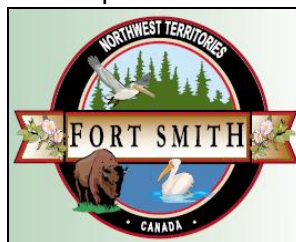


# Town of Fort Smith

## Community FireSmart Protection Plan



Prepared for:



February 2010

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# 1. Introduction

The Fort Smith Community FireSmart Protection Plan was developed to provide practical and operational wildland/urban interface risk mitigation strategies within the Town of Fort Smith municipal boundaries.

The project objectives include:

- Assess wildland/urban interface hazard and risk
- Based on interface hazard and risk, review and make recommendations to mitigate wildfire threat issues using the seven disciplines of wildland/urban interface:
  - Vegetation management
  - Development
  - Public education and communications
  - Legislation
  - Inter-agency cooperation
  - Cross-training
  - Emergency planning
- Develop an action plan identifying roles and responsibilities, human and operational resources, funding needs, and timetables for carrying out the highest priority projects.

The planning process was led by the Fort Smith FireSmart Committee, comprised of the following representatives:

Westly Steed	Committee Chairperson
Richard Olsen	GNWT Environment and Natural Resources
Jim Hood	Town of Fort Smith
Cec Heron	Smith Landing First Nation
Fred Daniels	Smith Landing First Nation
Ray Tourangeau	Salt River First Nation
Chris Heron	NWT Metis Association
Bill Reimer	GNWT Municipal and Community Affairs
Darren Linaker	Town of Fort Smith Fire Department
Jeff Dixon	Parks Canada

The Fort Smith Community FireSmart Protection Plan was developed using standardized FireSmart hazard assessment protocols and mitigative measures were developed based on the seven disciplines of wildland/urban interface approach and current research and knowledge in interface community protection.

An implementation plan is included in this Plan to assist agencies to budget and complete projects based on the priorities identified.

## 2. Planning Area

The planning area includes all lands within the Town of Fort Smith municipal boundaries (Map 1).

The planning area has been divided into six development zones to focus the hazard and risk assessment and mitigative measures:

- Town East
- Town Central
- Town West
- Towering Pines
- Airport
- Bell Rock

Land ownership throughout the planning area is varied and is represented by the following (Map 2):

- Commissioner (GNWT)
- Federal
- Indian Affairs Branch
- Mixed
- Municipal
- Private
- Salt River Indian Reserve





