Proposal Background:
The Villages of Queen Charlotte, Port Clements, Masset and the Regional District Area E community of Sandspit (the “communities”) have each been awarded funding through the provincial 2019 Community Resiliency Investment Program to develop Community Wildfire Protection Plans (CWPP). The Haida First Nations located in the communities of Old Massett and Skidegate will be included in the development of the Masset and Queen Charlotte CWPPs in order to fully address risks and vulnerabilities, and improve the collective resiliency of all communities throughout the project area. The communities are all located on Haida Gwaii, a remote archipelago off the Northwest Coast of BC. Our communities routinely collaborate at a regional and sub-regional level on a broad range of issues of common interest and concern, including emergency planning through our All Islands Emergency Planning Team.

Though all four communities each require separate CWPPs, they desire for the Plans to be consistent and coordinated due to the proximity of the communities, hazard and vulnerabilities of mutual concern, and the strong likelihood that a major wildfire would require a coordinated, cross-jurisdictional emergency response. Area of Interest (AOI) maps for each community are attached as Appendix A.

Through this Request for Proposals (RFP), the communities are inviting prospective proponents to submit proposals for the provision of four separate but coordinated CWPPs using the 2018 Province of British Columbia’s CWPP Template, including all mapping and spatial data requirements (See Appendix B).

The Coastal Fire Centre Wildfire Prevention Officer, BC Wildfire Service, Ministry of Forests, Lands, Natural Resource Operations, and Rural Development will be a key information source for development of the Plans. Contact information for key contacts will be provided upon project start.

RFP Contacts:
For the purposes of this procurement process, the “RFP Contact” shall be:

Daniel Fish, Corporate Officer, North Coast Regional District
Email: corporateofficer@ncrdbc.com
Phone: 250 624 2002 ext 2

Questions related to the joint RFP, including any need for clarification regarding proposal requirements and issues with the AOI should be referred to the RFP Contact.

Addenda:
To receive any addenda’s, proponents are required to submit their email addresses to corporateofficer@ncrdbc.com.

Scope of Work and Timeline:
Development and completion of CWPPs for each community’s complete AOI must include:

- Consultation with municipal staff, Haida Nations (staff and/or Band Council), Fire Chiefs from neighbouring jurisdictions, provincial staff (BC Wildfire Service, MFLNRO, MoTI, BC Parks, etc.), utilities (hydro, TELUS, GwaiiTel, GwaiiComm, etc.), the Sandspit Airport and other key private landowners and/or stakeholders as required to complete the project;
Review of all relevant documents and background information;
Preparation of a CWPP that fully conforms to the 2018 Province of BC’s CWPP template;
Preparation of all related and required maps, spatial data and metadata;
Provision of a draft copy of the final plan for review by each community;
Delivery of one hard copy and one digital (PDF) copy of the final plan to each community;
Presentation of each CWPP to its respective Council and key stakeholders, which can be conducted remotely if needed.

The communities have been approved for funding and work can commence as soon as the contracts are awarded. Though four separate contracts will be issued, the intent of doing a joint RFP is to award all of the contracts to one proponent.

Submitted proposals must outline a reasonable timeframe in which the work will be completed. In order to comply with the terms of the Community Resiliency Investment Plan, all four CWPPs must be complete and submitted to the communities on or before March 31, 2020.

Response Content:
As noted, though four separate contracts will be issued, the intent of doing a joint RFP is to award all four contracts to one proponent. Proponents may therefore submit one combined proposal for all four CWPPs, as long as the recommended approach for each community is outlined and separate budgets/cost breakdowns are provided.

To facilitate the evaluation of proposals, proponents should submit the following information in the following order:

- A cover page introducing the proponent and outlining your experience and understanding of the project.
- A detailed description of your proposed approach to this project for each community, including timelines for anticipated stages and final completion. Proponents are encouraged to consider opportunities for collaboration between the communities, both within the scope of this project on an ongoing basis with respect to wildfire protection.
- A list of three references including contact name and information of organizations for which you have provided a similar service.
- An outline of your fee proposal showing separately your fee and estimated expenses for each community, broken down by project areas consistent with the provincial 2018 CWPP template sections and subsections.

Evaluation Criteria:
The communities will evaluate submissions based primarily on the suitability of the proposal for achieving the stated purposes, i.e. meeting the standards and requirements of the provincial 2018 CWPP template.

Other considerations may include:

- Demonstrated proven and/or related experience
- Availability and timelines
- Budget
- Reference checks
- Extent to which the proposal offers opportunities for collaboration and improved efficiencies between the communities
Submissions:
Proposals are due by 4:00 pm on July 5, 2019, and will be accepted in hard copy to:

“Joint RFP for Community Wildfire Protection Plans – Haida Gwaii’

North Coast Regional District
14-342 3rd Avenue West
Prince Rupert, B.C. V8J 2K3
ATTN: Daniel Fish, Corporate Officer

Or in PDF format by email to corporateofficer@ncrdbc.com.

The communities are not responsible for the timely receipt of submissions, and the late receipt of a submission may be cause for rejection. There will be no public opening of this RFP. Proposals must remain valid for 90 days following the closing time and date. Proposals are irrevocable after the closing time and date.

The communities are subject to the provisions of the Freedom of Information and Protection of Privacy Act (FOIPPA). As a result, while Section 21 of the Act does offer some protection for third party business interests, the communities cannot guarantee that any information provided in the submissions can or will be held in confidence.

The successful bidder may be required to provide proof of the following:

- A clearance letter from WorkSafeBC that confirms they are registered and in good financial standing with WorkSafeBC; and
- Certification of insurance for a policy of general commercial liability insurance coverage for property damage, personal injury or death in the amount of $2,000,000 per occurrence.

The communities reserve the right to accept or reject any or all quotes either whole or in part at any time, or waive formalities in, or accept a quote either whole or in part which is deemed most favourable in the interest of each community.

The communities will be under no obligation to proceed further with any submitted quote and, should they decide to abandon same, they may, at any time, invite further quotes for the supply of the described services or enter into any discussion or negotiations with any party for the provision of the services.

No alterations, amendments or additional information will be accepted after the closing date and time unless invited by the communities.

The lowest or any submission in response to this RFP will not necessarily be accepted. The quotes will be considered on their merits and it is not the intention of the communities to buy on price alone.

APPENDIX A – Area of Interest (AOI) maps for the Village of Queen Charlotte, Port Clements, Masset, and Regional District Area E Sandspit
APPENDIX B – 2019 Province of BC CWPP Template
Figure 1. Draft Area of Interest for the Sandspit CWPP
Community Wildfire Protection Plan Template

Community Resiliency Investment Program
FireSmart Community Funding & Supports

2018

Updated August 2018
Introduction

The Community Resiliency Investment (CRI) program is a new provincial program intended to reduce the risk and impact of wildfire to communities in BC through community funding, supports and priority fuel management activities on provincial Crown land.

The Union of BC Municipalities (UBCM), First Nations’ Emergency Services Society (FNESS) and the Forest Enhancement Society of BC (FESBC) are working with the Ministry of Forests, Lands, Natural Resource Operations & Rural Development (FLNRORD), represented by the BC Wildfire Service (BCWS), to administer the FireSmart Community Funding & Supports portion of the program for local government and First Nation applicants.

Instructions for Using the CWPP Template

Wildfire is an integral part of British Columbia’s ecosystems and landscapes, including areas where citizens settle and communities grow. Due to an increasing population and expanding rural development, more communities in B.C. are located in areas of potentially increased wildfire risk.

This CWPP Template is designed to assist local governments and First Nations in the preparation of a plan that will determine the level of, and steps to manage, wildfire risk primarily within their administrative boundary. It provides background information and links to supplementary information required to ensure that factors contributing to wildfire risk are well understood.

The CWPP Template provides an outline of the topics to be addressed in order to effectively plan for the mitigation of wildfire risk, but allows for flexibility in the addition of text, photos and other supporting documentation, as required.

This is the minimum mandatory content and structure requirement for a CWPP in BC under the Community Resiliency Investment program. However, each local government and First Nation will have unique situations and circumstances that should also be addressed and expanded upon in the template, as required. This may include additional sub sections, maps and photos that highlight specific actions, challenges, etc.

