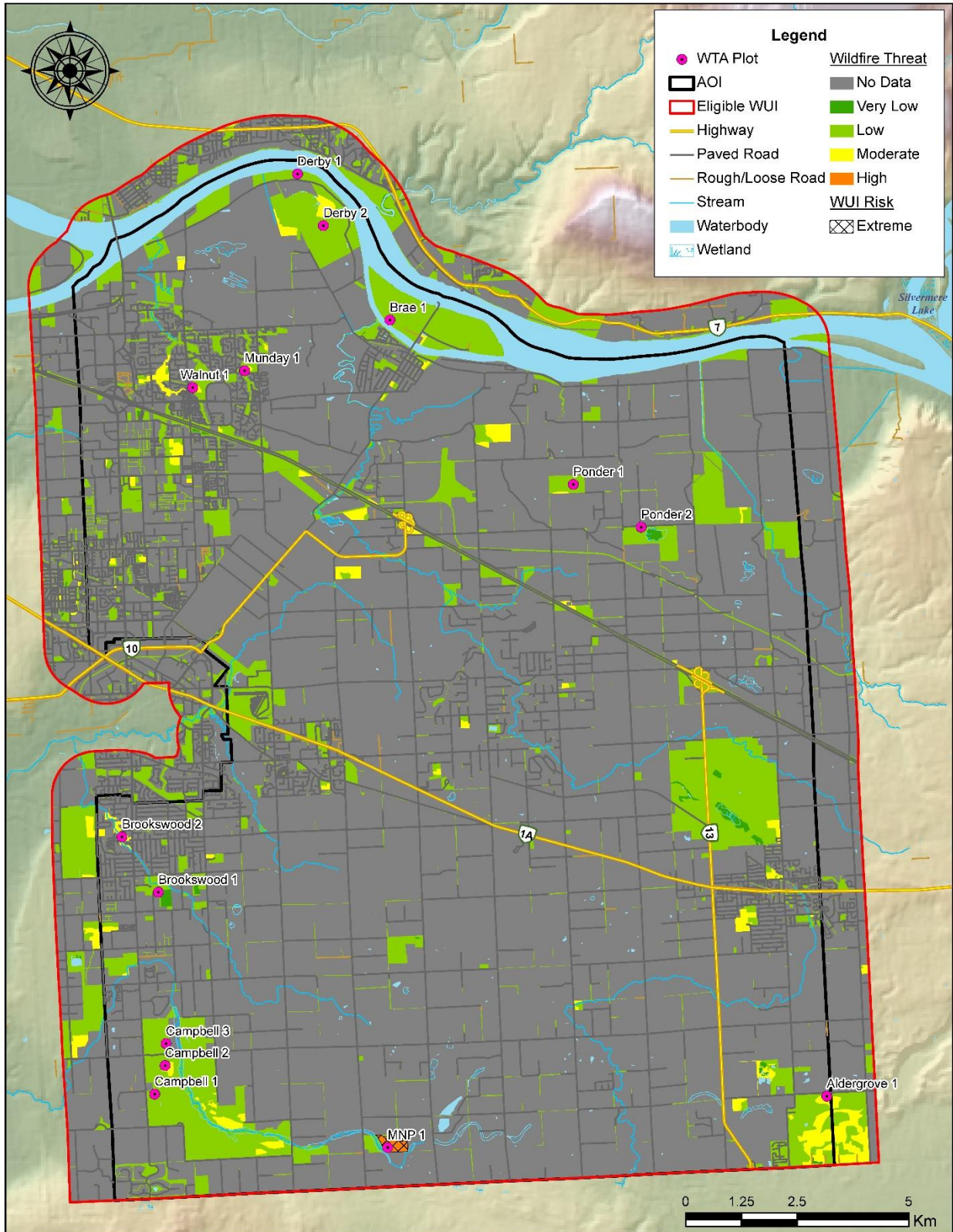
- **Low:** The high or extreme threat is sufficiently distant from developments, having no direct impact of the community and is located over 2 km from structures;
- **Moderate:** The high or extreme threat is sufficiently distant from developments, having no direct impact of the community and is located 500 m to 2 km distance from structures;
- **High:** The high or extreme threat has potential to directly impact a community or development and is located 200 m to 500 m from structures; and
- **Extreme:** The high or extreme threat has potential to directly impact a community or development and is located within 200 m from structures.

Only 0.2% of the Township’s WUI qualifies for this analysis, which is represented/mapped by one polygon (with accompanying WUI Threat Plot “MNP-1”) located within Municipal Natural Park in the south-central area of the Township. The entirety of this 18.4-hectare polygon has a WUI risk class of Extreme. Often, these polygons are targeted for fuel management activities, however, because the associated forest stand

is isolated and bounded by the Little Campbell River and cleared private land, fuel management activities are not recommended for it. Instead, trail-side vegetation management would be more appropriate, which is discussed further in Section 5.6.

For detailed field data collection and spatial analysis methodology for the local threat assessment and classification, see Appendix A-3: WUI Risk Spatial Analysis Methodology.

Map 6: Local wildfire threat assessment of the Township of Langley's WUI



## 4.4 HAZARD, RISK, AND VULNERABILITY ASSESSMENT

The purpose of a Hazard, Risk, and Vulnerability Analysis (HRVA) is to help a community make risk-based choices to address vulnerabilities, mitigate hazards, and prepare for responding to and recovering from hazard events. The HRVA process assesses sources of potential harm, their likelihood of occurring, the severity of their possible impacts, and who or what is particularly exposed or vulnerable to these impacts.<sup>31</sup>

The Township’s HRVA was housed within the 2021 Langley Emergency Response Plan (Annex I B), and Interface wildfire was addressed as such:

Hazard Definition						Fire: Interface Wildfire					
HAZARD DEFINITION		SECONDARY HAZARDS		IMPACT / CONSEQUENCE		HAZARD HISTORY		DISCUSSION POINTS TO CONSIDER		HAZARD SCENARIO	
Interface issues in some areas within the Township		Secondary hazards may include: <ul style="list-style-type: none"> <li>- road closures</li> <li>- air quality affected</li> <li>- evacuation of area or neighbourhood and businesses</li> <li>- additional resources to prevent fire spread</li> <li>- Exposures</li> </ul>		Potential community impacts: <ul style="list-style-type: none"> <li>- injuries and/or deaths</li> <li>- displaced residents for short to long term</li> <li>- evacuation of area or neighbourhood</li> <li>- water shortage</li> <li>- infrastructure impacted (roads closed)</li> <li>- loss of pets / animals</li> <li>- additional resources</li> <li>-</li> </ul> Department impact: <ul style="list-style-type: none"> <li>- water usage</li> <li>- staff fatigue</li> <li>- resource shortages</li> <li>- rehabilitation for firefighters</li> <li>- equipment failure</li> <li>- restricted or reduced response capacity to other events</li> <li>- Injuries / death to firefighters/civilians</li> <li>- Critical Incident Response Management concerns.</li> </ul>		Fire along Hwy. 1 between 264 <sup>th</sup> & 245 <sup>th</sup>		Wildfires fires have the potential to be very public events  <b>Resource Mgmt.</b>  <u>Agencies involved:</u> <ul style="list-style-type: none"> <li>- Mutual Aid partners</li> <li>- BCAS</li> <li>- BC Hydro</li> <li>- Fortis BC</li> <li>- RCMP</li> <li>- ESS</li> <li>- Fire Dispatch</li> <li>- Technical experts (BC Forestry)</li> <li>- Engineering (PW)</li> </ul> <u>Liaison with:</u> PEP Min. of Environment Fisheries & Oceans (Fed) Other support agencies CN / CP Rail		A fully loaded tractor / trailer unit pulls off the side of Hwy 1 after noticing smoke coming from his trailer. Fire spreads to the grass and brush along Hwy and then extends to forest.  <b>NOT RATED</b>	

Figure 6: Township of Langley Interface Wildfire HRVA

The soon-to-be developed Township of Langley emergency program HRVA should look and refer to the most recent CWRP for the most up to date wildfire risk analyses and vulnerabilities to the community, as well as key recommendations to focus on.

<sup>31</sup> Government of BC. HRVA Example Report. [https://www2.gov.bc.ca/assets/gov/public-safety-and-emergency-services/emergency-preparedness-response-recovery/local-government/hrva/hrva\\_forms-step\\_8-anytown\\_bc-sample\\_hrva\\_report.pdf](https://www2.gov.bc.ca/assets/gov/public-safety-and-emergency-services/emergency-preparedness-response-recovery/local-government/hrva/hrva_forms-step_8-anytown_bc-sample_hrva_report.pdf)

## SECTION 5: FIRESMART PRINCIPLES

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Recent studies completed by the Institute for Catastrophic Loss Reduction from the Fort McMurray and Lytton urban wildfire events showed that although wildfire conditions pass quickly (~60 seconds), homes will burn independently of the wildfire event, and for a long time. This means that although wildfire can cause structure ignition (most often via embers/firebrands which can travel up to 10km; less often via direct flame), this is concentrated to the wildland-urban interface edge for interface communities or throughout intermix communities. Fire then moving through an urban community becomes a structure-to-structure ignition/burning event – once these initial homes are on fire, they then transfer fire, through vegetation, convective heat, and flame contact to other structures, and so forth. This creates an urban conflagration which quickly overwhelms emergency response.

FireSmart™ is the leading program in the country aimed at empowering the public and increasing neighbourhood resilience through wildfire mitigation measures. It has been formally adopted by almost all Canadian provinces and territories, including British Columbia in 2000. The FireSmart program covers a wide breadth of preventative measures that are founded in the seven FireSmart disciplines: Education, Legislation and Planning, Development Considerations, Interagency Cooperation, Emergency Planning, Vegetation Management, and Cross-Training. These seven disciplines, and the guiding principles behind FireSmart, can be applied at several spatial scales, and are not restricted to any type of land ownership, forest type or property type.

The overarching goal of FireSmart is encouraging communities and citizens to adopt practices to mitigate the negative impacts of wildfire to assets on public and private property. While responsibility for effectively mitigating hazards must be shared between many entities including residents, industry, businesses, and governments,<sup>32</sup> the ultimate root of the WUI interface problem is the vulnerability of structures and homes to ignition during wildfire events, in particular vulnerability to embers. As a result, risk mitigation actions on private properties are emphasized.

