

Wildfire Risk Assessment

Three Sisters Mountain Village Three Sisters Village & Smith Creek Area Structure Plans

Prepared for:

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1 Overview

In 2017, QuantumPlace Developments Ltd, on behalf of Three Sisters Mountain Village Properties Ltd., prepared a high-level Wildfire Risk Assessment for the proposed Resort Centre, now being referred to as the Three Sisters Village Area Structure Plan and Smith Creek Area Structure Plan (ASP) areas (Walkinshaw, 2017).

This revised Wildfire Risk Assessment has been prepared based on amendments to the wildlife corridor and the conceptual development plans for the proposed Three Sisters Village and Smith Creek Plan areas to provide conceptual FireSmart hazard mitigation recommendations to reduce the threat of wildfire to the proposed development **with an emphasis on the vegetation management requirements within and adjacent to wildlife corridors.**

The past decade has shown that the threat of wildfire to life and property is increasing and we can no longer continue to design and build new developments without FireSmart consideration and implementation at the design and construction stage.

Developers, municipal government, and provincial governments must work cooperatively to set the protection of life and property as a priority in wildland/urban interface community development.

2 Current Wildfire Threat Assessment

Current wildfire threat for the Three Sisters Village and Smith Creek Plan areas and surrounding lands were evaluated through field observations and through the data collected for the Town of Canmore Wildfire Mitigation Strategy Review (March/2018) (Map 1).

Beverly et al. (2010) finds that wildland/urban interface structures are often ignited by:

- Radiant heat from hazardous wildland fuels less than 30 metres from the structure;
- Short-range ember transport from hazardous wildland fuels less than 100 metres from the structure, and/or;
- Long-range ember transport from hazardous wildland fuels less than 500 metres from the structure.

2.1 Development-Level Assessment

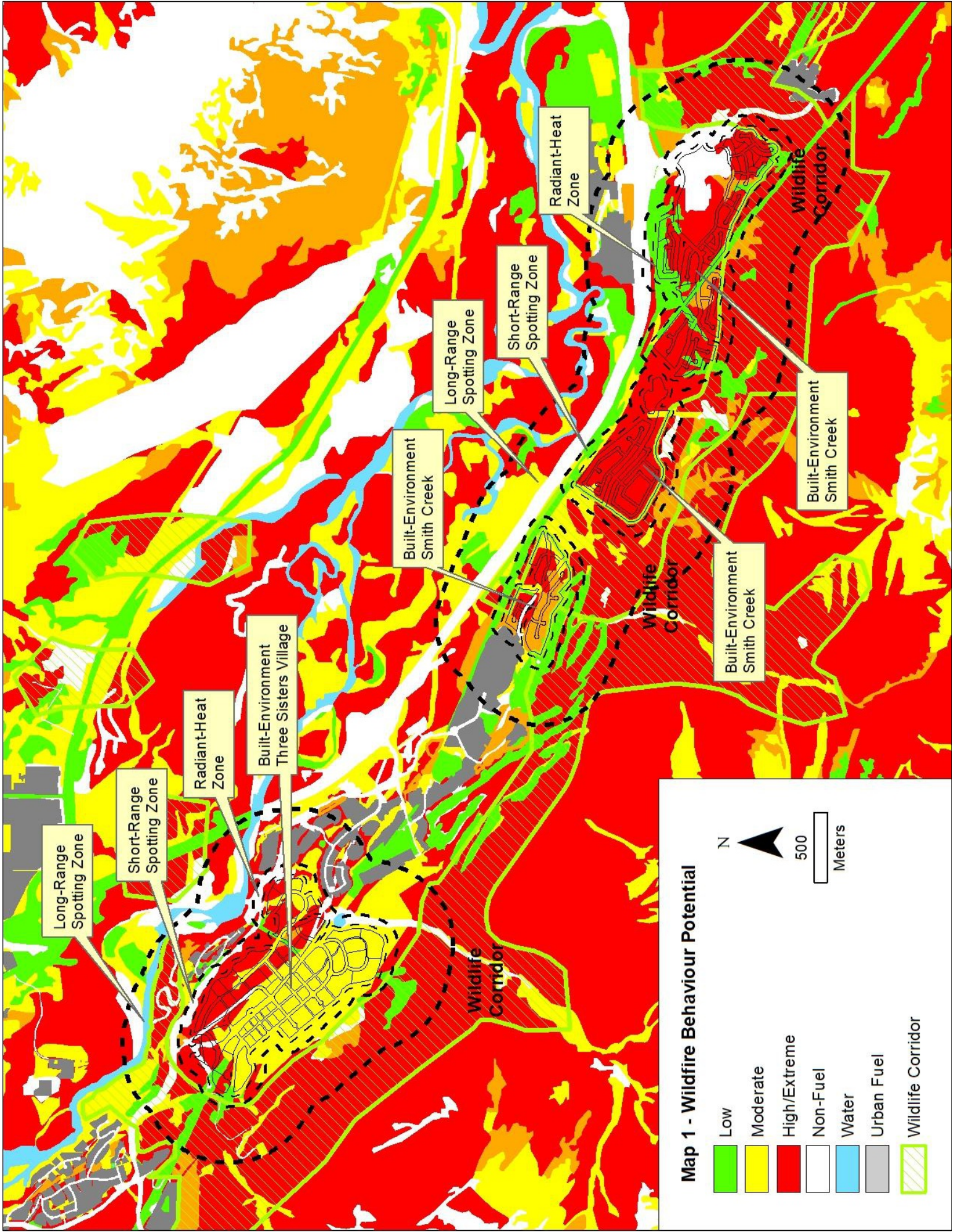
The wildfire behaviour potential within and 100 metres surrounding the Smith Creek and Three Sisters Village Plan areas ranges from Low to High-Extreme based on the following characteristics:

- **Smith Creek** - predominantly dense mature coniferous forest on slopes from 10% to 45%+ creating **High/Extreme** wildfire behaviour potential.
- **Three Sisters Village:**
 - Mixture of cured-grass with **Moderate** wildfire behaviour potential and occluded strips of mature coniferous forest with **High/Extreme** wildfire behaviour potential.
 - Dense mature coniferous forest in the west and north portions and along the south boundary of the site with **High/Extreme** wildfire behaviour potential.

2.2 Landscape-Level Assessment

The wildfire behaviour potential within 500 metres of the Smith Creek and Three Sisters Village Plan areas is predominantly **High/Extreme** based on the following characteristics:

- Predominantly mature coniferous (pine/spruce) forest in all directions from the proposed development sites.
- Winds predominantly from the west on High-Extreme fire danger days in the Bow Valley.
- Intense wildfire behaviour with long-range spotting is possible.



3 Mitigation Options

New developments in Moderate to High/Extreme wildfire behaviour potential areas must consider three main options in development design:

- Structural options;
- Infrastructure options;
- Vegetation management options.

Wise use of each of these three options together will result in a community that is much less prone to wildfire losses and improve firefighter response effectiveness and safety.

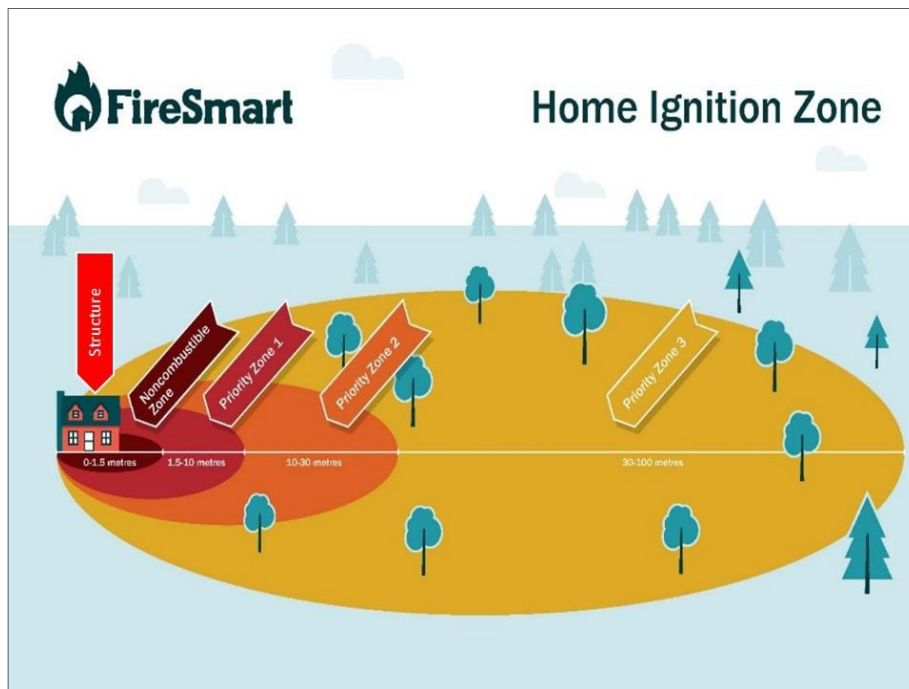
The Home Ignition Zone includes the Structure and surrounding 100 metres.