The CWPP Template is organized into the following major sections:

Section 1 Introduction: introduces the purpose of a CWPP and the CWPP planning process

Section 2 Local Area Description: defines the Area of Interest (AOI) for the CWPP; provides a description of the community (or communities) within the AOI; summarizes current community engagement, and; identifies linkages to other plans that provide valuable information to reduce the threat of wildfires

Section 3 Values at Risk: introduces the extent to which wildfire has the potential to impact values within a community

Section 4 Wildfire Threat: describes the process that was undertaken to identify and summarize the fuel hazard and other factors that contribute to the wildfire threat around a community

Section 5 Risk Management and Mitigation Factors: outlines the strategies the community can put into practice to reduce the risk and the impact of a wildfire in four subsections
5.1 Fuel Management: identifies and prioritizes fuel management treatments

5.2 FireSmart Planning and Activities: summarizes the current level of FireSmart implementation and identifies priority areas for future FireSmart activities

5.3 Community Communication and Education: describes the key steps required to build engagement and support within the community for the CWPP. This includes education and outreach and local community prevention programs.

5.4 Other Preventative Measures: identifies local actions and strategies that reduce the threat of wildfires

Section 6 Wildfire Response Resources: provides a high level overview of the resources that are available to local governments in the case of a wildfire.

The CWPP Template includes italicized instructions highlighted in red, that are to be deleted in the final documents (including these initial pages), with embedded suggestions for map locations and content.
CWPP Cover Page
Acknowledgments

This is where any acknowledgements to members of the CWPP planning team, stakeholders or partnership in the development of the CWPP are summarized. Include any letters of endorsement from the Board or Council.
Executive Summary
Summary of CWPP Recommendations

Complete Table 1 by including all CWPP recommendations. Add in sub-headings and details as required.

Table 1: Summary of CWPP Recommendations

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<th>Section 4: Wildfire Threat</th>
<th>Objective/Priority</th>
<th>Recommendation/ Next Steps</th>
<th>Responsibility/Funding Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Section 5: Risk Management and Mitigation Factors</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Section 6: Wildfire Response</td>
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SECTION 1: Introduction

The intent of this section is to introduce the purpose of a CWPP and outline the CWPP planning process.

1.1 Purpose

The intent of this sub-section is to describe the overall purpose and goals of the CWPP.

The purpose of a Community Wildfire Protection Plan is to identify the wildfire risks primarily within the administrative boundary, to describe the potential consequences if a wildfire was to impact the community, and to examine possible ways to reduce the wildfire risk. The goal is to define the threat to human life, property and critical infrastructure from wildfires in an identified area, identify measures necessary to mitigate those threats and outline a plan of action to implement the measures.

The CWPP planning process will provide the community with a detailed framework to inform the implementation of specific actions that will result in:

1. Reduced likelihood of a wildfire entering the community
2. Reduced impacts and losses to property and critical infrastructure
3. Reduced negative economic and social impacts to the community

1.2 CWPP Planning Process

The intent of this sub-section is to describe the planning process/approach that was used, including presentations to Board or Council, stakeholder engagement, plan review and approval, and key steps undertaken during the plan’s development.

Preparing a CWPP will be based on the needs of the local government, First Nation and community members involved in its development. To properly prepare for a wildfire, a community is required to develop a plan that involves key stakeholders, incorporates land use plans and clearly describes the wildfire risk. The CWPP should complement any polices, plans, legislation or multi-party agreements that are currently in place. There are generally four phases to developing a CWPP.

1. Build your team. Assemble a team of specialists and identify review and approval responsibilities. Planning for wildfire risk mitigation is a shared responsibility requiring the involvement of community planners, public and government organizations and the residents themselves.

2. Identify the values at risk and assess the local wildfire threat primarily within the administrative boundary. The risks associated with wildfire need to be understood before a CWPP can define actions or activities to mitigate those risks.

3. Develop a risk mitigation strategy that may include: prioritized fuel treatments, FireSmart activities, and local wildfire response recommendations that will reduce the wildfire threat. This is a critical component of the CWPP. This is the guide for mitigating risk to values, and developing the appropriate strategies that will reduce an identified significant risk.

4. Build your community engagement and education strategy. Presenting the CWPP to the Board or Council and engaging individual community members, key stakeholders and local government or First Nation staff in specific activities will ensure successful implementation of the CWPP.
SECTION 2: Local Area Description

The intent of this section is to define the Area of Interest (AOI) for the CWPP, provide a description of the community (or communities) within the AOI, summarize current community engagement, and identify linkages to other plans that provide valuable information to reduce the threat of wildfires.

Understanding the relationship of the community to its surrounding environment, and what that means in terms of the wildfire hazard, threat and risk of loss, is critical to help the community plan for mitigation activities and respond to wildfire events.

To support this understanding, the BCWS has conducted a Provincial Strategic Threat Analysis (PSTA) that will aid in the identification of wildfire threat and potential fire behaviour. The outputs of the PSTA are available as a data package based on the AOI with a 20 kilometer buffer. This information is intended to help inform the community’s wildfire prevention planning process.

BCWS will provide the following data for all CWPPs:

- The Provincial Strategic Threat Analysis (PSTA) and WUI Risk Class Polygons
  - BC Fuel Type
  - Wildfire Threat
  - Head Fire Intensity, Spotting, Fire History
  - Wildland Urban Interface (Structure Density Classes, Structures)
  - Proposed and completed fuel treatments post-2013

- Initial Spread Index (ISI) Roses

Other relevant data will need to be acquired from the local government or First Nation, captured through other means (e.g. digitized from imagery), or downloaded from DataBC, the Integrated Cadastre Society or other sources.

2.1 CWPP Area of Interest

The intent of this sub-section is to define the Area of Interest (AOI).

The AOI will be defined by the administrative boundaries and should focus primarily on local government land and First Nations land. The AOI should reflect how the community is organized and how it approaches other similar planning projects, but should not extend beyond the WUI as defined by a 2km buffer around structure density of greater than 6 to 25 structures per km².

Wildfire threat assessments and fuel management treatments located exclusively on provincial Crown Land, outside of municipal boundaries or First Nation land, are funded through the Forest Enhancement Society of BC. For the purposes of CRIP, FireSmart activities including wildfire risk assessments and vegetation management planning will be focused primarily within the AOI.

When communities are located close together and are geographically aligned, a “regional” approach may be most effective. For regional districts this could be the boundary of an electoral area that encompasses multiple communities. This mimics a municipal boundary approach and has been successful in some areas of the province to gain efficiencies.

To define the AOI, start with administrative boundaries and any other local information to identify the area that makes the most sense from a structure density, administrative, and community wildfire protection perspective.
Provide a summary of the Area of Interest, including total hectares of private, local government or First Nations land, federal Crown and provincial Crown land. Ownership data may be available from the local government or First Nation and is also available for download from DataBC.

2.2 Community Description
The intent of this sub-section is to identify the key characteristics of the community related to wildfire threat.

Provide an overview of the people and places within the AOI, including a general description of:

- Local government(s) and First Nation(s), including gross area of the community/non-fuel area, gross area of AOI and a general overview of land use
- Local infrastructure and services
- Economic drivers
- Clear delineation of land ownership (private, local government, Treaty First Nations, federal Crown, provincial Crown land)
- Firefighting jurisdiction
- Existing evacuation/egress routes

2.3 Past Wildfires, Evacuations and Impacts
The intent of this sub-section is to describe past significant wildfires and the impact on the community.

Provide an overview of past wildfire events, including a description of the fire behaviour, and a review of the weather conditions for the day (if available and relevant). Describe how the event(s) impacted the community, including the number of evacuation orders, evacuation alerts, smoke impacts and damage to property and infrastructure (powerlines, bridges, homes, etc.). Describe any key learnings from post-fire reviews and any activities the community has undertaken as a result. Describe any additional consequences, including impacts to the local economy, social impacts on citizens (including evacuations), and other consequences.

2.4 Current Community Engagement
The intent of this sub-section is to summarize current level of wildfire prevention measures in the community, including previous CWPPs, local government or First Nation planning, fuel treatments or FireSmart activities, and the identification of community organizations that are participating in activities to reduce the threat of wildfires.

Describe how the community has been engaged in wildfire prevention activities, including previous CWPP(s) and updates, FireSmart plans and other relevant local government or First Nation planning efforts. Identify any fuel treatments that have been completed primarily within administrative boundaries, and any measures that have advanced FireSmart implementation.

2.5 Linkages to Other Plans and Policies
The intent of this sub-section is to identify the sources and linkages to other documents in order to minimize duplication while identifying other plans or legal requirements that are relevant to
the CWPP planning process. It also discusses the relevance of objectives, strategies and polices that will influence the development of the CWPP.