Many of the recommendations proposed in this plan are eligible for funding under the UBCM CRI FireSmart Community Funding and Supports (FCFS) program. Looking forwards to the 2024 application intake and beyond, the application guide highlights that it will be required for all applicants to have *all* the following FireSmart components developed/active in their community:

- A person hired/contracted acting in a FireSmart position as a FireSmart coordinator (can be a title added to a current employee/contractor or a new hire).
- An active Community FireSmart & Resiliency Committee.
- A current CWRP or CWPP that is acceptable to the BCWS Wildfire Prevention Officer/Prevention Specialist or the FNESS Mitigation Specialist/Liaison. This includes assessment and identification of FireSmart and fuel management priorities.

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<sup>32</sup> FireSmart Canada. 2021. Retrieved from: <https://www.firesmartcanada.ca>

## Community Overview

During CWRP development, FireSmart vulnerability and resilience factors for the Township were noted (Table 13). This incorporates field observations, the local risk assessment, information gathered through stakeholder questionnaires and Community FireSmart Resiliency Committee meetings, and information from the Fire Chief.

*Table 13: FireSmart vulnerability and resilience factors within the Township of Langley*

Vulnerability	Resilience
<ul style="list-style-type: none"> <li>- International border on dominant fire season leading wind edge (south edge of municipality)</li> <li>- Extensive farm and agricultural land (if vegetative fuels poorly managed)</li> <li>- Major industrial transportation corridors (Highway 1 and rail lines; ignition risk)</li> <li>- Large population (ignition risk)</li> <li>- Lack of recent wildfire/large-scale fire events can lead to a lack of the public’s wildfire awareness/concern</li> </ul>	<ul style="list-style-type: none"> <li>- Hydrants in densely developed neighbourhoods</li> <li>- Relatively flat topography</li> <li>- Extensive farm and agricultural land (if vegetative fuels well managed)</li> <li>- Municipal properties mostly maintained vegetation</li> <li>- Public land forested areas dominated by low-hazard, low-fire behaviour deciduous-dominated fuel types</li> </ul>

Owing to the large amount of private land within the Township, and the overall low fire behaviour risk determined on municipal parcels and within Metro Vancouver Regional Parks, there are only a few on-the-ground actions the Township can take to directly lower wildfire risk. Thus, mitigating key wildfire risks and vulnerabilities for the municipality will largely fall under education programs directed at residents and visitors to the Township, planning and development considerations aimed at building more fire resilient neighbourhoods, emergency planning so that when a wildfire/large fire event occurs first responders are prepared, and private land FireSmart vegetation management.

Funding for this CWRP was part of a larger 2022 CRI FCFS grant application by the Township of Langley. That application also included funding for FireSmart education programs and workshops.

The following sections provide information on each FireSmart discipline. An analysis of actions that have been implemented in the Township is discussed, as well as any relevant gaps identified. Each section contains a table of recommended actions for the Township relating to that FireSmart discipline. Most actions are fundable through the CRI FCFS program. Each recommendation includes a rationale, lead agency, timeline, and estimated resources to complete (if known).

## 5.1 EDUCATION

Public education and outreach play a critical role in helping a community prepare for and prevent a wildfire. Participating in wildfire risk reduction and resiliency activities also promotes a sense of empowerment and shared responsibility. A successful public education campaign that builds awareness and understanding among residents and visitors can support the implementation of projects related to other FireSmart disciplines.

The Township of Langley’s Public Safety and Community Risk Officers provide educational services predominantly focused on fire prevention and life safety to reduce and prevent fires from occurring. FireSmart education was part of the Public Safety and Community Risk department’s portfolio in 2022, delivering CRI FCFS funded events and education campaigns through in-person fire and life safety programs and via the Township’s website (tol.ca), social media, bus shelter ads, emails, and other digital formats.<sup>33</sup>

The Township should look to continue to apply for funding to support FireSmart education through community events and social media. Having a FireSmart social media campaign developed and delivered can reach a large audience across the large municipality. Owing to the significant amount of agriculture and farmland, delivering farm specific FireSmart messaging would raise awareness within a large proportion of the municipal area. Additional education opportunities the Township can consider include delivering FireSmart programs to local youth within School District #35, developing a FireSmart specific page on the Township of Langley municipal webpage, and making FireSmart Home Ignition Zone Assessments available to residents.

CRI FCFS funding is available to hire/contract a person to act in a FireSmart position as a FireSmart coordinator (can be a title added to a current employee/contractor or a new hire). Planning, organizing, and executing the Township’s FireSmart program would run through them, including education and most other recommendations proposed in this plan.

Table 14 below details recommended FireSmart education actions that the Township can implement.

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<sup>33</sup> <https://www.tol.ca/en/services/public-safety-and-community-risk.aspx>



Table 14: Education recommendation and action items

Item	Priority	Recommendation	Rationale	Lead	Timeframe	Metric for Success	Funding Source / Est. Cost (\$) / Person Hours
				(Involved)			
<b>Education - Section 5.1</b>							
<b>Residents</b>							
1	High	Continue to promote FireSmart approaches for wildfire risk reduction to homeowners, businesses, and stakeholders through FireSmart workshops, open houses, and/or presentations. Supply FireSmart resources during these engagement campaigns and promote the FireSmart Begins at Home mobile app as a method of conducting home assessments.	FireSmart BC resources help present a unified message. Print resources are popular and easy to distribute. Take notes on what outreach methods have the most uptake and where, and adapt the program accordingly over time. Work with local businesses to advertise.	Public Safety and Community Risk /FireSmart	Ongoing	Continued growth in uptake and attendance of the FireSmart program	CRI FCFS funding resources for Education events (banners, brochures, promo items).
2	High	Promote the Farm and Ranch Wildfire Preparedness Program by offering free Hazard Assessments and holding workshops to assist farmers in completing a Wildfire Plan.	The Township has large rural areas with agricultural properties ranging from hobby farms to commercial farm operations. Previous large-scale emergencies have highlighted the importance of having a Wildfire Plan, especially when it comes to animal evacuation.	Public Safety and Community Risk /FireSmart  (Consultant)	Launch assessments within 2 years	Farms begin to have Wildfire Plans completed.	CRI FCFS funding for assessments
3	High	Provide FireSmart Home Ignition Zone (HIZ) assessments to residents as a tool to educate them on what are and aren't fire and wildfire risks on the home and property.	These assessments will detail specific FireSmart structure upgrade and landscaping recommendations private landowners and the municipal government can then action on.	Local FireSmart Representatives  (Consultant)	HIZ assessment registration open (1 year); assessments being completed (2 years)	HIZ assessments are being completed.	CRI FCFS funding for assessments (up to \$265/home)
4	High	Take the FireSmart message into local schools with presentations by FireSmart and fire services staff, and/or use of the FireSmart BC Education Kit materials.	FireSmart education for youth can lead to wildfire awareness being a normal part of their lives as well as bringing information home to their families.	Public Safety and Community Risk /FireSmart (Fire Department; BCWS)	Yearly	One FireSmart education day per school year in all high schools.	CRI FCFS funding available for presentations and materials

Item	Priority	Recommendation	Rationale	Lead	Timeframe	Metric for Success	Funding Source / Est. Cost (\$) / Person Hours
				(Involved)			
5	High	Launch a FireSmart social media campaign targeting platforms and online community groups used by the Township's residents.	This can be a cost effective and wide-reaching method used to continue FireSmart education within the municipality. [CRI FCFS funding is available to hire a consultant to develop FireSmart social media campaigns.]	Public Safety and Community Risk /FireSmart  (Consultant)	Campaign launched within 3 years	Increased FireSmart awareness among residents. Increase of people at FireSmart events	CRI FCFS funding  Contracted services to develop (~\$5,000 and deliver~\$2,000)
<b>Administration</b>							
6	High	a) Create a FireSmart Coordinator position to lead implementation of FireSmart activities and CWRP recommendations in the Township. The FireSmart Coordinator should be trained as a Local FireSmart Representative (LFR) and should also take the free online Wildfire Risk Reduction (WRR) course offered by FireSmart BC.  b) Have the FireSmart Coordinator (add other Community FireSmart and Resiliency Committee members, as wanted) attend FireSmart BC's annual WUI Symposium.	a) An internal FireSmart coordinator is an efficient way to deliver programs.  b) The WUI Symposium brings together FireSmart and wildfire professionals from across the province and provides great educational and networking opportunities.	If Internal: Public Safety and Community Risk /FireSmart  (External: Consultant)	a) 1 year  b) Yearly	a) Internal or external person acting as the Township's FireSmart Coordinator  b) FireSmart Coordinator attends WUI Symposium annually	CRI FCFS funding available for both the FireSmart Coordinator position and for persons to attend the WUI Symposium
7	High	Make this plan available on the Township's website. Once approved, hold public meeting(s) to present the plan and generate buy-in.	Plan implementation will be most successful with buy-in from the public, as significant action on private land is required.	Public Safety and Community Risk /FireSmart	1 year from approval date	Residents aware of the CWRP	Township of Langley
8	High	Develop a FireSmart page on the Township of Langley's municipal webpage. Advertise it to residents and use it as the place for them to go to see what FireSmart activities are happening where, when, and how they can participate.	Residents use the Township's webpage as a source for information – this should be utilized to educate for FireSmart and wildfire awareness.	Township of Langley  (Consultant)	3 years	Webpage active and promoting FireSmart events, hosting assessment registrations, etc.	CRI FCFS funding available  (~\$3000 contracted service. ~40 hours for set-up. Additional hours for updates as required)

## 5.2 LEGISLATION, PLANNING AND DEVELOPMENT CONSIDERATIONS

Legislation and planning regulations are effective tools for reducing wildfire risk and are quite effective when applied by municipalities. These regulations are often rooted in an Official Community Plan (OCP): a document that acts as an aspirational expression of the objectives and policies of the local government, and provides government with a long-range framework to guide, monitor, and evaluate future land use and development. The Township's OCP and bylaws relevant to FireSmart and wildfire planning and preparedness were reviewed in Section 2. Due to the unique rural/agricultural and urban mix present within the Township, local government has developed "Community" and "Neighbourhood" plans for specific, identifiable, consolidated urban areas to act as a declaration of the goals, objectives, and policies which will guide their future development above and beyond the OCP.

Overall, all goals relating to development, growth, sustainability, infrastructure, and urban design should account for wildfire as a risk that can be planned for, managed, and mitigated. This is currently addressed, indirectly or directly, within the Township's OCP via statements such as:

- "Support and encourage initiatives that reduce the number of deaths;"
- "Support preventable safety programs and initiatives, as opposed to reactive responses;" and
- "Facilitate mitigation measures such as natural hazard Development Permit Areas to reduce risks arising from landslides, flood, debris flow, and forest interface wildfire."