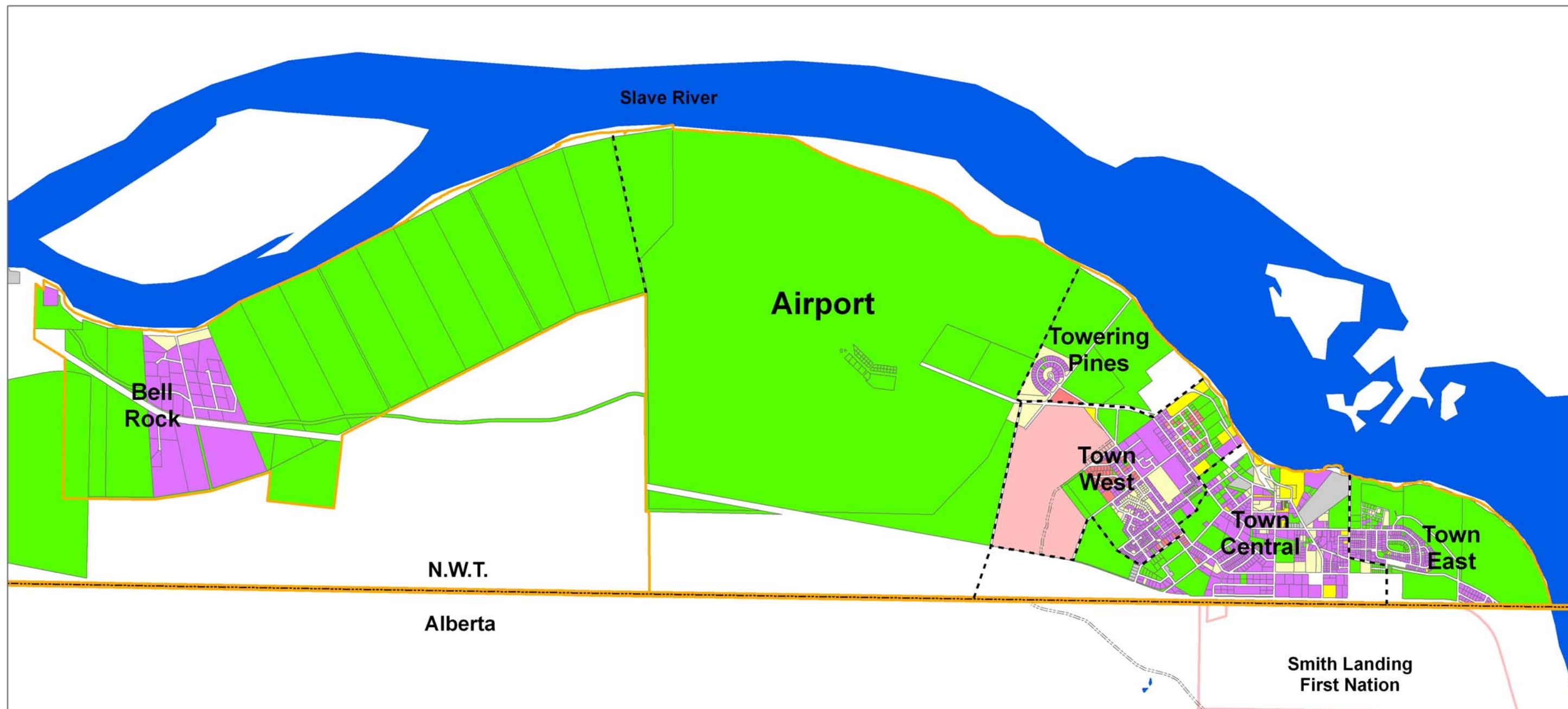
**Map 1 - Planning Area**

-  NWT/Alberta Border
-  Fort Smith Planning Area Boundary
-  Development Zones
-  Smith Landing First Nation










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## Map 2 - Land Status Authority

-  NWT/Alberta Border
-  Fort Smith Planning Area Boundary
-  Development Zones
-  Smith Landing First Nation

-  Commissioner
-  Federal
-  Indian Affairs Branch
-  Mixed
-  Municipal
-  Private
-  Salt River Indian Reserve

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### 3. Hazard & Risk Assessment

The hazard and risk assessment process analyses the risk of wildfire ignition through analysis of fire incidence, the wildfire behavior potential through analysis of fuels and weather data, and the values at risk to wildfire through FireSmart hazard assessments.

#### 3.1 Wildfire Ignition Potential

The assessment of recent fire incidence was completed using historical fire data from GNWT Environment and Natural Resources (ENR), Parks Canada Wood Buffalo National Park, and Alberta Sustainable Resource Development (SRD) for the ten-year period from 1999 to 2008, and personal conversations with local authorities.