2.5.1 Local Authority Emergency Plan

Under the Emergency Program Act, local governments must prepare local emergency plans that include preparation for, response to, and recovery from, emergencies and disasters. The plan must cover all potential emergencies and disasters that could affect all or any part of the local government, including wildfire, and may contain essential information for the CWPP.

Review the Local Authority Emergency Plan and identify sections that are relevant to the CWPP (e.g., Hazard Risk Vulnerability Analysis and Critical Infrastructure Assessments), provide a link to the plan as well as ensure there is consistency, but not redundancy, between it and the CWPP.

Refer to: Emergency Management BC Local Authority Emergency Management Programs and Critical Infrastructure Assessment

Insert any relevant maps or information from Local Authority Emergency Plans that supports the CWPP.

2.5.2 Affiliated CWPPs

Discuss any adjacent or overlapping CWPPs that exist and their relevance. Discuss strategies on how to integrate these to avoid duplication and identify any plan for potential joint projects.

2.5.3 Local Government and First Nation Plans and Policies

Review all relevant local government and First Nation plans, policies and bylaws and identify sections that are relevant to the CWPP. This may include—but is not limited to—First Nation Comprehensive Community Plans, Official Community Plans (including Development Permit Areas), zoning and subdivision bylaws, parks, recreation and/or open space plans, and local bylaws that restrict the use of fire within local government and First Nation boundaries.

Describe any specific requirements related to wildfire risk mitigation activities and highlight any major gaps and key recommendations for the community.

2.5.4 Higher Level Plans and Relevant Legislation

Review all relevant Provincial legislation and regulations and identify sections that are relevant to the CWPP. List all relevant higher level plans for the area, including Land and Resource Management Plans, Higher Level Plan Orders and any legal land management objectives.

2.5.5 Ministry or Industry Plans

Additional forest management planning activities may be underway in the AOI. Integrating existing planning initiatives is critical to ensuring efficient and effective wildfire risk mitigation activities. Review any available Ministry of Environment, BC Parks or Ministry of Forests, Land and Natural Resource Operations and Rural Development Fire Management Plan information or and identify sections that are relevant to the CWPP, including any planned or completed fuel treatments and/or proposed Fuel Treatments Opportunities Summaries (FTOS) that may be available for the AOI.
If the planning is extending out onto provincial crown land, additional plans to consider may include Forest Stewardship Plans, Forest Health Plans, Range Management Plans, Ecological Restoration Plans, Parks and Protected Area Management Plans, Integrated Investment plans.

SECTION 3: Values at Risk

The intent of this section is to introduce the extent to which wildfire has the potential to impact values within a community and should be primarily driven by the Critical Infrastructure Assessment competed under the Local Emergency Planning process.

Values at risk (VAR) are the human or natural resources that may be impacted by wildfire. This includes human life, property, critical infrastructure, high environmental and cultural values, and resource values.

Updating VAR data is critical for effective mitigation planning. This can be achieved through the Critical Infrastructure Assessments process during the development of the Local Authority Emergency Plan use of high quality imagery to identify areas of new development and values such as critical infrastructure.

3.1 Human Life and Safety

The intent of this sub-section is to clearly identify and understand where people and structures are located within the AOI in order to effectively determine the wildfire risk and identify mitigation activities.

In the event of a wildfire approaching a community, the first priority is human life and safety, including the evacuation of at-risk areas. Wildfire can move quickly and unpredictably. It takes time for people to evacuate an area and safe egress can be blocked by the fire itself or by vehicle congestion or accidents.

Describe the population distribution within the AOI using the most recent data available. Review and update information on campgrounds, picnic areas and other locations primarily within the administrative boundary that have high use during fire season.

3.2 Critical Infrastructure

The intent of this sub-section is to clearly identify and understand where critical infrastructure is located in order to effectively determine the wildfire risk and identify mitigation activities.

- Publicly and provincially owned critical infrastructure (CI) are assets owned by the Provincial government, local government, public institution (such as health authority or school district), First Nation or Treaty First Nation that are essential to the health, safety, security or economic wellbeing of the community and the effective functioning of government, or assets identified in a Local Authority Emergency Plan Hazard, Risk & Vulnerability and Critical Infrastructure assessment.

Describe critical infrastructure and the risk that wildfire poses to the infrastructure (this requires working with the asset owners). Outline the services related to critical infrastructure (electricity, communications, water supply, waste treatment, hospitals, schools, etc.), and the impacts and implications of disruption of these services, during and after a wildfire. Most of this information should be available in the local emergency plan.
3.2.1 Electrical Power

Provide updated information regarding transmission and distribution lines and what they supply (e.g., identify if a power line supplies other communities); locations of transformers and towers; types of poles (metal vs. wood); substation or generating station locations, loads, and what they supply. Detail any linkages to water supply (e.g., water system requires electricity to function).

3.2.2 Communications, Pipelines and Publicly Owned Buildings

Provide updated information regarding the type and locations of communication towers or repeaters, gas lines, hospitals, airports and publicly owned buildings.

3.2.3 Water and Sewage Infrastructure

Provide updated information regarding water supply infrastructure elements, such as intake dams and locations, pipelines, water treatment plants, sewer facilities, etc. Describe water availability for firefighting and the potential for drought conditions during fire season.

3.3 High Environmental and Cultural Values

The intent of this sub-section is to clearly identify and understand where high environmental and cultural values are located within the AOI in order to effectively determine wildfire risk and identify mitigation activities.

3.3.1 Drinking Water Supply Area and Community Watersheds

Communities that depend on surface water from a specific watershed should be aware that wildfire has the potential to cause significant damage to soils, high rates of sedimentation and/or landslides that can degrade water quality for many years. In worst-case scenarios, the water supply may have to be abandoned (temporarily or permanently) or new water treatment infrastructure may need to be built, which can take several years and substantial funding.

Provide updated information on the water supply(s) upon which the community relies. When a community relies partially or completely on surface water, describe the location of the watershed and its vulnerability to wildfire.

Describe the current water reservoir and/or drinking water supply capacity, its relevance and vulnerability, and provide any initial analysis of potential wildfire impacts.

3.3.2 Cultural Values

Indigenous cultural heritage resources include archaeological sites, traditional use sites, historic buildings and artefacts, and heritage trails, or any other objects or places of “historical, cultural or archaeological significance to British Columbia, a community or an aboriginal people”.

Archaeological sites in British Columbia that date to 1846 or earlier are protected from alteration of any kind by the Heritage Conservation Act (HCA) (1996). The provisions of the HCA apply to archaeological sites located on both public and private land, known and unknown, and are

binding on government. The Archaeology Branch of the Ministry of Forests, Lands and Natural Resource Operations and Rural Development administers the provisions of the HCA and are responsible for making final decisions concerning the management of archaeological resources. Day-to-day planning, research and fieldwork are conducted by professional consulting archaeologists.

Non-archaeological cultural heritage in BC is generally not protected by statute, but the use of and access to these resources is enshrined as a constitutionally protected Aboriginal right. Locally identified cultural heritage values that may be impacted by wildfire or suppression efforts can be included, if agreed to by the local First Nation.

3.3.3 High Environmental Values
Provide updated information on any high environmental values, such as significant species at risk and established legal objectives and orders.

3.4 Other Resource Values
The intent of this sub-section is to describe significant additional resource values (such as timber, water or high-value wildlife habitat, etc.) that are present within the AOI and/or values that may constrain fuel treatment opportunities.

Provide updated information on other resource values (such as the timber harvesting land base and its contributions and impacts on short-, mid- and long-term timber supply), if relevant.

3.5 Hazardous Values
The intent of this sub-section is to identify hazardous values that pose a safety hazard to emergency responders.

Provide updated information on hazardous values, such as large propane facilities, landfills, rail yards, storage facilities containing explosives, etc. Outline any mitigation measures.

SECTION 4: Wildfire Threat and Risk
The intent of this section is to summarize the factors that help determine the wildfire risk around the community. These factors include natural fire regime and ecology, Provincial Strategic Threat Analysis, and a local wildfire risk analysis.

A risk-based framework consists of the consideration of the likelihood of an unwanted wildfire event and the consequences to communities and high value resources and assets as the measure of risk, as follows:

- Likelihood is the probability of the unwanted wildfire event occurring
- Consequence is the amount of damage occurring as a result
- Risk is measured as the product of likelihood and consequence but multiple inputs are also required in order to effectively quantify risk, including severity, value type, and vulnerability

Through the identification of risk level, priorities for mitigation as well as opportunities for increasing community resiliency are both enhanced.
Many aspects of wildfire threat assessment fall under the practice of professional forestry as outlined in the ABCFP Interim Guidelines - Fire and Fuel Management. This section of the CWPP may be required to be prepared by a forest professional that possesses a sound understanding of fire threat analysis, fire behaviour and suppression, and resource management.