When the Township's OCP is next up for review and updating, FireSmart and FireSmart principles should be imbedded directly within the stated objectives and policies to guide future land use and development decisions through a wildfire lens.

The Township's "Community" and "Neighbourhood" plans should be used to specify wildfire risk reduction and FireSmart principles within its most populated areas. These plans fall short in incorporating FireSmart specifically into many key objectives and policies, thus limiting FireSmart incorporation into legislation and policy. Specific to managing development, one of the most powerful influences that legislation and planning can have on local wildfire risk reduction and resiliency is through regulating FireSmart construction and landscaping through wildfire hazard Development Permit Areas (DPAs).

Pursuant to Section 5 of the 2015 BC Building Act, municipalities may not establish technical regulations related to buildings [in their Building Bylaw]. For that reason, most local governments choose to enact FireSmart requirements for new buildings (and specific renovations of existing buildings) and subdivision development through a Development Permit Area application process. Incorporating a specific interface wildfire protection DPA and guidelines will guide development design to minimize wildfire/fire hazards and contribute to the fire safety of the neighbourhood/community, thus limiting property damage should a wildfire occur. The following aspects should be considered in the interface wildfire hazard DPA development:

1. Establish DPA objectives (e.g., minimize risk to property and people from wildfires, minimize risk to forested areas surrounding the municipality, and conserve the visual and ecological assets of the forests surrounding communities, etc.).
2. Mandate FireSmart construction materials, some of which may be beyond the BC Building Code within the established wildfire hazard development permit area.
3. Engage the development community and the public in the DPA development process to educate, inform, and allow for input. This can be accomplished in a variety of formats, including, but not limited to, workshops, informational sessions, or open houses.

DPAs can incorporate as many or as few FireSmart construction and landscaping principles to achieve the level of risk reduction acceptable by the community and the municipality. However, three key principles have been proven to provide the greatest risk reduction and should be seriously considered:<sup>34</sup>

- Installing fire-resistant roofing.
- Installing fire-resistant structure siding.
- Creating a 1.5 metre non-combustible zone surrounding the structure.

The Township has started to act upon this, developing draft Interface Wildfire DPA policies to be incorporated into three new Community Plans in development. The policies will be implemented on a trial basis, and if successful, Interface Wildfire DPA policies should be amended into additional appropriate neighbourhoods.

Regulating human-caused or exacerbated fires through bylaws is a key legislative mechanism to minimize wildfire/fire hazards and contribute to the fire safety of the neighbourhood/community. Overall, the powers given to the Fire Chief, Fire Department, and Public Safety and Community Risk Officers through the Fire Prevention, Community Standards, and Tree Protection bylaws are robust and cover all major fire and wildfire risks that should be considered, including implementing local fire bans. Public Safety and Community Risk Officers, with the cooperation of property owners, work diligently to correct hazards and increase fire safety awareness through a process of inspections and enforcement.<sup>35</sup> From Spring of 2018 to the Fall of 2022 (excluding Spring 2020 when no burning was allowed), a total of 15,538 burn permits were applied for and approved by the Township – an average of 1,726 per burning season (two burning seasons per year).<sup>36</sup> This amount of participation in burn permit application by the public shows a high level of awareness of fire safety and related bylaws.

FireSmart principles can also be regulated through a local government's landscaping bylaws (a good option if Interface Wildfire DPAs are not being applied). Several jurisdictions, including the District of Squamish and the City of Nelson, have implemented Wildfire Landscaping Bylaws to prohibit the planting

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<sup>34</sup> As noted in FireSmart BC's recently published "An examination of the Lytton, BC wildland-urban fire destruction" document and additionally detailed and discussed in the National Research Council's "National Guide for Wildland-Urban Interface Fires".

<sup>35</sup> <https://www.tol.ca/en/services/public-safety-and-community-risk.aspx>

<sup>36</sup> Data supplied by the Township of Langley Fire Department

of new flammable conifer shrubs next to residences. Even without much enforcement, such a bylaw can a) educate the public on FireSmart best practices; b) set the tone for FireSmart recognition at the local government scale; and c) be implemented for public infrastructure.



*Figure 7: Newly completed apartment complex with highly flammable cedar hedging planted.*

The Township should also look to complete FireSmart assessments of critical infrastructure, prioritizing those that are the most important towards responding to, and recovering from, a wildfire emergency (see Section 3.2.1, Table 7). The municipality should commit to following through on the high priority recommendations provided in the assessments – by taking the lead, the community may follow.<sup>37</sup>

Opportunities to update or strengthen existing policies, and recommendations to consider new policies or bylaws, are identified in Table 15.

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<sup>37</sup> To be eligible for CRI FCFS mitigation work funding in 2023 and beyond, all community asset projects must have completed a FireSmart Home or Critical Infrastructure Ignition Zone Assessment or equivalent.

Table 15: Legislation, planning and development recommendation and action items

Item	Priority	Recommendation	Rationale	Lead	Timeframe	Metric for Success	Funding Source / Est. Cost (\$) / Person Hours
				(Involved)			
<i>Legislation, Planning and Development - Section 5.2</i>							
9	High	Complete or schedule periodic updates of the CWRP. The frequency of updates is dependent upon major changes which would impact local wildfire risk, funding changing that may lead to new opportunities or the rate at which wildfire risk reduction efforts are implemented.	A current (i.e., no more than 5 years old) CWRP is a requirement for further funding under the CRI Program. Reassess and reprioritize proposed and complete.	Public Safety and Community Risk /FireSmart (Consultant)	5 years from adopting this CWRP document	Township of Langley always has an up-to-date CWRP and action plan	CRI FCFS funding up to \$32,000. Incremental staff hours for project management (40-80)
10	High	Consider adopting a Wildfire Landscaping Bylaw to restrict flammable landscaping. Example: prohibit conifer vegetation in the Immediate Zone of a residence or structure (0-1.5 m) and prohibit the planting of new conifer vegetation in Priority Zone 1 (1.5-10 m).	Highly flammable landscaping plants (ex., cedar hedges) were noted throughout the Township, especially on more densely populated streets. Other jurisdictions (District of Squamish, City of Nelson) have successfully implemented a similar bylaw, which can be an effective communication tool regardless of enforcement capacity.	Public Safety and Community Risk /FireSmart	3 Years	A Wildfire Landscaping Bylaw is being considered by Council	Incremental staff hours. CRI FCRS up to \$10,700 per bylaw for development considerations
11	High	Implement draft Interface Wildfire DPA policies that are part of Community Plans currently in development. Monitor DPA implementation with a goal of amending these policies into additional neighbourhoods.	The most effective option to further encourage FireSmart principles in development is through Interface Wildfire Hazard Development Permit Areas. Other jurisdictions (District of West Vancouver, District of Squamish) have successfully done so.	Public Safety and Community Risk /FireSmart (Consultant)	5 Years	Draft DPAs assessed for effectiveness and applied into other Community Plans	Incremental staff hours. CRI FCRS up to \$10,700 for DPA development
12	High	Complete FireSmart Critical Infrastructure Assessments of critical infrastructure, prioritizing those that are the most important towards responding to, and recovering from, a wildfire emergency (see Table 7). Note: Update this table, as needed, to include other critical infrastructure.	For more effective response to and recovery from a wildfire emergency. Plan to implement high priority recommendations (can be funded through CRI FCFS). Update	Public Safety and Community Risk /FireSmart (Consultant)	3 Years	Identified priority critical infrastructure listed in Table 7 have completed FireSmart Assessments	Incremental staff hours. CRI FCRS up to \$850 per assessment

Item	Priority	Recommendation	Rationale	Lead	Timeframe	Metric for Success	Funding Source / Est. Cost (\$) / Person Hours
				(Involved)			
13	Moderate	Update the Township of Langley OCP and associated Community and Neighbourhood Plans through a wildfire lens, incorporating FireSmart principles where needed. Include a policy to require the construction of municipal assets and critical infrastructure to adhere to FireSmart principles.	To promote wildfire resiliency in development. To make additional community assets (i.e., community centres) safe refuges during a wildfire emergency.	Public Safety and Community Risk /FireSmart  (Consultant)	5-10 Years	FireSmart language and policies amended into the OCP, Community, and Neighbourhood Plans	Incremental staff hours. CRI FCRS up to \$10,700 per OCP amendment for development considerations

### 5.3 INTERAGENCY COOPERATION

The goal of interagency cooperation is to broaden from a single department- or agency-based siloes approach to a landscape-level, multi-agency approach.<sup>38</sup> This increases the ability of local governments to plan for and respond to emergencies effectively.

Owing to the Township’s population, density, and level of urban development (municipal and private land combined account for approximately 90% of the Township’s land ownership), the Township itself has an emergency management organizational structure and associated infrastructure in place to respond to most emergencies. As such, it is most important that the Township ensures that there is the required interdepartmental communication and planning mechanisms available to plan for wildfire emergencies as well as implementing this plan’s recommendations.

A Community FireSmart and Resiliency Committee (CFRC) is recommended as part of the CWRP development process (and mentioned previously, required for all CRI FCFS approved funding applications starting in 2024). The Township’s CFRC (detailed below in Table 16) reflects the key planners and responders who will be most involved in local FireSmart, wildfire resiliency planning, wildfire and emergency response, and land management specific to the WUI. The intent is to foster collaborative problem solving and planning, and delineate required roles and actions during times of emergency response. Internally, this includes a member of the Township’s Public Safety and Community Risk Department, Fire Department, and Parks Department. Externally, it includes a representative of Metro Vancouver Parks and BCWS.

*Table 16: Township of Langley’s Community FireSmart Resiliency Committee*

Agency	Department	Title
Township of Langley	Public Safety and Community Risk Committee	FireSmart Coordinator (or equivalent)
	Fire Department	Assistant Chief
	Municipal Parks	Manager Park Operations
Metro Vancouver	Regional Parks, East Area	Park Operations Supervisor
BC Wildfire Service	Fraser Fire Zone – Cultus/Haig	Wildfire Assistant/Technician

Metro Vancouver Regional Parks account for most of the large natural and forested land within the Township’s WUI. There were four fire incidents recorded in Regional Parks within the WUI in 2022 – one explosion and three illegal campfires. Township of Langley Fire Department responded to one of the illegal campfires. In general, if first on the scene, Metro Vancouver Regional Parks staff would initiate fire

<sup>38</sup> CRI FCSF 2021 CWRP Supplemental Instruction Guide



suppression (initial attack) until local fire department arrives and assumes incident command. Regional Parks staff would then provide support that could include trained S-100 staff, equipment, and resources including access to water. From time to time, Metro Vancouver's response will also include trained human resources from its Watershed Protection team, or teams from BC Wildfire Service. These events, and the Fire Department being relied upon for assuming incident command (and at times being the first to respond to a wildland fire), highlight the need for continued interagency cooperation between the Township and Metro Vancouver Regional Parks.