Non-Combustible Zone begins immediately adjacent to the structure and any attachments and extends outward in all directions for 1.5 metres. This Zone should consist of completely non-combustible materials. Woody shrubs, trees or tree branches should be avoided in this zone and any that are present should be properly mitigated.

Priority Zone 1 begins 1.5 metres from the structure and extends outward in all directions for a minimum of 10 metres. The objective of vegetation management in this Zone is to create an environment that will not support fire of any kind.

Priority Zone 2 begins 10 metres from the structure and extends to a minimum of 30 metres from the structure. The objective of vegetation management within this Zone is to create an environment that only supports fires of lower intensity and rate of spread.

Priority Zone 3 begins 30 metres from the structure and extends to 100 metres or farther from the structure. Vegetation management may only be needed in this Zone when High/Extreme hazard levels result from **heavy continuous coniferous forest vegetation and/or steep topography**.



3.1 Structural Options.

Use of fire-rated or fire-resistant exterior structural materials will reduce the likelihood of ignition from airborne firebrands, radiant heat, and/or direct flame impingement. Refer to the Wildland/Urban Interface (WUI) Products catalogue published by CAL-FIRE Fire Engineering Division (2011) for listings of approved fire-rated exterior materials for interface communities.

The Three Sisters Village and Smith Creek Area Structure Plan policies recognize the need for fire-rated/fire-resistant exterior building materials.

Recommendation: Require the use of fire-rated/fire-resistant exterior building materials for all structures.

3.2 Infrastructure Options.

Development of FireSmart infrastructure standards will increase resident and firefighter safety and facilitate a quicker, more effective response by firefighters.

- Access:
 - Three Sisters Parkway is a loop-road design with points of egress at the Three Sisters and Dead Man's Flats overpasses.
 - Three Sisters Village access roads are primarily loop-road design with two points of egress to the Three Sisters Parkway.
 - Smith Creek access roads are dead-end cul-de-sac and/or loop-road design.
- Water Supply – fire hydrant water supply will be provided for both Plan areas.
- Parks and Open Spaces:
 - The Three Sisters Village Plan area has incorporated several open spaces into their concept design that will act as fuelbreaks from extreme hazard fuels.
 - The Stewart Creek Plan area has forested open spaces adjacent to proposed development areas that will require fuels reduction to reduce wildfire threat.

Recommendation: Follow the Town of Canmore Engineering Design and Construction Guidelines (2020) for access road and fire suppression water supply standards.

3.3 Vegetation Management Options.

FireSmart vegetation management may use a combination of different standards and strategies based on the desire to reduce wildfire threat to development versus the acceptance of wildfire risk for the conservation of wildlife corridors and ecological factors. Conceptual fuel modification areas for the Three Sisters Village and Smith Creek development pods (Maps 2 & 3) are designed based on proposed development boundaries and the standards and strategies below. These conceptual fuel modification areas may be reduced or enlarged based on final development area footprints and management of current wildland grass and coniferous fuels within the development pods.

Standards:

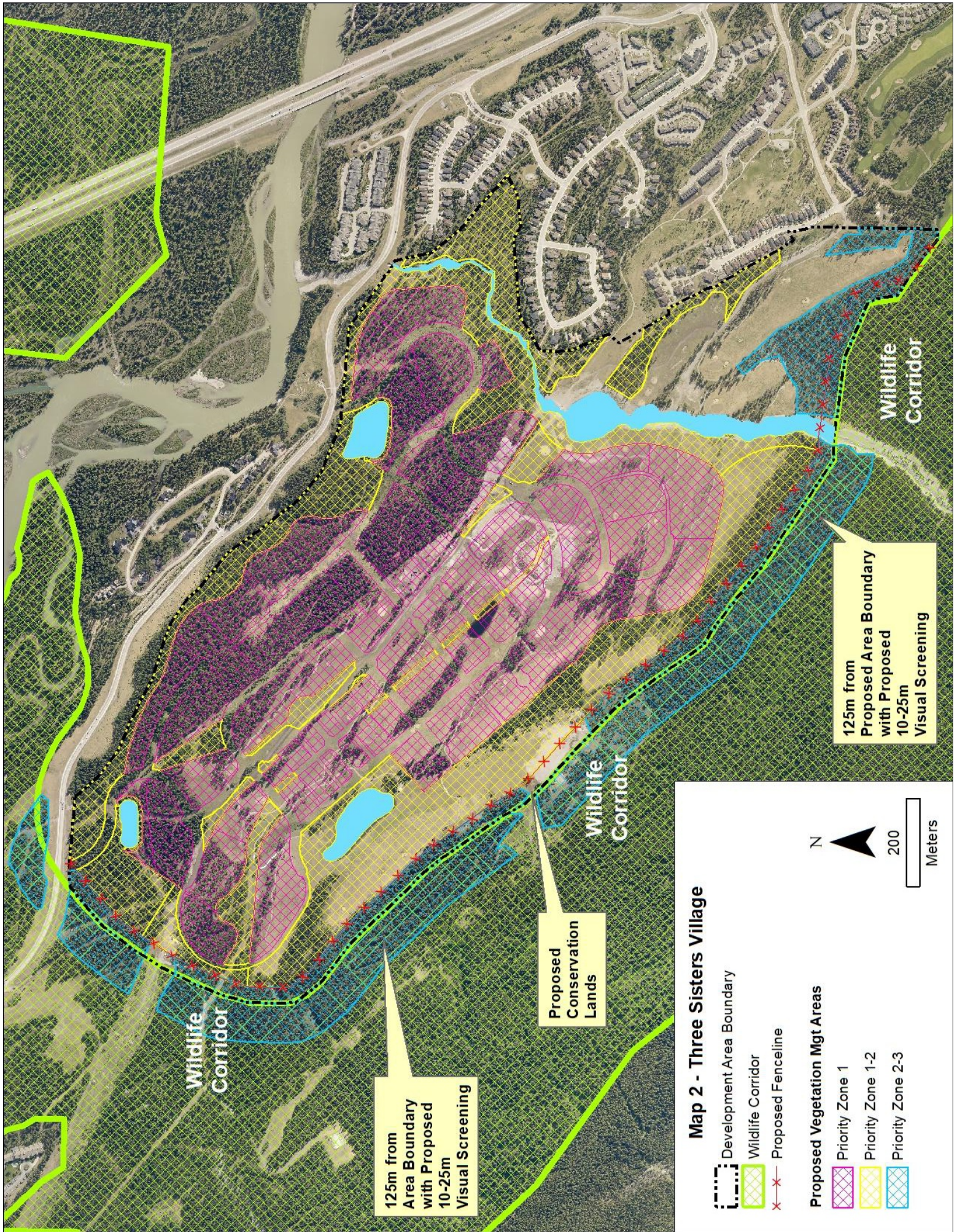
Field observations and GIS analysis leads to the following recommended minimum vegetation management standards.

- **Non-Combustible Zone (0-1.5m) and Priority Zone 1 (1.5m-10m) fuel removal and species conversion** is required around all structures.
- **Priority Zone 2 (10-30m) fuel reduction** is required around all structures.
- **Priority Zone 3 fuel reduction** is required for:
 - Forested areas with <25% slope above or below structures – minimum of 125m from structures including visual screens where required.
 - Forested areas with slopes 25-45% below structures – minimum of 150m from structures.
 - Forested areas with slopes >45% below structures – minimum of 200m from structures.

Strategies:

- Fuel removal in the Non-Combustible Zone and Priority Zone 1 through removal of all flammable coniferous trees, shrubs, and grasses and conversion to FireSmart species.
- Fuel removal in Priority Zones 2-3 through redevelopment and/or maintenance mowing of the existing wildland grasses within 30 metres of structures on the abandoned golf course fairways.
- Fuel reduction to full FireSmart recommended guidelines (3 metre crown-spacing) in Priority Zones 2-3 in a one-pass cycle or two-pass cycle separated by approximately 10 years to reduce blowdown potential.
- Fuel reduction to reduced FireSmart standards (no green tree removal, lesser pruning heights) in Priority Zones 2-3 where visual screens are preferred for wildlife corridors.

Recommendation: Detailed Wildfire Risk Assessments and fuel modification prescriptions may be required based on final subdivision development plans. Recommended fuel modification strategies within and adjacent to developments should be implemented before and/or during the development construction stage.