Due to the complex nature of wildfire threat assessment, planning for, and implementation of, fuel treatments in BC, the BCWS has updated and developed a set of tools to aid in determining the wildfire threat, fuel treatment design and implementation, in addition to the detailed guidance in this section of the CWPP Template.

### 4.1 Fire Regime, Fire Weather and Climate Change

The intent of this sub-section is to provide the ecological context of wildfire for the community and to describe the role of fire (frequency and intensity) in the local ecosystem under historical conditions, and the potential implications of future conditions, caused by the interruption of the natural fire cycle and/or climate change.

#### 4.1.1 Fire Regime and Fire Weather

Describe the historical fire regime and any changes to that regime that have occurred in part due to fire exclusion. In B.C., NDT4 areas have been assessed using condition class mapping by the Ecosystem Restoration Program and may be available. Describe forest health issues (insects and disease) that are present and have contributed to changes in the fire regime and forest attributes. Describe human development (e.g. land clearing and forest harvesting, grazing, ecosystem restoration, fuel treatments) and natural events that have altered the fuel hazard around the community. Describe the implications regarding wildfire behaviour that may result from all of the factors described above.

Wildfire threat exposure to the community will vary throughout the fire season based on the fuels present, the moisture content of fuels, and fire weather conditions. Consequences of a threat may be realized when an ignition occurs during high or extreme wildfire conditions, as represented by Fire Danger Rating. Discuss the implications to the community in regards to wildfire threat related to the local fire history, climatology, and fuel conditions around the community.

#### 4.1.2 Climate Change

Climate change projections point to a warmer and drier environment and shifts in vegetation with the following implications in some areas of the province:

- Increased disturbances due to insects and disease
- Shifts in vegetation. Potential ranges of species will move northward and upward in elevation
- Increased forest fire frequency
- Longer and more intense wildfire seasons
- Increased number of high and extreme fire danger days for an average year

As a result, some existing forests have an increased probability of more frequent, intense and more difficult to control wildfires that are likely to result in increased tree mortality, detrimental impacts to soils and hydrology, and increased threat to the community and interface areas. Describe relevant potential climate change impacts that are applicable to the community from
local or provincial level information. The following sources are available: Climate Change Adaptation and the Pacific Climate Impacts Consortium.

4.2 Provincial Strategic Threat Analysis (PSTA)

The intent of this sub-section is to describe fire threat ratings from the PSTA and its key inputs relevant to the community.

The PSTA and the Risk Class framework are high level analyses and provide a starting point to assess the local wildfire threat. The PSTA utilizes and interprets provincial fuel type mapping, historical fire occurrence data, topography, and historical weather station data.

Note that the PSTA is conducted at the provincial level and has a number of limitations. The PSTA information is complemented with a local wildfire threat analysis that considers local factors to improve the wildfire threat assessment (see Section 4.3). The PSTA includes information and maps that describe fuel types, historical fire density, and the potential for embers to land in an area (spotting impact), head fire intensity, and the final wildfire threat.

Wildfire threat is directly related to the likelihood of hazardous fuel igniting and fire spreading into the community either directly or through ember transport. The PSTA provides information to help evaluate the three conditions necessary for a wildfire to threaten a community:

1. an ignition occurs (Fire History)
2. the resulting fire generates sufficient intensity (Head Fire Intensity) and spreads rapidly, and
3. the fire spreads into and/or transports embers into the community (Spotting Impact)

Refer to: 2017 Provincial Strategic Threat Assessment.

4.2.1 Fire History

Although the location of future ignitions is difficult to predict with accuracy, a review of historical fire ignitions and spread can reveal patterns that have a greater likelihood of occurring in the future.

Fire history tells the story of the relationships between fire behaviour, landscape ecology, management policy (including fire suppression), human development and other land-use changes throughout the area. The potential for very large, destructive and landscape-altering fires is related to the historical fire and fire response patterns within a given planning unit.

Describe the implications of the historical fire for the community. Include any relevant local fire history (start location, numbers and perimeters) in the discussion. Examine the ignition location and the final fire perimeters to determine if there are fire spread patterns with respect to prevailing winds and topography. Describe the implications of fire spread patterns for the community. Describe the number of fires, and any patterns regarding the direction of fire spread, high occurrence areas, etc., and the implications for the community.

Note any major fires near the community that were a threat or resulted in impacts. Discuss the implications of the historical fire incidence in terms of the likelihood of future wildfires and, if applicable, discuss any patterns that indicate that specific areas surrounding the community are likely to pose a greater threat.
4.3 Local Wildfire Threat Assessment

This section is only required for local government land or First Nations land and is optional for provincial Crown land

The intent of this sub-section is to provide a detailed assessment of the local wildfire threat, including field reviewed fuel characteristics, proximity of fuel to the community, local fire spread patterns, topographical considerations and local factors.

Outline the local wildfire threat assessment process that was used. The process should consider local wildfire threat factors, stratify the area of interest based on relative wildfire threat and risk, and identify priority areas for field assessment.

Refer to Appendix 1.

SECTION 5: Risk Management and Mitigation Factors

The intent of this section is to outline the strategies the community can put into practice to reduce the risk and the impact of a wildfire. Risk mitigation choices can vary by community, fuel type, ecology, hazard, terrain factors, land ownership, other unique local risk factors, local government and First Nation capacity, and/or public acceptance.

Mitigating wildfire risk is a proactive approach to reducing potential impacts and subsequent losses from devastating wildfires, and is best conducted in a coordinated fashion amongst applicable land managers/owners that may include provincial and federal governments, local governments, First Nations, and private landowners. Understanding and assessing all of the risks that apply to a given community is a key consideration when determining actions that local governments or First Nations can undertake to mitigate and manage the wildfire risk within and adjacent to their respective jurisdictions.

There are many different risk mitigation options available. Three have been identified for this section:

1. Fuel Management – reduce fire behaviour potential
2. FireSmart – reduce fire spread into community and impacts to values
3. Communication and Education – reduce fire occurrence

It is important for forest professionals to look beyond forest fuels when assessing the risk and threat. High risk activities, human use and other environmental factors should also be assessed within the AOI. Considering these other factors should allow the professional to design fuel treatments and other recommendations that meet the needs of the community and build resilience to the potential impacts of wildfire. Additional options should be discussed where relevant.

5.1 Fuel Management

The intent of this section is to conduct more detailed work on the highest local risk areas of the WUI identified in Section 4.3 and design logical treatment units for future prescription development and fuel management treatments within the highest risk areas.

Within the highest threat priority units that are likely to be treated during the lifespan of the CWPP, design logical fuel treatment units for fuel management treatments.

Design logical fuel treatment units to modify fire behaviour and create options for fire suppression. Key principles to be considered in the development of fuel treatment units (FTU’s)
include: continuity, relatively linear, anchored to non-fuel areas, accessible, defensible, and designed to be effective in changing fire behaviour from a crown fire to a surface fire during 90th percentile fire weather conditions for the local area. Proposed treatments should be sufficient in size, sufficiently treated, and strategically located with boundaries that can be effectively utilized for wildfire response. Boundaries should be consistent with logical burn unit planning principles including: utilizing topographical breaks and man-made and natural features (roads, railways, hydro transmission lines, gas pipelines, wetlands, lakes, irrigated fields, non-fuel areas, etc.). Fuel treatment design should also consider constrained areas (i.e. private land, constraints that preclude treatment), and treatment method (commercial timber harvest, mechanical, prescribed fire, etc.). Other considerations include recommendations in existing CWPPs (that meet current standards), completed fuel management prescriptions, and completed fuel treatments, when they are compatible with the design standards noted above.

For each fuel treatment unit (uniquely identified), specify the fire management objectives related to the desired change in fire behaviour that will guide future fuel treatment prescription development. For example:

- Conduct fuel treatments to create residual stands characteristics that do not support active crown fire
- Apply prescribed fire under suitable conditions to provide ecological benefits, reduce fuel loading, and reduce the probability of catastrophic fire in the future

For each fuel treatment unit: complete one Wildfire Threat Assessment Worksheet #1 – Priority Setting Scoring, stratify each fuel treatment unit based on fuel type, and complete the necessary number of Wildfire Threat Assessment Worksheet #2– Plot Level Fuel Characteristics to accurately reflect the fuel characteristics and provide a summary (if >1 plot).