It is recommended the CFRC focus on the following important risk reduction and planning measures during its initial meetings:

- FireSmart on private property: starting/continuing with education opportunities (discussed in Section 5.1 and 5.6).
- FireSmart education specifically targeting farms and fire assessments of farms (discussed in Section 5.1).
- FireSmart vegetation management along municipal and Regional Park trail sides, especially those adjacent to homes/apartments (discussed in Section 5.6).

The Township's FireSmart vulnerabilities detailed in Table 13 help point towards important agencies that should be additionally collaborated with, including but not limited to:

- BC Ministry of Transportation and Infrastructure
  - Re: provincial highway routes through the WUI; hazardous materials transported and managing vegetative fuels within the right-of way.
- Canadian Pacific and Canadian National
  - Re: railway lines through the WUI; hazardous materials transported and managing vegetative fuels within the right-of way.
- Langley Regional Airport
  - Re: Combustible fuel storage and managing vegetative fuels on the property.

Mutual Aid Agreements allow for resources to be shared across jurisdictional boundaries bolstering firefighting capabilities to adjacent communities when needed. Township of Langley Fire Department has fire response mutual aid agreements with all bordering municipalities, and should look to continue these into the future.

The Katzie First Nation, Kwikwetlem (Kwantlen) First Nation, and Matsqui First Nation each have Reservation parcels within the Township's municipal boundary and agreements for fire response from the Township of Langley Fire Department. Assessing the level of FireSmart application within each is out of scope for this plan, but the Township should engage with each First Nation with the intent to provide resources, if wanted, to assist in developing FireSmart programs with them. Having each community's FireSmart programs working together in lockstep would provide efficiencies in delivering them, as well as consistency in FireSmart messaging. Additionally, having a representative from each First Nation sit on the Township's CFRC would provide a platform for meaningful collaboration.

Recommendations and action items that Township of Langley can implement to continue growing interagency relationships and increase interagency cooperation are listed below in Table 17.

Table 17: Interagency cooperation recommendation and action items

Item	Priority	Recommendation	Rationale	Lead	Timeframe	Metric for Success	Funding Source / Est. Cost (\$) / Person Hours
<i>Interagency Cooperation - Section 5.3</i>							
14	High	Continue hosting Township of Langley Community FireSmart and Resiliency Committee (CFRC) meetings, incorporating recommended FireSmart, wildfire, and land managers as recommended.	The committee is an opportunity to share information on planned activities and learn from other stakeholders, and will help efficiently to plan and deliver the Township's FireSmart program. An active CFRC is an impending requirement for CRI FCFS funding.	Public Safety and Community Risk /FireSmart  (Identified stakeholders)	Yearly and ongoing	At least one committee meeting held annually	At least 8 internal hours per meeting to prepare, participate and debrief; CRI FCFS up to \$2,140 per meeting
15	High	Engage with additional agencies that own or manage high ignition risk infrastructure (BC Ministry of Transportation and Infrastructure, Canadian Pacific and Canadian National Railways, Langley Regional Airport, etc.) specifically about managing the grass and other vegetative fuel loads within their right-of-ways or on their properties.	These transportation corridors and infrastructure represent a considerable fire ignition risk within the Township's WUI. They are often lined with grass (rail-lines, highways) or have large areas of grass within them (airport). The recent Lytton wildfire disaster showed how wildfire can move quickly through urban areas in un-managed or poorly managed grass-dominated fuel network, creating an urban conflagration scenario that quickly overwhelmed local Fire Departments and response agencies. Ensuring grass and other fuels associated with these infrastructures are managed properly, especially during fire season, can greatly limit a fire's ability to spread quickly and becoming a wildfire/urban conflagration emergency.	Public Safety and Community Risk /FireSmart  (Identified stakeholders)	Engage with all within 2 years	Grass and other fuels associated with high ignition risk infrastructure are being managed	Internal hours, amount dependent on level of engagement
16	High	Engage with the Katzie First Nation, Kwikwetlem (Kwantlen) First Nation, and Matsqui First Nation about collaborative opportunities for FireSmart program development and delivery.	To encourage FireSmart throughout the Township of Langley. To provide efficiencies in delivering FireSmart programs, as well as consistency in FireSmart messaging.	Public Safety and Community Risk /FireSmart  (Identified First Nations)	Engage with all within 2 years	Collaborative FireSmart Programs underway within 5 years	Internal hours, amount dependent on level of engagement

## 5.4 CROSS-TRAINING AND FIRE DEPARTMENT RESOURCES

All staff and agency partners who are expected to participate in the development and implementation of this plan, or participate in a wildfire response and recovery, should be appropriately trained. This includes Township of Langley municipal staff and Township of Langley Fire Department (TLFD) members.

Training opportunities for emergency management staff, as funded in the 2023 CRI FCFS program include but are not limited to:

- Introduction to Emergency Management in Canada (basic concepts and structure of emergency management); and
- ICS-100 (introduction to an effective system for incident command, control, and coordination of response at an emergency site; available online).

There are currently four FireSmart Local FireSmart Representatives on TLFD. Three TLFD members have completed First Nation cultural sensitivity training. Some TLFD staff completed S-100 (basic fire suppression and safety) training some years ago, but are no longer certified. Overall, all TLFD staff should aim to be trained (at minimum) in S-100. Moreso, TLFD staff should look to be trained in the more comprehensive SPP-WFF1 (Wildland Firefighter Level 1; includes S-100, S-185, and ICS-100) – as also recommended in the Township of Langley Fire Department Standards of Cover and Deployment Plan.

Regular in-person cross-training between BCWS and structural fire crews is an important consideration as crews are likely to work together and use each other's equipment in the event of an interface wildfire. There has been no cross-training between BCWS and TLFD to date.

TLFD is Commission of Fire Accreditation International (CFAI) accredited. Accreditation (internationally recognized) is received through an ongoing, voluntary self-assessment and peer-assessment process that aims to look for opportunities for improvement (through an improvement plan) across all aspects of the Department.<sup>39</sup> Additionally, TLFD is Superior Tanker Shuttle Service accredited through the Fire Underwriters Survey. This accreditation is a recognized equivalency to hydrant protection. To be accredited, fire departments must commit to maintaining a high standard of organization, and practice delivering the service regularly.<sup>40</sup> The fire department must be able to show through testing and documentation that it can continuously provide water supplies in excess of the minimum required for hydranted municipal-type water supplies.<sup>40</sup> As such, TLFD is well equipped to respond to structural fires within its response area. Major equipment available includes two rescue trucks, eight fire engines, 10 engine/tenders, and two quint trucks. However, TLFD has no wildfire specific equipment. TLFD should look to purchase wildland firefighting equipment relevant to the interface wildfire scenarios it could be faced with, including mobile sprinkler units. TLFD should prioritize the purchase of a trailer so that the equipment can be deployed to where it is needed most, quickly. The Township should consult with BCWS

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<sup>39</sup> <https://www.cpse.org/accreditation/>

<sup>40</sup> <https://fireunderwriters.ca/grading/superior-tanker-shuttle-service.html#:~:text=Accredited%20Superior%20Tanker%20Shuttle%20Service%20is%20a%20recognized%20equivalency%20to,practice%20delivering%20the%20service%20regularly.>

Fraser Fire Zone (Cultus/Haig fire base) staff on what equipment should be prioritized, and then schedule training sessions with it. CRI FCFS funding is available starting in 2023 for FireSmart structure protection equipment, which includes sprinkler structure units.

Table 18 lists recommendations for the Township related to Cross-Training and Fire Department resources.

Table 18: Cross-training recommendation and action items

Item	Priority	Recommendation	Rationale	Lead	Timeframe	Metric for Success	Funding Source / Est. Cost (\$) / Person Hours
				(Involved)			
<b>Cross-Training and Fire Department Resources - Section 5.4</b>							
<b>Training</b>							
17	High	<p><i>For Township of Langley Fire Department staff:</i></p> <p>a) Work towards all staff should be trained, at minimum with S-100 (basic fire suppression and safety). Furthermore, staff should look to be trained in the more comprehensive SPP-WFF1 (Wildland Firefighter Level 1).</p> <p>b) Other training to be considered includes S-231 (Engine Boss Course), and S-185 (Structural Protection Unit Deployment).</p>	SPP-WFF-1 is specific for structural fire fighters who respond to wildland fires in their service area.	TLFD	1 year and ongoing	All members are trained in SPP-WFF1 and refresh the course annually	Compensation for course instructor/facilitation of spring training courses; CRI FCFS funding
18	High	Continue offering training opportunities for municipal staff and TLFD staff, including Emergency Operations Centre (EOC) and Incident Command System (ICS) courses, as well as First Nation cultural sensitivity training.	ICS-100 is an online course that provides an introduction to effective control of an emergency site; other levels of ICS provide more detailed training. BCWS uses the ICS system. TLFD has response agreements with local First Nation reservation communities – sensitivity training is important for further education and awareness of First Nation considerations while working in their traditional territories and communities.	TLFD Public Safety and Community Risk /FireSmart	1 year and ongoing	<p>Increased numbers TLFD and municipal staff have additional identified training.</p> <p>All Public Safety and Community Risk members have First Nation cultural sensitivity training.</p>	CRI FCFS: staff time and course cost (ICS-100 \$25 online)
19	Moderate	TLFD should schedule regularly (bi-annually at least) practical training with wildland firefighting equipment, and if possible cross-training with BCWS (Fraser Fire Zone – Cultus/Haig fire base).	Cross-training enhances the abilities of crews to work together on an interface fire.	TLFD	Training every second year (minimum)	TLFD and BCWS are conducting training sessions	In-house staff time and costs

**Equipment**

20	High	TLFD should look to acquire (and train with) wildland firefighting equipment, including mobile sprinkler units. TLFD should prioritize the purchase of a trailer so that the equipment can be deployed to where it is needed most, quickly.	The Township should consult with BCWS Fraser Fire Zone (Cultus/Haig fire base) staff on what equipment should be prioritized, and then schedule training sessions with it. Prioritizing the purchase of a trailer allows for wildland firefighting equipment and mobile sprinklers to be stored in one location that can be mobilized to where it is needed most. Training is available for setting up and running mobile sprinkler units.	TLFD	5 Years	Trailer with equipment (including mobile sprinklers) has been acquired. Training using mobile sprinklers has been provided to TLFD staff	Up to \$45,000/per year. Four year/phases identified as part of CRI FCFS funding
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**Response**

21	High	TLFD should continue to uphold both Commission of Fire Accreditation International and Superior Tanker Shuttle Service accreditations.	These accreditations provide TLFD with ongoing department reviews with action plan outcomes to facilitate continued response and service improvements.	TLFD	Ongoing	Accreditations upheld	In-house hours and costs specific to each (neither funded through CRI FCFS)
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### 5.5 EMERGENCY PLANNING

When several wildfire emergencies are taking place throughout the province, BCWS resource availability may become scarce. Deployment of provincial resources occurs based on the Provincial Coordination Plan for Wildland-Urban Interface Fires.<sup>41</sup> Therefore, local government wildfire preparedness and resource availability are critical components of community wildfire resilience – individuals and agencies need to be ready to act. Plans, mutual aid agreements, resources, training, and emergency communications systems make for effective wildfire response.