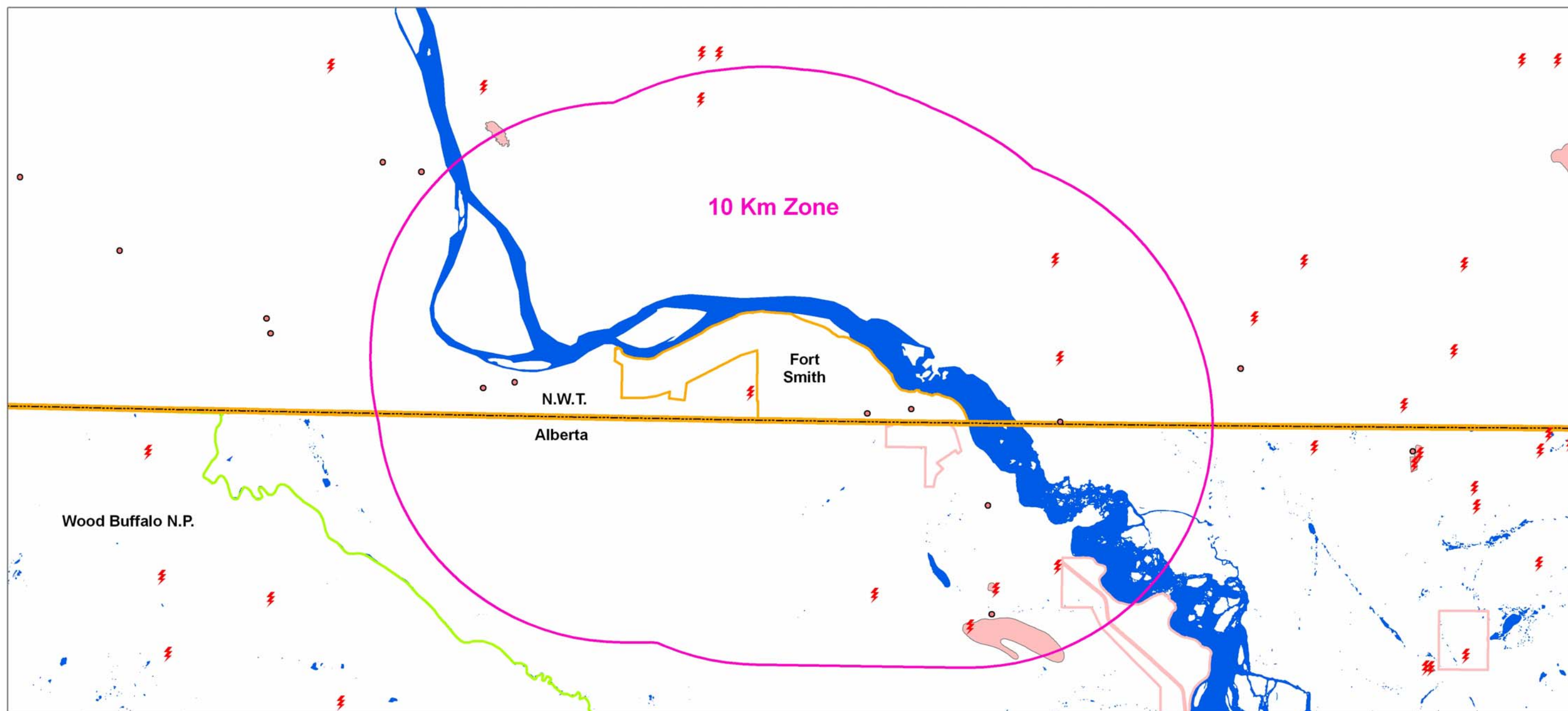
Data within a 10 kilometre radius of the planning area boundary indicates that the risk of wildfire is present. Analysis of the past ten years of fire incidence data (Table 1) indicates that fire agencies responded to 16 wildfires in the planning area. The majority of fires (>56%) are lightning-caused and contained at initial attack at less than 4 hectares in size however in 2005 a 390 hectare fire in Alberta approximately 9 kilometres south of Fort Smith created the need for community protection strategies and tactics for development in Fort Smith and Smith Landing First Nation (Map 3).

**Table 1: 10-Year Fire Incidence by General Cause (1999 – 2008)**

General Cause	Number of Fires	Percent of Total
Lightning	9	56.2
Resident	2	12.5
Other	2	12.5
Recreation	1	6.2
Burning Permit	1	6.2
Incendiary	1	6.2
<b>Totals</b>	<b>16</b>	<b>100.0</b>




While Wood Buffalo National Park is outside the ten kilometer study area, it is important to consider the wildfire history. Fire incidence is high with the main cause being lightning. Large fires occur frequently in the Park with major fires occurring on or over the Park boundaries near Fort Smith over the past several decades.

The Town of Ft. Smith Fire Department reports that the fire department responds to several grass fires annually with the spring season being the most problematic.



**Map 3 - Ten-Year Wildfire Incidence 1999-2008**

-  NWT/Alberta Border
-  Fort Smith Planning Area Boundary
-  Smith Landing First Nation
-  Wood Buffalo N.P. Boundary

-  Human-Caused Wildfire
-  Lightning-Caused Wildfire
-  Wildfire > 4 hectares



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## 3.2 Wildfire Behavior Potential

### 3.2.1 Wildland Fuel Types

Fire Behavior Prediction (FBP) fuel types (Taylor, 1997) were used to analyze the fuel types and fire behavior potential within and adjacent to Fort Smith.