Summary Table as specified below:

Table 2: Fuel Treatment Summary Table

<table>
<thead>
<tr>
<th>FTU # and Stratum</th>
<th>Total Area (ha)</th>
<th>Treatment Unit Type / Objective</th>
<th>Local Fuel Threat (Hectares)</th>
<th>Overlapping Values / Treatment Constraints</th>
<th>Treatment Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Extreme / High</td>
<td>Mod</td>
</tr>
</tbody>
</table>

5.2 FireSmart Planning & Activities

The intent of this section is to summarize the current level of FireSmart that has been completed, is under implementation, and to identify areas that are FireSmart, or have received FireSmart recognition through the FireSmart Canada Recognition Program, and to identify future FireSmart activities within the AOI.

5.2.1 FireSmart Goals & Objectives

The intent of this sub-section is to identify the general goals and objectives of FireSmart.
The general goal of FireSmart is to encourage communities and citizens to adopt and conduct FireSmart practices to mitigate the negative impacts of wildfire to assets on public and private property. Findings from a study of the 2016 Horse River wildfire in Fort McMurray indicate that FireSmart principles were one of the main reasons why individual homes survived, regardless of the broader wildfire threat surrounding them. This was true in both the urban and rural areas.

**Goals of FireSmart**

The goal of FireSmart is to encourage homeowners to conduct FireSmart practices on their property to reduce damages and minimize the hazards associated with wildfire. These practices should aim to:

- Reduce the potential for an active crown fire to move through private land
- Reduce the potential for ember transport through private land and structures
- Create landscape conditions around properties where fire suppression efforts can be effective and safe for responders and resources
- Treat fuel adjacent and nearby to structures to reduce the probability of ignition from radiant heat, direct flame contact and ember transport
- Implement measures to structures and assets that reduce the probability of ignition and loss

**5.2.2 Key Aspects of FireSmart for Local Governments and First Nations**

The intent of this sub-section is to provide a summary of FireSmart activities that can be used to measure current level of implementation and to recommend next steps. There are many different ways that members of the community and stakeholders can provide options to mitigate the risk (FireSmart, 2003).

1. **Elected officials can adopt bylaws that promote FireSmart principles related to publicly owned buildings and land**
2. **Local government planners can recommend fire-resistant landscaping standards and design FireSmart public spaces**
3. **Developers can design and build FireSmart buildings in accordance with local bylaws**
4. **Private land owners and residents can modify fuels around their property and buildings and follow FireSmart principles**
5. **Industrial mangers and businesses can ensure that facilities are constructed and maintained following FireSmart guidelines**

Refer to Table 3 below for a summary FireSmart practices and activities that could be adopted by a community.

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2 Al Westhaver, Why some homes survived: Learning from the Fort McMurray wildfire disaster (Toronto: Institute for Catastrophic Loss Reduction, 2016)
| 1. Education | • Develop and/or promote local FireSmart educational activities and tools. Refer to [BC FireSmart Resources](https://www.bc.ca/government/environment-and-sustainable-development/firesmart) for FireSmart materials that are currently available.  
• Develop and/or promote education for the reduction of human-caused fires  
• Encourage active participation in Wildfire Community Preparedness Day  
• Organize and host a community FireSmart day, FireSmart events and workshops, and wildfire season open houses  
• Apply for [FireSmart Canada Community Recognition](https://www.firesmartcanada.ca/) |
| 2. Planning | • Develop or update a CWPP  
• Develop policies and practices for design and maintenance of FireSmart publicly owned land and First Nations land, such as parks and open spaces  
• Develop policies and practices for design and maintenance of FireSmart publicly owned buildings  
• Conduct site visits and FireSmart and/or risk assessments for publicly owned lands, First Nation lands and publicly owned buildings |
| 3. Development considerations | • Amend Official Community Plans, Comprehensive Community Plans and/or land use, engineering and public works bylaws to incorporate FireSmart policies  
• Revise landscaping requirements in zoning and development permit documents to require fire resistant landscaping  
• Establish Development Permit Areas for Wildfire Hazard in order to establish requirements for the exterior design and finish of buildings  
• Include wildfire prevention and suppression considerations in the design of subdivisions (e.g. road widths, turning radius for emergency vehicles, and access and egress points)  
• Amend referral processes for new developments to ensure multiple departments, including the fire department and/or emergency management staff, are included |
| 4. Interagency | • Develop and/or participate in regional or local FireSmart planning tables |

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| Co-operation | • Participate in multi-agency fire and/or fuel management tables |
| 5. Emergency planning | • Develop and/or participate in cross-jurisdictional meetings and tabletop exercises, including seasonal readiness meetings  
• Review structural protection capacity (i.e. Fire safety assessments) |
| 6. Cross training | • Cross-train fire departments to include structural fire and interface wildfire training (e.g. S-100)  
• Provide or attend training for Local FireSmart Representatives and community champions  
• Support professional development to increase capacity for FireSmart activities |
| 7. FireSmart Demonstration Projects | • Undertake FireSmart Demonstration Projects for publicly owned buildings or publicly and provincially owned critical infrastructure. This may include:  
  o Replacing building materials (i.e. siding or roofing) with fire-resistant materials  
  o Replacing landscaping with fire-resistant plants as outlined in the FireSmart Guide to Landscaping |
| 8. FireSmart Activities for Private Land | • Planning for private land (only with private property owners’ consent)  
  o Develop FireSmart Community Plans for specific areas  
  o Conduct FireSmart Home and Property Assessments  
• Offer local rebate programs to home owners on private land and First Nations land that complete eligible FireSmart activities on their own properties  
• Provide off-site debris disposal for private land owners who have undertaken their own vegetation management, including:  
  o Provide a dumpster, chipper or other collection method  
  o Waive tipping fees  
  o Provide curbside debris pick-up |

### 5.2.3 Identify Priority Areas within the Area of Interest for FireSmart

The intent of this sub-section is to use of the information gathered on local wildfire threat and risk assessments (Section 4.0 above) to best understand the priority areas for FireSmart planning and activities. This could be based on the relative level of wildfire risk adjacent to established neighbourhoods, although the application of FireSmart principles to isolated critical infrastructure could also be a priority.
Complete the table below to identify relative priority areas for FireSmart in relation to the level of wildfire risk, the current level of implementation in those areas, and next steps for increasing FireSmart activities. At a minimum, CWPP planners should identify, at a very high level, general priority areas within AOI that may benefit from FireSmart assessment(s). This overview could utilize local knowledge, aerial image interpretation, and/or information obtained from previous FireSmart assessments.

Table 4: Summary of FireSmart

<table>
<thead>
<tr>
<th>Area ID</th>
<th>Wildfire Risk Rating (E/H/M/L)</th>
<th>FireSmart Y/N</th>
<th>FireSmart Canada Recognition Received Y/N</th>
<th>Recommended FireSmart Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Priority Area #1: [insert name of neighbourhood, zone, critical infrastructure, etc.]</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Map of areas that are FireSmart. (Optional)

5.3 Community Communication and Education

The intent of this section is to describe the key steps required to build engagement and support within the community for the CWPP in a concise format. This includes education on fire prevention practices, outreach and community programs.

The CWPP will only be successful if the community is engaged, informed and supportive of the process and the recommendations. Moving from the CWPP to implementation of specific activities requires that the community is well informed of the reasons for, and the benefits of, specific mitigation activities. The following steps should be described in this section:

1. Specify how the CWPP will be made accessible/available to the general public (posted, public meetings, etc.)
2. Develop a communication strategy regarding wildfire risk and priority mitigation measures that are being undertaken by the community
3. Outline a process to encourage stakeholders in the natural resource sector to identify opportunities for mutually beneficial forest/fuel treatments
4. Develop a public education strategy designed to reduce human caused fires. Evaluate BCWS Fire Cause data provided by the fuel Management Specialist and identify local historical patterns of human caused fires
5. Develop a FireSmart communication plan
6. Other
5.4 Other Prevention Measures
The intent of this section is to identify local actions and strategies that reduce the threat of wildfire ignitions.

*Fire prevention can be achieved through communication and education initiatives, as well as through the development and implementation of policies and regulations, including operational guidelines and restrictions. Fire prevention can be addressed at the community level through various avenues. Danger class rating signs within fire protection zones, public communication, industrial work restrictions and fire bans are examples of public fire prevention measures.*

*Provide a list of any other actions or strategies that are being undertaken within the AOI to reduce the threat of wildfire ignitions.*

5.5 Summary of Recommendations
The intent of this sub-section is to summarize all the recommendations that have been included in this section.