The Township’s emergency management has previously been provided by the municipality in conjunction with Langley City. However, at the time of this plan’s writing, the Township has decided to have their own emergency program for itself. Response to an interface wildfire event will be coordinated and directed through the Township’s emergency plan. As such, it should be reviewed, tested, and updated to ensure such an event will be properly actioned. The Township is no stranger to natural disasters, but these are almost all flooding events. However, these experiences will have required the Township to work through similar complexities that would be associated with an emergency wildfire event:

- Evacuation of a large number of residents (communication, coordination, etc.)
- Evacuation of livestock from farms
- A mix of densely populated urban centres and large-property farms and ranches.

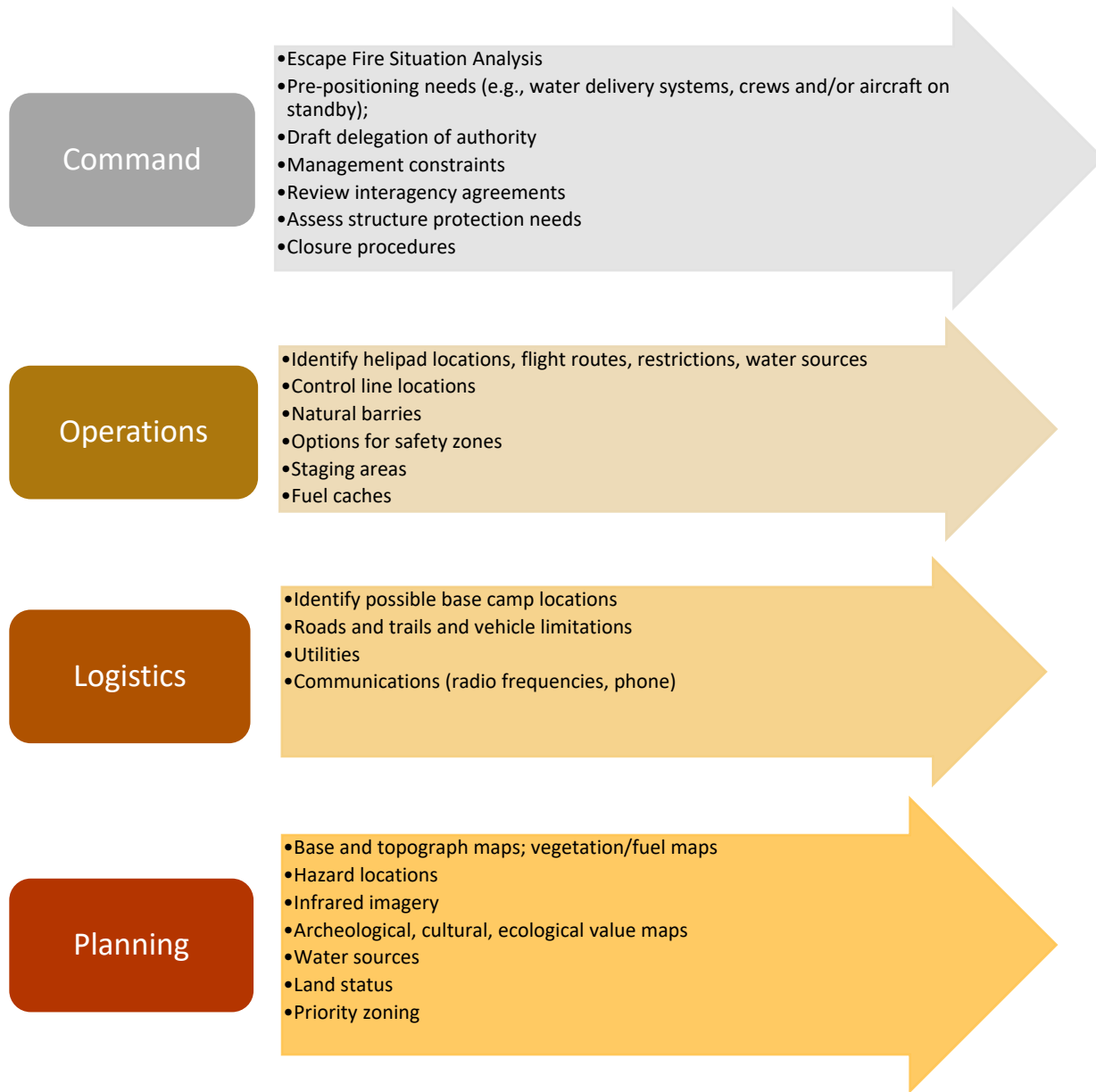
#### Pre-incident Planning

Pre-incident planning can help immensely with wildfire response. A pre-incident plan is a compilation of essential fire management information needed to save valuable time during fire suppression operations and should be developed and tested using tabletop simulations, and if necessary, revised prior to every fire season. BCWS should be involved in this process to ensure that any mapping done as part of the Fire Management Planning process is not unnecessarily duplicated. A pre-incident planning checklist that can be used to help develop a pre-incident wildfire suppression plan (and associated maps) is shown below in Figure 8.

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<sup>41</sup> Provincial Coordination Plan for Wildland Urban Interface Fires. 2016. Retrieved from: [https://www2.gov.bc.ca/assets/gov/public-safety-and-emergency-services/emergency-preparedness-response-recovery/provincial-emergency-planning/bc-provincial-coord-plan-for-wuifire\\_revised\\_july\\_2016.pdf](https://www2.gov.bc.ca/assets/gov/public-safety-and-emergency-services/emergency-preparedness-response-recovery/provincial-emergency-planning/bc-provincial-coord-plan-for-wuifire_revised_july_2016.pdf)





*Figure 8: A pre-incident planning checklist that can be used to help develop a pre-incident wildfire suppression plan and associated maps.*

**Emergency Simulation Exercises**

Emergency simulation exercises involving those who participate in wildfire response and recovery can identify weaknesses in evacuation communication, coordination, and implementation to be addressed. Holding wildfire specific table-top exercises should be prioritized by the Township. These also create valuable cross-training opportunities.

### Wildfire Preparedness Condition Level

Township of Langley could also consider developing local daily action guidelines based on expected wildfire conditions. Table 19 below provides a template that can be tailored even more specifically to the Township, outlining actions staff can take as fire danger levels change throughout the year (but primarily throughout the fire season).

*Table 19: Example of a Wildfire Response Preparedness Condition Guide<sup>42</sup>*

FIRE DANGER LEVEL	ACTION GUIDELINES
LOW	<ul style="list-style-type: none"> <li>All Municipal staff on normal shifts.</li> </ul>
MODERATE	<ul style="list-style-type: none"> <li>All Municipal staff on normal shifts.</li> <li>Information gathering and dissemination through the Township's CFRC.</li> </ul>
HIGH	<ul style="list-style-type: none"> <li>All Municipal staff on normal shifts.</li> <li>Daily fire/burning detection patrols by staff/TLFD.</li> <li>Regional fire situation evaluated.</li> <li>Daily fire behavior advisory issued (radio, websites, social media).</li> <li>Wildland fire trained TLFD staff and EOC staff notified of Fire Danger Level.</li> <li>Establish weekly communications with CFRC.</li> <li>Hourly rain profile for all weather stations after lightning storms.</li> </ul>
EXTREME	<ul style="list-style-type: none"> <li>Rain profile (see above).</li> <li>Daily fire/burning detection patrols by staff/TLFD.</li> <li>Daily fire behavior advisory issued (radio, websites, social media).</li> <li>Regional fire situation evaluated.</li> <li>EOC staff considered for stand-by.</li> <li>Wildland fire trained TLFD staff considered for stand-by/extended shifts.</li> <li>Designated community staff or contractors: water tender and heavy machinery operators, arborists may be considered for stand-by/extended shifts.</li> <li>Establish daily communications with CFRC.</li> <li>Initiating natural area and trail closures (coordinate with Metro Vancouver Parks).</li> <li>Update public (radio, websites, social media) as new information changes.</li> </ul>
FIRE(S) ONGOING	<ul style="list-style-type: none"> <li>All conditions apply as for Extreme (regardless of actual fire danger rating).</li> <li>Provide regular updates to media/structural fire departments/staff on fire situation.</li> <li>Mobilize EOC support if evacuation is possible, or fire event requires additional support.</li> <li>Implement Evacuation Alerts and Orders based on fire behavior prediction and under the direction of the Fire Chief/BCWS.</li> </ul>

Recommendations and action items that Township of Langley can implement to continue productive and effective emergency planning are detailed below in Table 20.