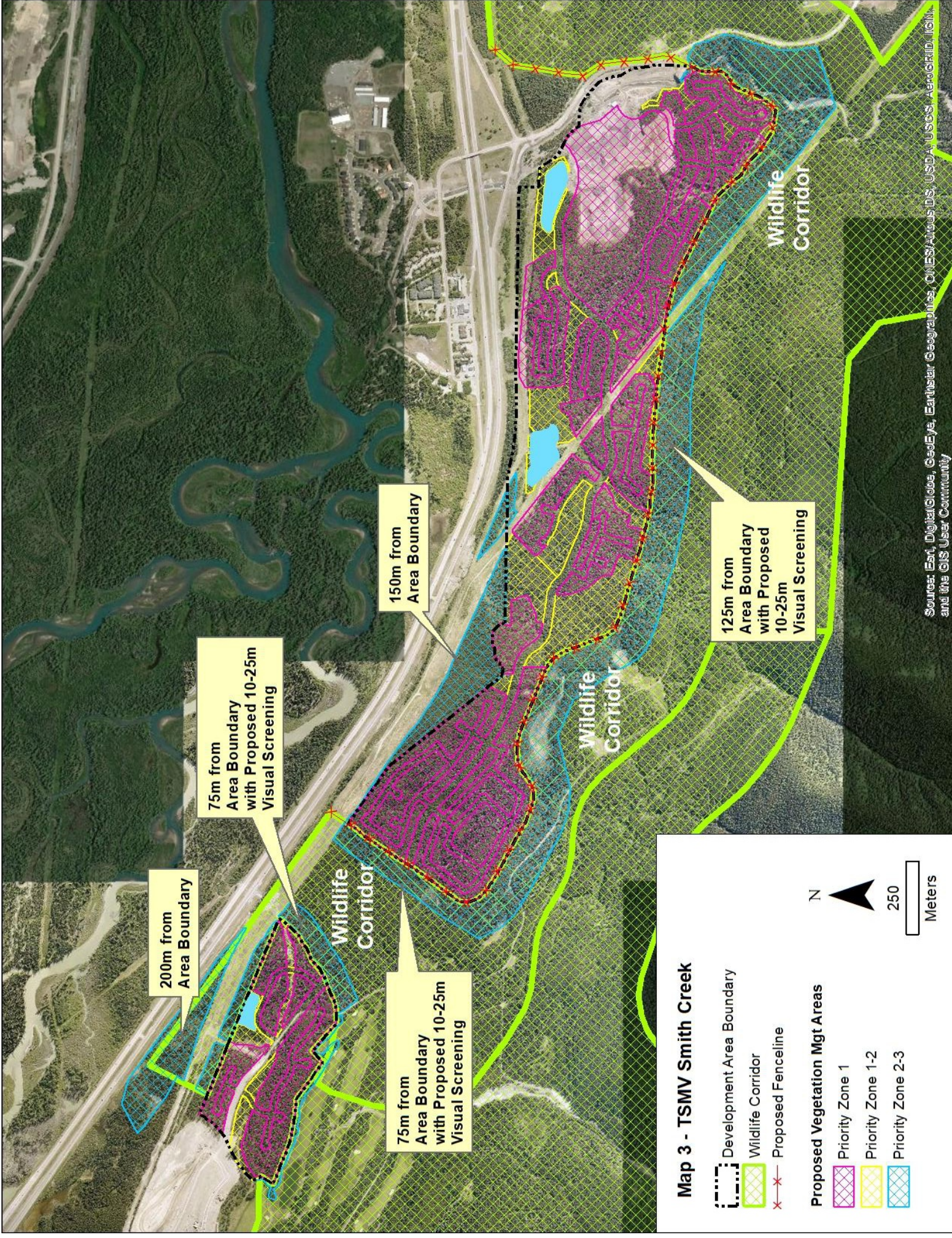


Map 2 - Three Sisters Village







- Development Area Boundary
- Wildlife Corridor
- Proposed Fenceline

- Proposed Vegetation Mgt Areas
 - Priority Zone 1
 - Priority Zone 1-2
 - Priority Zone 2-3





Map 3 - TSMV Smith Creek

-  Development Area Boundary
 -  Wildlife Corridor
 -  Proposed Fenceline
- Proposed Vegetation Mgt Areas**
-  Priority Zone 1
 -  Priority Zone 1-2
 -  Priority Zone 2-3



200m from Area Boundary

75m from Area Boundary with Proposed 10-25m Visual Screening

150m from Area Boundary

125m from Area Boundary with Proposed 10-25m Visual Screening

Sources: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

4 References

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