<table>
<thead>
<tr>
<th>Recommendation</th>
<th>Responsibility/Funding Source</th>
<th>Next Steps</th>
</tr>
</thead>
</table>

SECTION 6: Wildfire Response Resources
The intent of this section is to provide a high level overview of the resources that are available to local governments in the case of a wildfire.

*Interface fires are complex incidents that typically involve both wildland and structural fires. During times when many fires are burning in the Province and threatening multiple communities at the same time, resource requests can exceed the resources available. In B.C. these resources are deployed according to [B.C. Provincial Coordination Plan for Wildland Urban Interface Fires (revised July 2016)](https://example.com).*

6.1 Local Government and First Nation Firefighting Resources
The intent of this sub-section is to identify implications of wildfire that impact firefighting efforts (e.g. loss of electrical power and water pressure and supply), the contingencies that have been put in place, and any recommended measures that would help to make community firefighting more effective. Include a high level summary of mutual aid agreements.

6.1.1 Fire Departments and Equipment
*Wildfire can also affect fire departments’ ability to effectively fight fire due to safety issues, loss of water pressure, excessive smoke, etc. Provide a description of local fire department capacity and limitations. This should include a review of training, equipment, evacuation and volunteer fire departments. Outline any additional measures that have been undertaken including the development of a wildfire preparedness plan.*

6.1.2 Water Availability for Wildfire Suppression
Provide a description of local water supply and limitations, including the capacity of water for both structural and within the AOI. Consider that water needs to be available for the entire fire season and during an event that may disrupt electricity delivery. Describe any developed contingencies regarding the possibility of losing power and the associated implications regarding water pressure. Fire department engines also have the capacity to draw water from alternative water sources that have been pre-identified and tested. Describe any alternative water sources, and access requirements. Provide a brief description of local fire hydrant capacity and limitations including any industrial sites (work with applicable stakeholders).

6.1.3 Access and Evacuation

Provide a brief description of the access constraints and opportunities for local equipment to respond. Include a discussion on adverse grades, curves, and potential bridge weight considerations, and a summary of the areas with and without quality access for emergency fire fighting vehicles. Provide a description of the potential issues using local emergency planning or other relevant information.

Access routes may often double as evacuation routes as well. Identification of emergency evacuation routes within the community boundary is a local government or First Nation responsibility. Fuel condition adjacent to evacuation routes should be considered in relation to potential fire behaviour and potential impediments to safe evacuation. Of most concern are areas where evacuation routes are limited. Fuel treatments necessary to ensure safe evacuation should be identified and prioritized in relation to other risks identified in the CWPP.

6.1.4. Training

Identify training options to build capacity within the suppression and emergency management area. Maintain the current level of structural protection training for response staff. Increase focus in interface training in S100 Introductory and S215 Advanced wildfire suppression training and mock exercises in partnership with BCWS.

6.2 Structure Protection

The intent of this section is to provide a summary of what is available to the community for structure protection, and provide any recommendations.

Describe the current capacity of the local government and First Nation for sprinkler deployments or any Structure Protection Unit (SPU) deployment plan recommendation the CWPP planning process has identified. Provide recommendations for the community to fill in any identified gaps. In addition, building or retrofitting structures and managing vegetation to FireSmart standards ahead of time, is recommended.

6.3 Summary of Recommendations

The intent of this sub-section is to summarize all the recommendations that have been included in this section.

<table>
<thead>
<tr>
<th>Recommendation</th>
<th>Responsibility/Funding Source</th>
<th>Next Steps</th>
</tr>
</thead>
</table>

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Appendix 1: Local Wildfire Threat Process

This section is only required for local government land or First Nations land and is optional for provincial Crown land

The key steps necessary to complete the local wildfire threat assessment are outlined below:

1. Develop local fuel type map
2. Consider the proximity of fuel to the community
3. Consider fire spread patterns (i.e. ISI Roses)
4. Consider topography
5. Stratify the WUI based on relative wildfire threat
6. Consider other local factors
7. Identify priority wildfire risk areas for field assessment as outlined in the document below

Refer to: Threat Assessment Factors information is provided in the 2016 Wildfire Threat Assessment Guide and Worksheets Sub-component and Descriptors Definitions

A1.1 Fuel Type Attribute Assessment

The accuracy of the local fire threat determination and fuel treatment design is directly linked to the accuracy of the fuel type information. If the fuel typing is incorrect based on significant disturbance such as harvesting or major fire, to the degree that the associated fire behaviour will drastically change the corresponding threat information will also be incorrect. BCWS annually produces a comprehensive fuel type layer for fire behaviour prediction using the Vegetation Resources Inventory (VRI) data, which is summarized in the following reference document.

Refer to: 2017 BCWS Fuel Typing Summary Document

There are limitations to the provincial scale approach when it comes to examining fine-scale variations in fuel structure on the landscape and modeling the behaviour of individual fires. Examples of VRI attributes that could be readily verified in the field (by properly trained technicians) include tree species composition, tree height, tree density, tree age, and canopy cover. Stand attributes can be determined from individual tree attributes with proper sampling.

Ground-truthing of fuel structure characteristics specific to fire behaviour prediction can also be undertaken. This involves assessing attributes that have been found to be particularly significant in affecting fire behaviour and may or may not be part of general forest stand characteristics: fuel loading (fine and coarse woody debris, litter and duff depth, and crown fuel load), crown base height, canopy bulk density (difficult to measure directly), and tree height. Crown attributes (especially crown base height and canopy bulk density) can also be assessed by combining measured stand attributes with modeled crown fuel characteristics.

Various tables and calculators can be used for such purposes; predictions based on these studies would also benefit from field validation, although these efforts often consist of significant research projects (e.g. destructive sampling and measurement of entire tree crowns) rather than

simple field measurements. These characteristics can be used to inform the selection of the best fit FBP fuel type; however, it is not always obvious how to do so. For example, surface fuel loading or canopy bulk density are not described quantitatively for FBP fuel types in the technical system description.\(^5\)

Ground-truthing of FBP fuel types, however, is more problematic. Assigning a FBP fuel type to a particular stand or vegetation polygon is a complex, somewhat subjective process, often described as a blend of ‘art’ and science. Evaluating FBP fuel types in the field requires specialized training and experience in a particular vegetation type, and is not readily done by most field technicians unless performed by personnel who have locally relevant fire behaviour skills and experience.

The following table shows the fire behaviour potential of the FBP fuel types grouped into 4 categories based on their relevance to a wildfire threat assessment.

Table 5: Fuel Type Categories and Crown Fire Spot Potential

<table>
<thead>
<tr>
<th>Fuel Type Categories</th>
<th>Fuel Type - Crown Fire/ Spot Potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>1: C1, C2, C4, M3-M4 (&gt;50% C/DF)</td>
<td>High</td>
</tr>
<tr>
<td>2: C3, C7, M3-M4 (&lt;50% C/DF) M1-M2 &gt;50% Conifer</td>
<td>Moderate</td>
</tr>
<tr>
<td>3: C5, C6, O1a/b, S1-3 M1-M2 (26-49% Conifer)</td>
<td>Low</td>
</tr>
<tr>
<td>4: D1, D2, M1-M2 (&lt;26% Conifer)</td>
<td>Very Low</td>
</tr>
</tbody>
</table>

As part of the CWPP planning process the BCWS fuel type layer attribute information should be verified using current data sources including imagery, new treatments, new developments or updated disturbance data.

As part of this process all changes should be documented and rationale provided, using Appendix 1 Wildfire Threat Assessment_FPB Fuel Type Change Rationale. This worksheet must be submitted to BCWSPrevention@gov.bc.ca for review and when approved incorporated into the CWPP.

Determine any areas where fuel type mapping appears to be potentially inaccurate and develop a quality assurance process to validate. This process will likely require field work that should be focused on areas that present the greatest potential inaccuracy, such as those listed below:

1. Areas with fuel management treatments (including Prescribed Fire) that are not mapped.
2. Recent silviculture treatments such as spacing and pruning.
3. Coniferous mapped as deciduous.
4. Grasses or shrubs mapped as forest.
5. Areas of non-fuel mapped as a fuel type.
6. Major disturbances (harvesting, wildfires, or land clearing for industrial purposes).
7. C7 fuel types with high Crown Closure.