<sup>42</sup> From FireSmart Community Funding and Supports 2021 CWRP Supplemental Instruction Guide

Table 20: Emergency preparedness recommendation and action items

Item	Priority	Recommendation	Rationale	Lead	Timeframe	Metric for Success	Funding Source / Est. Cost (\$) / Person Hours
				(Involved)			
<b>Emergency Planning - Section 5.5</b>							
22	High	Hold wildfire specific tabletop emergency scenarios with emergency management partners. Consider fires approaching from likely directions (i.e., from the south across the Canada/USA border) and how that would affect communication, evacuations, response, etc.	Tabletop exercises provide an opportunity to identify weak spots in a plan and collaborate.	Public Safety and Community Risk /FireSmart  CFRC	Every 2 years	A wildfire specific table-top exercise is completed every two years	CRI FCFS Emergency Planning: up to \$2,140 per meeting. Possibly CRI CEMF
23	High	Develop and action a Wildfire Response Preparedness Condition Guide (Table 19). Tailor this guide to the municipality's specific structure and edit it after mock-exercises/table-top drills.	To guide risk management primarily during times of High and Extreme wildfire danger levels.	Public Safety and Community Risk /FireSmart  CFRC BCWS	5 years	A Wildfire Response Preparedness Condition Guide has been developed	CRI FCFS Emergency Planning funds available
24	Moderate	Develop a specific Wildfire Pre-Incident Plan with associated maps.	To save valuable time during fire suppression operations. The plan should be developed and tested using tabletop simulations.	Public Safety and Community Risk /FireSmart  CFRC BCWS	5 years	A Wildfire Pre-Incident Plan has been developed	CRI FCFS Emergency Planning funds available
25	Low	Ensure that all critical infrastructure (water pumpstations, fire halls, community halls, identified EOCs) have back-up generators.	Back-up generators for pumphouses, treatment plants, and community buildings would facilitate both emergency response (water supply for suppression) and rapid community return and recovery following a fire.	Public Safety and Community Risk /FireSmart  Municipality Engineering	5 years	All water infrastructure, at a minimum, has back-up power	Cost varies - \$50,000+ per required generator

## 5.6 VEGETATION MANAGEMENT AND OTHER FIRESMART ACTIVITIES

As discussed in Section 4.1, fuel is the only aspect of the fire behavior triangle that can be modified to reduce wildfire threat. Fuel or vegetation management reduces potential wildfire intensity and ember exposure to people, structures, and other values through manipulation of both natural and cultivated vegetation within or adjacent to a community. A well-planned vegetation management strategy can greatly increase fire suppression effectiveness and reduce damage to property and to values.

Vegetation management can largely be accomplished through two different activities:

1. *Residential-scale FireSmart landscaping*: The removal, reduction, or conversion of flammable [landscaping] plants to create more fire-resistant areas in the FireSmart Immediate, Intermediate, and Extended Zones (0-30m from the structure; see Appendix A-5: Proximity of Fuel to the Community for more information and a diagram of the Home Ignition Zone).
2. *Fuel management treatments*: The manipulation or reduction of living or dead forest and grassland fuels to reduce the rate of spread and head fire intensity and enhance likelihood of successful suppression.

### Residential-Scale FireSmart landscaping

Since private land (a lot of which is used for industrial farming and hobby farming/ranching) makes up almost three quarters of the Township's WUI, residential-scale FireSmart landscaping is one of the most effective actions that can be taken to reduce wildfire risk in the WUI. Incentivizing homeowners and residents to conduct FireSmart activities on their homes and landscaping can be difficult. However, there are several funding opportunities through the CRI FCFS program to jumpstart residential FireSmart actions and to remove barriers to fuel reduction on private property:

- *FireSmart Home Ignition Zone Assessments* (see recommendation #3) – detail specific FireSmart structure upgrade and landscaping recommendations private property owners can action on.
- *Community Chipping Program* - allows residents to safely and at no cost dispose of woody yard waste, further reducing fire risk on their properties. A community chipping program is currently underway in City of Mission, and have been successful in many other communities across the province.
- *FireSmart Rebate Program* – rebates to private property owners for FireSmart activities completed on their home and property.

Residential-scale FireSmart landscaping does not need to be entirely centred upon the Township's residents and property owners – the municipality has an important role to play itself. The Township's Climate Action Strategy identifies municipal greenspaces and ecosystems (including tree canopy cover) as features that can limit climate change impacts. Identified actions to residents include planting drought tolerant trees and shrubs. The Township's Community Forest Strategy identifies growing the community forest equitably and sustainably by planting more trees. These plans should specifically identify FireSmart

trees and shrubs as those that should be planted so that they work jointly to also reduce wildfire and fire risk on municipal property and to associated/adjacent structures and homes. Additionally, the Township is initiating a green roof program for its residents. As part of the program, guidelines will be created – these guidelines should also incorporate FireSmart vegetation considerations to further reduce wildfire and fire risk within the community.

FireSmartBC has a dedicated online landscaping hub<sup>43</sup> with information and tables that identify plant species best suited for the various geographic regions throughout the province to support a community’s overall wildfire resiliency plan. This hub should be utilized and referenced when developing and incorporating FireSmart vegetation recommendations and guidelines in the Township’s formal strategies and landscaping initiatives.

The Township’s greenspaces can largely be divided into three main types: small municipal parks, large Metro Vancouver regional parks, and riparian (stream/creek) associated reserve features. Any green space, if composed of forest and grass fuels and left unmanaged, has the potential to act as a “wick” moving fire from place to place and structure to structure. Although an assessment of all municipal and regional park trails is outside the scope of this CWRP, some instances of risk were observed that the municipality should consider addressing:

- Figure 9 below shows conifer tree branches (in this picture, western red cedar trees) extending to the ground alongside the trail and also extending towards, and in some instances overhanging, adjacent residential structures. For trails in greenspaces that are adjacent to structures, the Township should look to prune conifer branches up from the ground and away from adjacent structures. This will limit the ability of an accidental ignition that started in the green space (ex., from a discarded cigarette butt) to move vertically up into the flammable cedar tree potentially transferring fire into the adjacent structures. Pruning these branches will also limit the ability of a fire that started in an adjacent structure moving through them to another adjacent structure.
- Figure 10 below shows a tractor with a mower attachment cutting road-side grass. Keeping all municipal grass, including playground fields and sports fields, mowed and/or watered (primarily during fire season) will greatly reduce their potential to carry fire.

Township of Langley Fire Department responded to 715 “Brush/Grass/Bark Mulch” fires from 2014 to 2022, an average of 80 per year.<sup>44</sup> This data highlights the need for emphasis on residential and critical infrastructure FireSmart vegetation management in conjunction with continued FireSmart education.

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<sup>43</sup> <https://firesmartbc.ca/landscaping-hub>

<sup>44</sup> Township of Langley Fire Department data received January 2023.

Additionally, the Township should look to implement recommended vegetation management actions proposed in completed FireSmart Critical Infrastructure Ignition Zone assessments (recommendation #12). By setting an example, the community will have an incentive to follow.



*Figure 9: overhanging trail-side cedar branches encroaching on adjacent homes/apartments.*



*Figure 10: Tractor mowing road-side grass.*

### Fuel Management Treatments

Fuel treatment opportunities may be a linear fuel break (minimum of 1 km) or polygon treatments for discrete areas. The intent of establishing fuel treatments is to modify fire behaviour and should be designed to keep surface fires on the ground and avoid becoming more dangerous crown fires. Fuel treatments also provide anchor points to fire-fighting crews for suppression activities.<sup>45</sup> The application of appropriate suppression tactics in a timely manner with sufficient resources is essential for fuel treatments to be effective. Fuel treatment units require periodic maintenance to retain their effectiveness.

Fuel treatments proposed within a CWRP can only be applicable to publicly owned land (i.e., municipal, Crown). No fuel management treatments are proposed as part of this plan – field work and office analysis

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<sup>45</sup> BC Wildfire Service. 2020. 2020 Fuel Management Prescription Guidance. [https://www2.gov.bc.ca/assets/gov/public-safety-and-emergency-services/wildfire-status/prevention/fire-fuel-management/fuels-management/2020\\_fuel\\_management\\_prescription\\_guidance\\_final.pdf](https://www2.gov.bc.ca/assets/gov/public-safety-and-emergency-services/wildfire-status/prevention/fire-fuel-management/fuels-management/2020_fuel_management_prescription_guidance_final.pdf)

determined that there are no suitable areas for fuel reduction treatment, considering the large amount of private property within the WUI, the existing fuel types and associated fire behaviour risks, and efficacy.

Associated vegetation management recommendations and action items are listed in Table 21.

Table 21: Vegetation management action items

Item	Priority	Recommendation	Rationale	Lead	Timeframe	Metric for Success	Funding Source / Est. Cost (\$) / Person Hours
				(Involved)			
<b>Vegetation Management - Section 5.6</b>							
<b>Residential FireSmart</b>							
26	High	Implement a community chipper program. Education of FireSmart yard and landscaping principles, including chipping specifications, should be incorporated into the program. Owing to the large geographical area of the municipality and the large number of properties, plan to implement the program on a community/neighbourhood by community/neighbourhood basis.	To reduce fire and wildfire hazards on private property within the WUI and promote FireSmart vegetation management knowledge and education. The intent is for landscaping/yard vegetation to be included, not farm or agriculture vegetation.	Public Safety and Community Risk /FireSmart	2 years	Chipper program has been trialed in a community with the intent to expand across the municipality	CRI FCFS funding available to cover calculated costs of program
27	High	Implement a FireSmart rebate program across the municipality.	To incentivize property owners to conduct FireSmart structure and vegetation management changes to their homes and landscaping, reducing fire and wildfire risk.	Public Safety and Community Risk /FireSmart	3 years	Rebate program has been implemented.	CRI FCFS funding: Rebates are limited to 50% of the total cost of eligible activities and up to \$1,000 per property
<b>FireSmart Vegetation Management in Municipal Programs and Plans</b>							
28	High	Implement recommended vegetation management recommendations from FireSmart Critical Infrastructure Ignition Zone Assessments, when completed, on a priority basis.	To reduce fire behavior and risks to critical infrastructure most important to fire and wildfire fighting and post-wildfire recovery.	Township of Langley municipal departments  (Public Safety and Community Risk /FireSmart)	5 years	High priority critical infrastructure has had FireSmart vegetation management completed	CRI FCFS funding up to \$53,500 per municipal infrastructure (vegetation management included)



Item	Priority	Recommendation	Rationale	Lead	Timeframe	Metric for Success	Funding Source / Est. Cost (\$) / Person Hours
				(Involved)			
29	High	Incorporate FireSmart vegetation management principles into relevant municipal programs and plans (i.e., green roof program; Climate Action Strategy, Climate Action Strategy).	Plans and policies can be used to both educate residents on FireSmart as well as direct FireSmart principles into development and plans, working towards a lower fire risk WUI.	Township of Langley municipal departments  (Public Safety and Community Risk /FireSmart)	5 years	FireSmart vegetation management principles incorporated into stated plans/strategies and considered for others, where applicable	In-house time and associated costs
30	High	Assess greenspace/greenway trails that are adjacent to structures (primarily residential areas) and identify areas where conifer trees should be pruned with the intent to create more ground-to-canopy spacing and increase spacing between branches and structures.	To reduce the risk of fire moving from municipal greenspaces to structures/homes, as well as from structures/homes, through greenspaces, to other structures/homes	Township of Langley Parks  (Public Safety and Community Risk /FireSmart)	5 years	Trails assessed – pruning work has commenced where necessary	In-house time and associated costs

## SECTION 6: APPENDICES

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### 6.1 APPENDIX A: LOCAL WILDFIRE RISK PROCESS

#### Field Data Collection

The primary goals of field data collection are to confirm or correct the provincial fuel type, complete Wildfire Threat Assessment Plots, and assess other features of interest to the development of the CWRP. This is accomplished by traversing as much of the WUI as possible (within time, budget, and access constraints). Wildfire Threat Assessment plots are completed on the 2020 version form, and as per the Wildland-Urban Interface Threat Assessment Guide.