The planning area is characterized with a combination of fuel types including (Map 4):

- Spruce-lichen woodland (C-1)
- Boreal spruce (C-2)
- Mature pine (C-3)
- Deciduous (D-1)
- Cured grass (O1)
- Non-fuel (NF)

Each of these fuel types can present hazard to interface structures based on fuel moisture conditions and time of year, however it is typically the C-2 and C-3 fuel types that present the highest wildland/urban interface hazard.

Primary fuel types in each of the development zones are discussed below. The analysis reveals that the large areas of coniferous fuel types within and adjacent to the planning area presents significant wildland/urban interface hazard.

#### **Town East**

The east and north sides of the zone has heavy C-3 and C-2 fuels which presents wildfire threat to the development perimeter of Carl's Drive and Axe Handle Hill subdivisions. The centre portion of the development area consists of non-fuels and patches of D-1 and cured grass.

#### **Town Central**

The Town Central zone is primarily developed and consists of non-fuels with patches of D-1 and cured grass fuels. There are smaller scattered patches of C-3 and C-1 fuels however wildfire threat is minimal from these areas.

#### **Town West**

The Town West zone has heavy C-3 and C-2 fuels on the west and south sides from Highway 5 and Trout Street to the development perimeter of Frontier Grove, West Village, and Indian Village subdivisions. There are also significant C-3 fuels within the developed areas in West Grove and on the Kaeser and Bevington properties. Fuels within and on the perimeter of this zone present significant risk to development.

#### **Towering Pines**

The Towering Pines zone consists primarily of heavy C-3 fuels throughout the zone with scattered patches of D-1, C-2, and non-fuel. The Towering Pines subdivision is primarily non-fuel with C-3 fuels in the middle of the development and some cured grass areas around the perimeter.

### **Airport**

The Airport zone has heavy C-3 and C-2 fuels on the east, south and north sides and D-1 fuels on the west side. The developed airport area is primarily non-fuel and cured grass and presents minimal risk to airport structures.

### **Bell Rock**

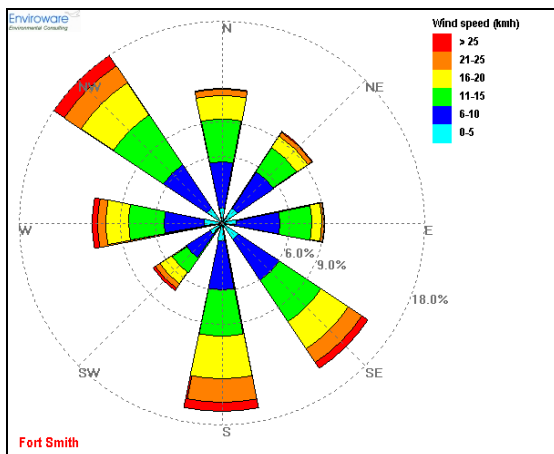
The Bell Rock zone has heavy C-3 and C-2 fuels throughout, including within the Bell Rock Estates subdivision, and scattered patches of D-1 throughout the zone. Fuels within and adjacent to the Bell Rock zone present significant threat to structures in Bell Rock Estates.

## **3.2.2 Fire Weather Analysis**

Sixteen years of historical fire weather from the Fort Smith weather station were used to determine the number of critical burning days and predominant wind directions.

Critical burning days were defined as those with a Fire Weather Index (FWI) greater than 14 or an Initial Spread Index (ISI) greater than 11. Data indicates that from a total of 2443 fire weather days, 29% had an FWI value greater than 14 and 8% had an ISI greater than 11.