In addition, this work should be focused on/ but not limited to, the areas of highest level of threat (e.g. higher hazard fuels C1, C2, C4, M2>50% conifer, upwind and/or closest to the community).

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Ensure that any deficiencies noted and approved in the fuel type mapping and associated information is corrected to produce an “Updated Fuel Map”. Provide a description of the fuel types (hectares of each fuel type) and their relevance to the wildfire threat assessment.

A1.2 Proximity of Fuel to the Community

Fuel closest to the community usually represents the highest hazard. The recommended approach is to treat fuels to achieve a desired level of hazard reduction, from the value or structure outward, ensuring mitigation continuity. Untreated areas between treatment areas and the value or structure may allow a wildfire to build in intensity and rate of spread, which can increase the risk to the value. To capture the importance of fuel proximity in the local wildfire threat assessment, the WUI is weighted more heavily from the value or structure outwards. Fuels adjacent to the values and/or structures at risk receive the highest rating followed by progressively lower ratings moving out.

The local wildfire threat assessment process subdivides the WUI into 3 areas – the first 100 meters (WUI 100), 101 to 500 meters (the WUI 500), and 501 to 2000 meters (the WUI 2000). These zones provide guidance for classifying threat levels and subsequent priorities of treatments.

Table 6: Proximity to the Interface

<table>
<thead>
<tr>
<th>Proximity to the Interface</th>
<th>Descriptor*</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>WUI 100</td>
<td>(0-100 m)</td>
<td>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.</td>
</tr>
<tr>
<td>WUI 500</td>
<td>(101-500 m)</td>
<td>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.</td>
</tr>
<tr>
<td>WUI 2000</td>
<td>(501-2000 m)</td>
<td>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.</td>
</tr>
<tr>
<td></td>
<td>&gt;2 000 m</td>
<td>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.</td>
</tr>
</tbody>
</table>

* 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.
Apply the zoning principles to the WUI. Discuss the relevance and importance of the proximity of fuels to the values at risk, including a discussion of the non-linear relationship between hazard, fire behaviour, and distance as it related to the community.

A1.3 Fire Spread Patterns (i.e. ISI Roses)

Wind speed, wind direction, and fine fuel moisture condition influences wildfire trajectory and rate of spread, and is summarized in the ISI Rose(s) from the local representative BCWS weather station(s). Wildfire that occurs upwind of a value poses a much more significant threat to that value than a fire that occurs downwind.

Analyze the predominant summer fire spread patterns during the peak burning period using **ISI Roses provided by BCWS**. These were generated using the hourly ISI data and grouped into four daily time periods and displayed in a monthly graphical format. If the weather station data is not representative, consider local input from the community rather than using un-representative data. Consider the prevailing wind direction during periods of higher ISI values and associated fire behaviour implications, and stratify the WUI into areas that tend to be downwind, upwind, or off-set, to these fire spread patterns. As an example, if the ISI Rose has the greatest spread potential from southwest winds, then it would be prudent to assign a higher level of risk (and to treat higher threat forest stands) to the SW quadrant of the community. The fire perimeter history for the area should also be reviewed for significant fire spread direction patterns. If no predominant wind pattern exists, this should also be discussed.

![Hourly (PST) ISI_Rose for CRANBROOK FS (426) July (2001~2016)](image)

*Figure 1: Initial Spread Index (ISI) Roses*
A1.4 Topography

Slope percentage and slope position of the value are both considered. Slope percentage influence a fire's trajectory and rate of spread. Slope position of the value relates to the ability of a wildfire to gain momentum during an uphill run and affects the potential impact to the value.

Slope Class

Determine slope percentages/classes for the WUI area. General fire behaviour implications of slope classes are summarized in the following table:

Table 7: Slope Percentage and Fire Behaviour Implications

<table>
<thead>
<tr>
<th>Slope Percent</th>
<th>Fire Behaviour Implications</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;20%</td>
<td>Very little flame and fuel interaction caused by slope, normal rate of spread.</td>
</tr>
<tr>
<td>21-30%</td>
<td>Flame tilt begins to preheat fuel, increase rate of spread.</td>
</tr>
<tr>
<td>31-45%</td>
<td>Flame tilt preheats fuel and begins to bathe flames into fuel, high rate of spread.</td>
</tr>
<tr>
<td>46-60%</td>
<td>Flame tilt preheats fuel and bathes flames into fuel, very high rate of spread.</td>
</tr>
<tr>
<td>&gt;60%</td>
<td>Flame tilt preheats fuel and bathes flames into fuel well upslope, extreme rate of spread.</td>
</tr>
</tbody>
</table>

Slope Position of the Value

Slope position of a value relates to the ability of a wildfire to gain momentum during an uphill run. A value at the bottom of the slope is equivalent to a value on flat ground; a value on the upper 1/3 of the slope would be impacted by high preheating and faster rates of spread than a value on flat ground.

Determine the values' location relative to the slope (bottom, mid-slope on a bench, mid-slope on a continuous slope, upper 1/3 of slope). When different portions of the community are in different relative slope positions, assess the portions separately. General fire behaviour implications of slope position to the value are summarized in the following table:

Table 8: Slope Position of Value and Fire Behaviour Implications

<table>
<thead>
<tr>
<th>Slope Position of Value</th>
<th>Fire Behaviour Implications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bottom of Slope/ Valley Bottom</td>
<td>Impacted by normal rates of spread.</td>
</tr>
<tr>
<td>Mid Slope - Bench</td>
<td>Impacted by increase rates of spread. Position on a bench may reduce</td>
</tr>
</tbody>
</table>
the preheating near the value. (Value is offset from the slope).

<table>
<thead>
<tr>
<th>Mid slope – continuous</th>
<th>Impacted by fast rates of spread. No break in terrain features affected by preheating and flames bathing into the fuel ahead of the fire.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper 1/3 of slope</td>
<td>Impacted by extreme rates of spread. At risk to large continuous fire run, preheating and flames bathing into the fuel.</td>
</tr>
</tbody>
</table>

**A1.5 Local Wildfire Threat Classification**

Classify the WUI into Local Wildfire Threat Classes based on the updated fuel map (Section 4.3.1). The following explains the process to be used in determining local wildfire threat:

1. Acquire the Provincial Strategic Threat Analysis and metadata from BCWS clipped to the area of interest.
2. Using the previously corrected fuel type map for the area of interest, find areas where the fuel types have been changed. Areas where there is no fuel type change use the PSTA threat score.
3. Look for a similar fuel type in the local area, crosswalk the HFI value from the similar fuel type to the corrected fuel type polygon and place into a table to recalculate the wildfire threat for the corrected polygon. Fire density and spotting impact numbers should not change due to any input at a local level. If the fire density seems to be misrepresentative of the local fire history, this can be captured in the rationale at the treatment design stage.

### Table 9: PSTA Inputs Cross Walk Table (Updated January 2018)

<table>
<thead>
<tr>
<th></th>
<th>Head Fire Intensity (60%)</th>
<th>Fire Density (30%)</th>
<th>Spotting Impact (10%)</th>
<th>Wildfire Threat Score (100%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Original PSTA Values</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 (O-1a/b)</td>
<td>6</td>
<td>3</td>
<td>27 (5 - Moderate)</td>
<td></td>
</tr>
<tr>
<td>1 (O-1a/b)</td>
<td>6</td>
<td>3</td>
<td>27 (5 - Moderate)</td>
<td></td>
</tr>
<tr>
<td>2(O-1a/b)</td>
<td>4</td>
<td>3</td>
<td>27 (5 - Moderate)</td>
<td></td>
</tr>
<tr>
<td><strong>Original Weighted Values</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>18</td>
<td>3</td>
<td>27 (5 - Moderate)</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>18</td>
<td>3</td>
<td>27 (5 - Moderate)</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>12</td>
<td>3</td>
<td>27 (5 - Moderate)</td>
<td></td>
</tr>
<tr>
<td><strong>Updated HFI (based on fuel type change)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 (M-1/2)</td>
<td>6</td>
<td>3</td>
<td>39 (7 - High)</td>
<td></td>
</tr>
<tr>
<td>4 (C-3)</td>
<td>6</td>
<td>3</td>
<td>45 (8 - High)</td>
<td></td>
</tr>
<tr>
<td>4 (C-3)</td>
<td>4</td>
<td>3</td>
<td>39 (7 - High)</td>
<td></td>
</tr>
<tr>
<td><strong>Updated Weighted Values</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>18</td>
<td>3</td>
<td>39 (7 - High)</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>18</td>
<td>3</td>
<td>45 (8 - High)</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>12</td>
<td>3</td>
<td>39 (7 - High)</td>
<td></td>
</tr>
</tbody>
</table>