For clarity, the final threat ratings for the WUI were determined through the completion of the following methodological steps:

1. Update fuel-typing using orthophotography provided by the client and field verification.
2. Update structural data using critical infrastructure information provided by the client, field visits to confirm structure additions or deletions, and orthophotography.
3. Complete field work to ground-truth fuel typing and assess site-level threat ratings.
4. Threat assessment analysis using field data collected and rating results of Wildfire Threat Assessment plots.

#### 6.1.1 APPENDIX A-1: FUEL TYPING METHODOLOGY AND LIMITATIONS

The Canadian Forest Fire Behaviour Prediction (FBP) System outlines five major fuel groups and sixteen fuel types based on characteristic fire behaviour under defined conditions.<sup>46</sup> Although a subjective process, the most appropriate fuel type was assigned based on research, experience, and practical knowledge; this system has been used within BC, with continual improvement and refinement, for 20 years.<sup>47</sup> It should be noted that there are significant limitations with the fuel typing system which should be recognized.

Significant limitations with the fuel typing system should be recognized. These include: a fuel typing system designed to describe fuels which sometimes do not occur within the WUI; fuel typing is not updated in private land; fuel types which cannot accurately capture the natural variability within a polygon; and, limitations in the data used to create initial fuel types.<sup>47</sup>

There are several implications of the fuel typing limitations, which include: fuel typing further from the developed areas of the study generally has a lower confidence; and, fuel typing should be used as a

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<sup>46</sup> Forestry Canada Fire Danger Group. (1992). *Development and Structure of the Canadian Forest Fire Behavior Prediction System: Information Report ST-X-3*

<sup>47</sup> Perrakis, D.B., Eade G., and Hicks, D. (2018). Natural Resources Canada. Canadian Forest Service. *British Columbia Wildfire Fuel Typing and Fuel Type Layer Description 2018 Version*.

starting point for more detailed assessments and as an indicator of overall wildfire risk, not as an operational, or site-level, assessment.

Table 22 summarizes the fuel types by general fire behaviour (crown fire and spotting potential) found within the WUI. These fuel types were used to guide the wildfire threat analysis.

**Table 22: Fuel Type Categories and Crown Fire Spot Potential. Only summaries of fuel types encountered within the WUI are provided**

Fuel Type	FBP / CFDDRS Description	WUI Description	Wildfire Behaviour Under High Wildfire Danger Level	Fuel Type – Crown Fire / Spotting Potential
C-3	Mature jack or lodgepole pine	Fully stocked, late young or mature forest (Douglas-fir leading), with high crown closure and crowns well separated from the ground.	Surface and crown fire, low to very high fire intensity and rate of spread.	Moderate*
C-5	Red and white pine	Lower density mature / old conifer leading forest (hemlock, cedar, Douglas-fir) with open canopies, high crown base heights, and a low-flammability (shrub) understory.	Surface fire spread, torching of individual trees, rarely crowning (usually limited to slopes > 30%), moderate intensity and rate of spread.	Low
M-1/2	Boreal mixedwood (leafless and green)	Moderately well-stocked mixed stand of conifers and deciduous species, low to moderate dead, down woody fuels. Coastal conifer components are less volatile than boreal spruce.	Surface fire spread, torching of individual trees and intermittent crowning, (depending on slope and percent conifer).	<26% conifer (Very Low); 26-49% Conifer (Low); >50% Conifer (Moderate)
O1a/b	Grass	Matted and standing grass communities; sparse or scattered shrubs, trees and down woody debris. Seasonal wetlands that have the potential to cure. Grass fields.	Rapidly spreading, high-intensity surface fire when cured and left unmanaged.	Low
D-1/2	Aspen (leafless and green)	Deciduous stands.	Always a surface fire, low to moderate rate of spread and fire intensity.	Low
W	N/A	Water	N/A	N/A
N	N/A	Non-fuel: roadways, Indian Reserves, gravel pits, cleared parking areas, irrigated fields (sports/parks)	N/A	N/A

\*C-3 fuel type is considered to have a moderate crown fire and spotting potential within the WUI due to the presence of low to moderate fuel loading from dead standing and partially or fully down woody material, and a low density of conifer ladder fuels.

The resulting updated fuel types were shown on Map 4 and discussed in Section 4.1.2.

## 6.1.2 APPENDIX A-2: WILDFIRE FIRE THREAT SPATIAL ANALYSIS METHODOLOGY

As part of the CWRP process, spatial data submissions are required to meet the defined standards in the Program and Application Guide. Proponents completing a CWRP can obtain open-source BC Wildfire datasets, including Provincial Strategic Threat Analysis (PSTA) datasets from the British Columbia Data Catalogue. Wildfire spatial datasets obtained through the BC Open Data Catalogue used in the development of the CWRP include, but are not limited to:

- PSTA Spotting Impact
- PSTA Fire Density
- PSTA Fire Threat Rating
- PSTA Lighting Fire Density
- PSTA Human Fire Density
- Head Fire Intensity
- WUI Human Interface Buffer (2Km buffer from structure point data)
- Wildland Urban Interface Risk Class
- Current Fire Polygons
- Current Fire Locations
- Historical Fire Perimeters
- Historical Fire Incident Locations
- Historical Fire Burn Severity
- Fuel Type

As part of the program, proponents completing a CWRP are provided with a supplementary Structure point dataset from BC Wildfire Services.

The provided PSTA data does not transfer directly into the geodatabase for submission, and several PSTA feature classes require extensive updating or correction. In addition, the Fire Threat determined in the PSTA is fundamentally different than the localized Fire Threat feature class that is included in the Local Fire Risk map required for project submission. The Fire Threat in the PSTA is based on provincial scale inputs - fire density, spotting impact; and head fire intensity; while the spatial submission Fire Threat is based on the components of the Wildland Urban Interface Threat Assessment Worksheet.

### Local Spatial Analysis

Not all attributes on the Wildfire Threat Assessment form can be determined using a GIS analysis on a landscape/polygon level. To emulate as closely as possible the threat categorization that would be determined using the Threat Assessment form, the variables in Table 23 were used as the basis for building the analytical model. The features chosen are those that are spatially explicit, available from existing and reliable spatial data or field data, and able to be confidently extrapolated to large polygons.

**Table 23: Description of variables used in spatial analysis for WUI wildfire risk assessment**

WUI Threat Sheet Attribute	Used in Analysis?	Comment
<b>Fuel Subcomponent</b>		
Duff depth and Moisture Regime	No	Many of these attributes assumed by using 'fuel type' as a component of the Fire Threat analysis. Most of these components are not easily extrapolated to a landscape or polygon scale, or the data available to estimate over large areas (VRI) is unreliable.
Surface Fuel continuity	No	
Vegetation Fuel Composition	No	
Fine Woody Debris Continuity	No	
	No	
Live and Dead Coniferous Crown Closure	No	
Live and Dead Conifer Crown Base height	No	
Live and Dead suppressed and Understory Conifers	No	
Forest health	No	
Continuous forest/slash cover within 2 km	No	
<b>Weather Subcomponent</b>		
BEC zone	Yes	Although included, these are broad classifications, meaning most polygons in the Study Area will have the same value
Historical weather fire occurrence	Yes	
<b>Topography Subcomponent</b>		
Aspect	Yes	Elevation model was used to determine slope.
Slope	Yes	
Terrain	No	
Landscape/ topographic limitations to wildfire spread	No	
<b>Structural Subcomponent</b>		
Position of structure/ community on slope	No	Too difficult to quantify – this is a relative value.
Type of development	No	Too difficult to analyze spatially.
Position of assessment area relative to values	Yes	Only distance to structures is used in this analysis, being above, below or sidehill too difficult to analyze spatially.

The other components are developed using spatial data (BEC zone, fire history zone) or spatial analysis (aspect, slope). A scoring system was developed to categorize resultant polygons as having relatively low, moderate, high or extreme Fire Threat, or Low, Moderate, High or Extreme wildfire threat class. Table 24 below summarizes the components and scores to determine the Fire Threat.

**Table 24: Fire Threat Class scoring components**

Attribute	Indicator	Score
<b>Fuel Type</b>	C-1	35
	C-2	
	C-3	
	C-4	
	M-3/4, >50% dead fir	25
	C-6	20
	M-1/2, >75% conifer	

Attribute	Indicator	Score
	C-7	15
	M-3/4, <50% dead fir	
	M-1/2, 50-75% conifer	
	M-1/2, 25-50% conifer	
	C-5	10
	O-1a/b	
	S-1	
	S-2	
	S-3	
	M-1/2, <25% conifer	5
	D-1/2	0
	W	0
	N	0
	<b>Weather - BEC Zone</b>	AT, irrigated
CWH, CDF, MH		3
ICH, SBS, ESSF		7
IDF, MS, SBPS, CWHsds1 & ds2, BWBS, SWB		10
PP, BG		15
<b>Historical Fire Occurrence Zone</b>	G5, R1, R2, G6, V5, R9, V9, V3, R5, R8, V7	1
	G3, G8, R3, R4, V6, G1, G9, V8	5
	G7, C5, G4, C4, V1, C1, N6	8
	K1, K5, K3, C2, C3, N5, K6, N4, K7, N2	10
	N7, K4	15
<b>Slope</b>	<16	1
	16-29 (max N slopes)	5
	30-44	10
	45-54	12
	>55	15
<b>Aspect (&gt;15% slope)</b>	North	0
	East	5
	<16% slope, all aspect	10
	West	12
	South	15

### Limitations

There are obvious limitations in this method, most notably that not all components of the threat assessment worksheet are scalable to a GIS model, generalizing the Fire Behaviour Threat score. The Wildfire Threat Score is greatly simplified, as determining the position of structures on a slope, the type of development and the relative position are difficult in an automated GIS process. Structures are considered, but there is no consideration for structure type (also not included on threat assessment worksheet). This method uses the best available information to produce accurate and useable threat assessment across the study area in a format which is required by the UBCM CRI program.