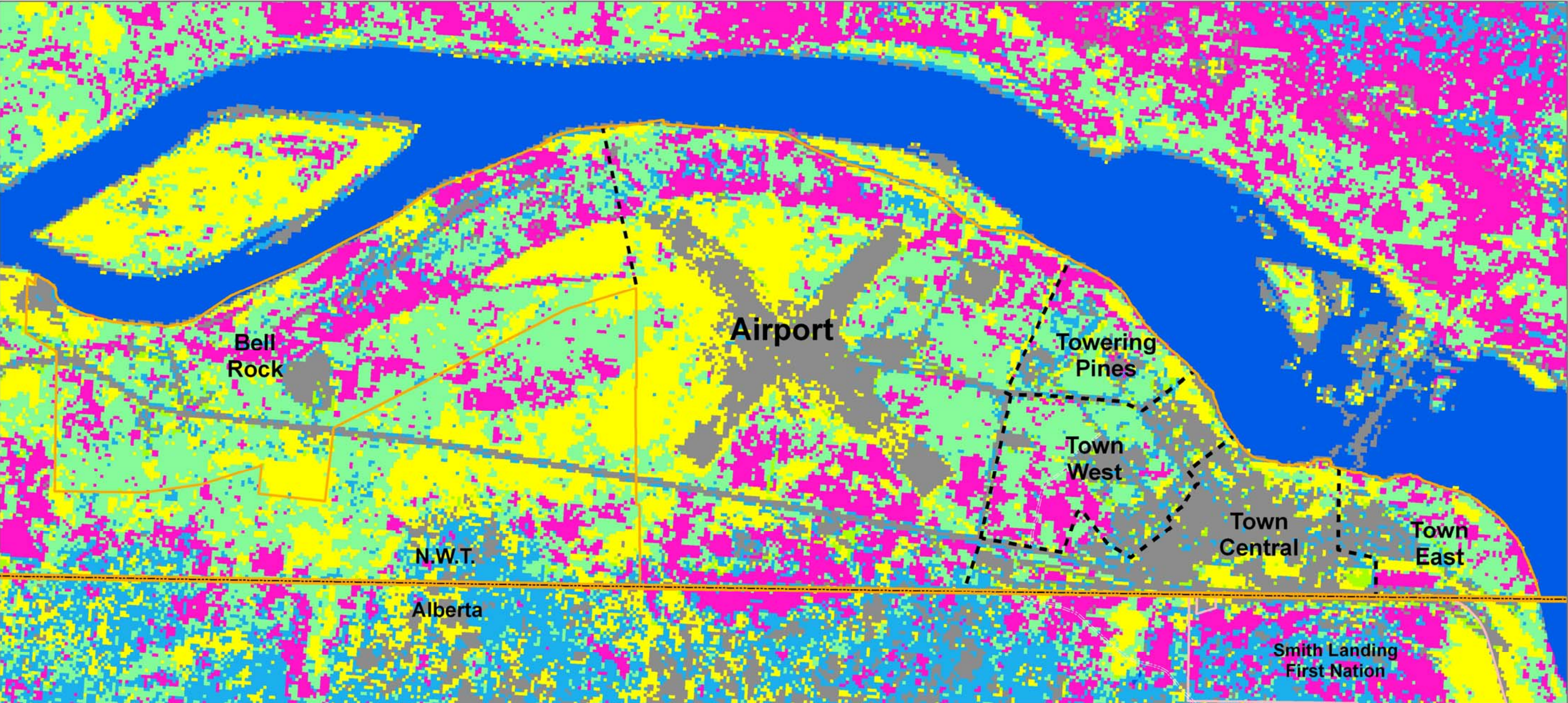
Analysis of wind direction indicates that the predominant wind directions and strongest winds are from the south/southeast and northwest (Figure 1). On critical burning days, the winds are from the S or SE 57% of the time.










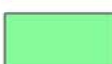


**Figure 1 – Fort Smith Windrose April – October**

Analysis of wildfire fuels and fire weather indicates that the threat of extreme wildfire behavior exists and the highest probability of threat to planning area developments is from the south/southeast and northwest/west quadrants.





**Map 4 - FBP Fuel Types**

- |   |  |  |
|---|--|--|
|  NWT/Alberta Border                |  Spruce-Lichen Woodland (C-1) |  Deciduous (D-1)                |
|  Fort Smith Planning Area Boundary |  Boreal Spruce (C-2)          |  Non-Fuel (NF)/Cured Grass (O1) |
|  Development Zones                 |  Mature Pine (C-3)            |  Water (WA)                     |
|  Smith Landing First Nation        |  |  |



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### 3.3 Values at Risk Assessment

FireSmart Structure/Site hazard assessments (P.I.P. 2003) were conducted on developments and community infrastructure within the planning area (Map 5). The purpose of the assessments was to collect and display hazard rating information in a consistent manner, to quantify the wildland/urban interface hazards within the planning area, and to help set priorities for mitigative options.