PSTA Classification table - Low, Moderate, High, Extreme classifications taken from 2017 PSTA document.
<table>
<thead>
<tr>
<th>Class</th>
<th>Water</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>No Threat</td>
</tr>
<tr>
<td>1</td>
<td>0.1-5</td>
<td>Low</td>
</tr>
<tr>
<td>2</td>
<td>5.1-10</td>
<td>Low</td>
</tr>
<tr>
<td>3</td>
<td>10.1-15</td>
<td>Low</td>
</tr>
<tr>
<td>4</td>
<td>15.1-21</td>
<td>Moderate</td>
</tr>
<tr>
<td>5</td>
<td>21.1-27</td>
<td>Moderate</td>
</tr>
<tr>
<td>6</td>
<td>27.1-33</td>
<td>Moderate</td>
</tr>
<tr>
<td>7</td>
<td>33.1-40</td>
<td>High</td>
</tr>
<tr>
<td>8</td>
<td>40.1-47</td>
<td>High</td>
</tr>
<tr>
<td>9</td>
<td>47.1-55</td>
<td>Extreme</td>
</tr>
<tr>
<td>10</td>
<td>55.1-81</td>
<td>Extreme</td>
</tr>
</tbody>
</table>

**A1.6 Local Wildfire Risk Classification**

As part of the CWPP analysis, local wildfire risk will need to be determined. The following factors are assessed to determine the local wildfire risk score.

1. Corrected wildfire threat (based on locally verified fuel type changes) is described in Section 4.3.6 – Local Wildfire Threat Calculation. This category is weighted at 30% of the total risk score.

2. Proximity is described in Section 4.3.2 – Proximity of Fuel to the Community. This weighs the risk of fuel based on distance from the community, giving a higher score for risk nearest to the values at risk in the community. This is described as “working from the value outward to mitigate risk”. This category is weighted at 30% of the total risk score.

3. Fire spread patterns (Section 4.3.3) use ISI roses and fire perimeter history to forecast the most likely potential fire spread direction for an approaching wildfire to the relative position of the community. Stratify the WUI into areas that tend to be downwind, upwind, or off-set, to these fire spread patterns. Due to the high variability of this information from community to community, generic relative weightings are not provided here, and local evaluation and weightings based on the strength of the local wind direction and intensity patterns is required. This category is weighted at 30% of the total risk score (when clear patterns are evident).

4. Topography (Section 4.3.4) is an important factor in increasing the rate of spread and the resulting head fire intensity of a wildfire. Slope may have little influence depending on the area of the province where the community is located. This category is weighted at 10% (5% for position and 5% for slope class) of the total risk score.
Figure 2: Local Wildfire Risk Inputs

Table explaining the weightings used in determining local wildfire risk are provided below:

Table 10: Local Wildfire Risk Summary

<table>
<thead>
<tr>
<th>Local Threat Score (30%)</th>
<th>Proximity (Zones) (30%)</th>
<th>Fire Spread Patterns (ISI Roses) (30%)</th>
<th>Slope Position (Value) (5%)</th>
<th>Slope Percent (5%)</th>
<th>Wildfire Risk Score (100%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.6/10</td>
<td>10/10</td>
<td>8/10</td>
<td>2/10</td>
<td>5/10</td>
<td>7.73/10</td>
</tr>
<tr>
<td>(within 100 m of value)</td>
<td>(west of community with predominant SW to NE wildfire spread pattern)</td>
<td>(lower part of the slope)</td>
<td>(30% slope)</td>
<td>(High)</td>
<td></td>
</tr>
</tbody>
</table>

Weighted Values

| 1.98 | 3 | 2.4 | 0.1 | 0.25 | 7.73 |

NB: Example of the process, not actual values used.

The wildfire risk assessment process outlined above provides a means to determine the wildfire risk as it applies to forest fuel hazard, proximity of fuel to the community, fire spread patterns and topography. These factors all influence how a wildfire could impact the community if ignition was to occur. It is also important for Professionals to consider and assess high forest fire risk activities, human use, and other environmental factors that affect wildfire threat and risk within different areas of the WUI. Note any additional local factors that influence (increase or decrease) the wildfire threat information that is unique to the community. For example, a review of human fire start history based on BCWS supplied data and BCWS Fire Centre Prevention Plans may identify high fire start areas that present a higher level of local wildfire threat. Contact the local Fuels Management Specialist for this information.

Discuss local factors with the fire services department to determine unique situations within the community that may have higher human ignition potential based on the historical fire response. This could include high use areas, reoccurring annual events, and known problem areas. Where local factors are sufficient to justify changes to the wildfire risk values determined above, document the rationale and provide a map of any alterations, as part of the CWPP. Considering all of the factors noted above should allow the Professional to provide a comprehensive assessment of the wildfire hazard and risk.
Updated January 2018: Using the 2012 Wildfire Threat Assessment Guide in place of the Wildfire Risk Classification process is acceptable under this section. Fuel type verification is still a requirement as well as brief discussion on the elements such as proximity, fire spread patterns, slope position, etc. The final local wildfire threat and/or risk mapping requirements would follow the standards outlined in Appendix 3 of the 2017 SWPI CWPP Program & Application Guide.

**Summarize the Relative Local Wildfire Risk Weighting in the following table:**

**Table 11: Local Wildfire Risk Weighting**

<table>
<thead>
<tr>
<th>Relative Risk</th>
<th>Weighting</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Risk</td>
<td>&lt;0.1</td>
</tr>
<tr>
<td>Low</td>
<td>0.1 - 3.9</td>
</tr>
<tr>
<td>Moderate</td>
<td>4 - 6.9</td>
</tr>
<tr>
<td>High</td>
<td>7 - 8.9</td>
</tr>
<tr>
<td>Extreme</td>
<td>9+</td>
</tr>
</tbody>
</table>

NB: The scoring system is based on a maximum score of 10.

**A1.7 Summary of Fire Risk Classes**

**No Risk (Gray):** The combination of the local fuel hazard (usually PSTA Class 0 or 1), weather influences, topography, proximity to the community, fuel (non-fuel) position in relation to fire spread patterns, and known local wildfire threat factors make it a no risk for threatening a community. These areas are non-fuel or sparsely vegetated and will not support spreading fires, and any patches of vegetation will usually self-extinguished. Low to no risk to any values at risk.

**Low (Green):** The combination of the local fuel hazard, weather influences, topography, proximity to the community, fuel position in relation to fire spread patterns, and known local wildfire threat factors make it a lower potential for threatening a community. These stands will support surface fires, single tree or small groups of conifer trees could torch/ candle in extreme fire weather conditions. Fuel type spot potential is very low, low risk to any values at risk.

**Moderate (Yellow):** The combination of the local fuel hazard, weather influences, topography, proximity to the community, fuel position in relation to fire spread patterns and known local wildfire threat factors make it possible that a wildfire in this area would threaten the community. Areas of matted grass, slash, conifer plantations, mature conifer stands with very high crown base height, and deciduous stands with 26 to 49% conifers. These stands will support surface fires, single tree or small groups of conifer trees could torch/ candle. Rates of spread would average between 2-5 meters/ minute. Forest stands would have potential to impact values in extreme weather conditions. Fuel type spot potential is unlikely to impact values at a long distance (<400m).

**High (Orange):** The combination of the local fuel hazard, weather influences, topography, proximity to the community, fuel position in relation to fire spread patterns, and known local
wildfire threat factors make it likely that a wildfire in this area would threaten the community. This includes stands with continuous surface/crown fuel that will support regular torching/candling, intermittent crown and/or continuous crown fires. Rates of spread would average 6-10 meters/minute. Fuel type spot potential is likely to impact values at a long distance (400-1,000m).

**Extreme (Red):** The combination of the local fuel hazard, weather influences, topography, proximity to the community, fuel position in relation to fire spread patterns, and known local wildfire threat factors make it very likely that a wildfire in this area would threaten the community. Stands with continuous surface/crown fuel and fuel characteristics that tend to support the development of intermittent or continuous crown fires. Rates of spread would average >10 meters/minute. Fuel type spot potential is probable to impact values at a long distance (400-1,000m or greater). These forest stands have the greater potential to produce extreme fire behaviour (long range spotting, fire whirls and other fire behaviour phenomena.)
Appendix 2: Wildfire Threat Assessment Worksheets and Photos