### 6.1.3 APPENDIX A-3: WUI RISK SPATIAL ANALYSIS METHODOLOGY

To determine the WUI Risk score, only the distance to structures is used. Buffer distance classes are determined; (<200m, 200m-500m and >500m) but only for polygons that had a ‘high’ or ‘extreme’ Fire Threat score from previous assessment. To determine WUI Risk; those polygons within 200m are rated as ‘extreme’, within 500m are rated as ‘high’, within 2km are ‘moderate’, and distances over that are rated ‘low’. WUI Risk Classes and associated assumed scores are summer below in Table 25.

**Table 25: WUI Risk Classes and their associated summed scores**

WUI Risk Class	Score
Very Low	0
Low	0-35
Moderate	35-55
High <sup>48</sup>	55-65
Extreme	>65

### 6.1.4 APPENDIX A-4: WILDFIRE THREAT PLOT LOCATIONS

Table 26 displays a summary of all Wildfire Threat Assessment (WTA) plots completed during CWRP field work. The original WTA plot forms and photos will be submitted as a separate document. The following ratings are applied to applicable point ranges: Low (0-48); Moderate (49 – 66); High (67 – 80); Extreme (>81).

**Table 26: Summary of Wildfire Threat Assessment (WTA) Worksheets**

Wildfire Threat Assessment Plot ID	Geographic Location	Wildfire Threat Assessment Score (0/42/58/70)
ALDERGROVE-1	Aldergrove Park	Low (40)
BRAE-1	Brae Island Park	Low (40)
BROOKSWOOD-1	Brookwood Pond, back forest of Noel Booth elementary school.	Low (39)
BROOKSWOOD-2	Brookwood Park, west of 40th Ave	Moderate (43)
CAMPBELL-1	Campbell Valley Regional Park (west side).	Low (33)
CAMPBELL-2	Campbell Valley Regional Park (south of 16th Ave)	Low (36)
CAMPBELL-3	Campbell Valley Regional Park (north of 16th Ave)	Moderate (50)
DERBY-1	Derby Reach Regional Park	Low (36)
DERBY-2	Derby Reach Regional Park (trailside east of the Langley Bog viewing platform)	Moderate (42)
MNP-1	Municipal Nature Park, north side.	Moderate (48)
MUNDAY-1	Topham Park near Langley Escape Garden, east of 91 Ave.	Moderate (45)

<sup>48</sup> WUI risk is only assessed for polygons with wildfire threat ratings of high or extreme.

PONDER-1	Ponder Park, south of cleared right of way off 76 Ave	Low (40)
PONDER-2	South of intersection of 72 Ave and 258 Street	Low (36)
WALNUT-1	West of track at Walnut Grove Secondary School	Moderate (43)

### 6.1.5 APPENDIX A-5: PROXIMITY OF FUEL TO THE COMMUNITY

The correlation between structure loss and wildfire are described below.

#### Home and Critical Infrastructure Ignition Zones

Multiple studies have shown that the principal factors regarding home and structure loss to wildfire are the structure’s characteristics and immediate surroundings. The area that determines the ignition potential of a structure to wildfire is referred to as (for residences) the Home Ignition Zone (HIZ) or (for critical infrastructure) the Critical Infrastructure Ignition Zone (CIIZ).<sup>49,50</sup> Both the HIZ and CIIZ include the structure itself and three concentric, progressively wider areas (the Immediate, Intermediate, and Extended Zones) that extend out to 30 m from the structure (Figure 11 below). Up until 2023, the HIZ included an additional area that extended out to 100 m from the structure, but this zone was removed as radiant heat is unlikely to ignite a structure at 30 m and beyond. More details on priority zones can be found in the FireSmart Manual. More details on priority zones can be found in the FireSmart Manual.<sup>51</sup>

<sup>49</sup> Reinhardt, E., R. Keane, D. Calkin, J. Cohen. 2008. *Objectives and considerations for wildland fuel treatment in forested ecosystems of the interior western United States*. Forest Ecology and Management 256:1997 - 2006. Retrieved from: [Objectives and considerations for wildland fuel treatment in forested ecosystems of the interior western United States | Treesearch \(usda.gov\)](#)

<sup>50</sup> Cohen, J. *Preventing Disaster Home Ignitability in the Wildland-urban Interface*. Journal of Forestry. p 15 - 21. Retrieved from: [Preventing Disaster: Home Ignitability in the Wildland-Urban Interface | Journal of Forestry | Oxford Academic \(oup.com\)](#)

<sup>51</sup> Available for download here: [FireSmartBC HomeownersManual Printable.pdf](#)





Figure 11: FireSmart Home and Critical Infrastructure Ignition Zone (HIZ, CIZ)

It has been found that during extreme wildfire events, most home destruction has been a result of low-intensity surface fire flame exposures, usually ignited by embers. Firebrands can be transported long distances ahead of the wildfire, across fire guards and fuel breaks, and accumulate within the HIZ/CIIZ in densities that can exceed 600 embers per square meter. Combustible materials found within the HIZ/CIIZ combine to provide fire pathways allowing spot surface fires ignited by embers to spread and carry flames or smoldering fire into contact with structures.

Because ignitability of the HIZ/CIIZ is the main factor driving structure loss, the intensity and rate of spread of wildland fires beyond the community has not been found to necessarily correspond to loss potential. For example, FireSmart homes with low ignitability may survive high-intensity fires, whereas highly ignitable homes may be destroyed during lower intensity surface fire events.<sup>50</sup> Increasing ignition resistance would reduce the number of homes simultaneously on fire; extreme wildfire conditions do not necessarily result in WUI fire disasters.<sup>52</sup> It is for this reason that the key to reducing WUI fire structure loss is to reduce structure ignitability. Mitigation responsibility must be centered on structure owners. Risk communication, education on the range of available activities, and prioritization of activities should help homeowners to feel empowered to complete simple risk reduction activities on their property.

<sup>52</sup> Calkin, D., J. Cohen, M. Finney, M. Thompson. 2014. *How risk management can prevent future wildfire disasters in the wildland-urban interface*. Proc Natl Acad Sci U.S.A. Jan 14; 111(2): 746-751. Retrieved from: [How risk management can prevent future wildfire disasters in the wildland-urban interface \(nih.gov\)](https://www.nih.gov/pubs/pub/24444)

## Community Zone

Vegetation management in the Community Zone applies to areas between 30 and 100 metres from any homes and structures. Vegetation management planning and implementation on most Community Zone lands should be directed through a formal fuel management prescription developed by a forest professional with wildfire vegetation management within their scope of practice. Depending on the results of FireSmart Home Ignition Zone assessments on individual structures, vegetation management may be required beyond 30 metres and up to 100 metres on larger parcels.<sup>53</sup> Many Community Zone open spaces/lands are often associated with high use by people thus increasing accidental ignition potential and the wildfire risk to critical infrastructure and homes surrounding them.

## Landscape Zone

The Landscape Zone encompasses larger regional parks within the Township. When considering risk in the Landscape Zone, Table 27 displays how wildfire threat and mitigation work can be viewed in relation to values within Cowichan Tribes.

**Table 27: Proximity to the Interface**

Proximity to the Interface	Descriptor*	Explanation
<b>WUI 100</b> <i>HIZ/CIIZ and Community Zones</i>	(0-100 m)	This Zone is always located adjacent to the value at risk. Treatment would modify the wildfire behaviour near or adjacent to the value. Treatment effectiveness would be increased when the value is FireSmart.
<b>WUI 500</b> <i>Community and Landscape Zones</i>	(100-500 m)	Treatment would affect wildfire behaviour approaching a value, as well as the wildfire's ability to impact the value with short- to medium- range spotting; should also provide suppression opportunities near a value.
<b>WUI 2000</b> <i>Landscape Zone</i>	(500-1000 m)	Treatment would be effective in limiting long - range spotting but short-range spotting may fall short of the value and cause a new ignition that could affect a value.
<i>Landscape Zone</i>	> 1000 m	This should form part of a landscape assessment and is generally not part of the zoning process. Treatment is relatively ineffective for threat mitigation to a value, unless used to form a part of a larger fuel break / treatment.

\*Distances are based on spotting distances of high and moderate fuel type spotting potential and threshold to break crown fire potential (100m). These distances can be varied with appropriate rationale, to address areas with low or extreme fuel hazards.

<sup>53</sup> CRI FCSF 2021 Supplemental Instruction Guide

## 6.2 APPENDIX B: WUI THREAT ASSESSMENT - WORKSHEETS AND PHOTOS

Provided separately as PDF package.

## 6.3 APPENDIX C: MAPS

Provided separately as PDF package.

## 6.4 APPENDIX D: LIST OF FIRST NATIONS AND ASSOCIATED GOVERNMENTS CONSULTED

Government	Contact Title	Email(s)	Address
Kwikwetlem (Kwantlen) First Nation	Cassandra Harper (Senior Project Coordinator, Referrals and Stewardship)	referrals@kwikwetlem.com	P.O. Box 1023, Fort Langley
Katzie First Nation	Chief and Council	landopsreferrals@katzie.ca	10946 Katzie Road, Pitt Meadows
Matsqui First Nation	Alice McKay	alice.mckay@matsqui.com	31989 Harris Road - PO Box 10, Matsqui
Peters First Nation	Chief and Council	administrator@petersfn.ca	16870 Peters Road, RR#2, Hope
Ts'uubaa-asatx First Nation (Lake Cowichan First Nation)	Chief and Council	carole@lcfn.ca	P.O. Box 159 313B Deer Road, Lake Cowichan
Halalt First Nation	Chief and Council	manager@halalt.org	7973 Chemainus Road, Chemainus
Penelakut Tribe	Chief and Council	robert@penelakut.ca	P.O. Box 360, Chemainus
Stz'uminus First Nation	Office	Krista.perrault@stzuminus.com	12611A Trans Canada Hwy, Ladysmith
Cowichan Tribes	n/a	Candace.Charlie@cowichantribes.com	5760 Allenby Road, Duncan
Lyackson First Nation	Chief and Council	referrals@lyackson.bc.ca	7973A Chemainus Road, Chemainus
Snuneymuxw First Nation	Chief and Council	taraw@snuneymuxw.ca	668 Centre Street, Nanaimo
Tsawwassen First Nation	Referral	jnickolet@tsawwassenfirstnation.com	1926 Tsawwassen Drive, Tsawwassen