#### 3.3.1 Present Development

Development zones within the planning area were assessed for hazard (Table 2) based on the current accepted standards in *FireSmart – Protecting Your Community from Wildfire* (PIP, 2003).

**Table 2: FireSmart Hazard Assessments**

Development Zone	Structure/Site Hazard (0 – 30m)
Town East	High - Extreme
Town Central	Low - Moderate
Town West	High - Extreme
Towering Pines	High - Extreme
Airport	Low
Bell Rock	Extreme

Perimeter developments at the highest risk to wildfire include:

1. Carl's Drive/Axe Handle Hill
2. Frontier Village/Indian Village/SRFN Development
3. Bell Rock Estates
4. Towering Pines Trailer Park

Hazard factor's for each of the development zones is discussed below.

##### 3.3.1(a) Town East

This area includes residential development in Axe Handle Hill and Carl's Drive subdivisions. FireSmart hazard is rated as low to moderate for dwellings in the central portion and high to extreme for perimeter structures along McDougal Rd, Pine Cres., Primrose Lane, and Carl's Drive due to adjacent C-3 and C-2 fuel types and a lack of adequate Zone 1 defensible space around many structures.





### **3.3.1(b) Town Central**

This area includes a mixture of residential, commercial, light industrial, and community infrastructure development. FireSmart hazard is rated as low except for structures with lack of Zone 1 defensible space next to isolated patches of wildland fuels scattered throughout the area or those with combustible wood-shake roofing materials or significant debris accumulations in the yards that are susceptible to airborne firebrand ignition.

### **3.3.1(c) Town West**

This area includes primarily residential development in the West Grove, Frontier Village, Coop Housing, and Indian Village subdivisions.

FireSmart hazard is rated as low to moderate for structures in central developed areas and high to extreme for perimeter structures adjacent to wildland C-3 and C-2 fuel types with inadequate Zone 1 defensible space, combustible roofing, or debris piles in the yard.



### **3.3.1(d) Towering Pines**

This area includes residential development in the Towering Pines trailer park and recreational development at the Queen Elizabeth Park/Campground. FireSmart hazard is rated as moderate on the south and west sides of the Towering Pines trailer park due to the light fuels adjacent and existing fuelbreaks surrounding the development and high on the north side due to the heavier C-3 fuels between the development and the campground.

### 3.3.1(e) Airport

This area includes commercial and infrastructure development at the Fort Smith airport. FireSmart hazard is rated as low to all airport structures due to the non-combustible building materials and significant fuelbreaks around the entire area.



### 3.3.1(f) Bell Rock

Bell Rock Estates includes country-residential development on the north and south side of Hwy 5. FireSmart hazard is high to extreme for the entire development due to the intermix with wildland fuels, lack of defensible space, and structural factors such as exposed decks, combustible siding materials, and combustible materials piles.

Old Bell Rock consists of a rural development in the on the south side of Hwy 5. FireSmart hazard is rated as low to moderate due to the deciduous and grass fuels and the significant clearing around the structures. Cured grass in the spring and fall seasons could present some risk to these structures.





FireSmart hazard assessments were conducted on critical infrastructure facilities within the planning area (Table 3). Most of the facilities are located within the urban development area and have a low or moderate hazard rating. The hospital was rated as high due to the combustible wood-shake roof putting it at risk to airborne firebrand ignition.

**Table 3: Critical Infrastructure FireSmart Hazard Assessments**

<b>Map Key</b>	<b>Development Name</b>	<b>Structure/Site Hazard (0 – 30m)</b>
1	Fort Smith Fire Hall	Low
2	St. Josephs Cathedral	Low
3	Parks Canada/GNWT Admin Bldg	Low
4	NWT Power Corporation Admin & Substation	Low
5	Fort Smith Water Treatment Plan	Low
6	Hospital	High
7	Salt River First Nation Band Office	Low
8	Fort Smith Recreation Centre	Low
9	GNWT ENR Regional Admin Office	Moderate
10	RCMP Station	Low
11	Mission Farm	Low
12	Fort Smith Town Hall	Low
13	Fort Smith Airport	Low
14	Northern Lights Special Care Home	Low
15	Fort Smith Water Tower/Pumping Station	Low
16	NorthWestel Cell Tower	Low
17	Northern Life Museum	Low

### **3.3.2 Future Development**

New residential development is planned and/or occurring in the West Grove subdivision and on the Salt River First Nations block on the west perimeter of town.

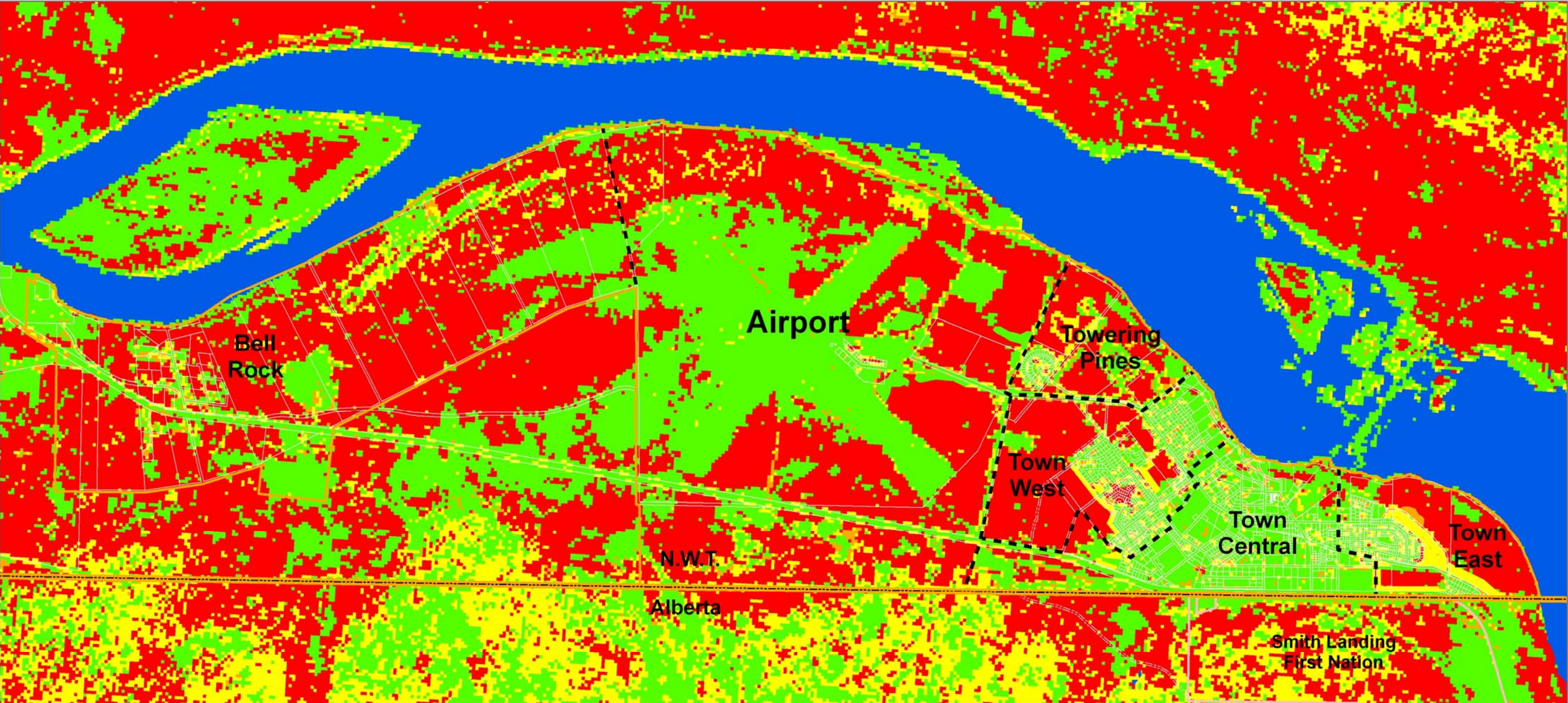
Residential development is currently occurring in the West Grove subdivision area. There are several serviced undeveloped lots available at this time in addition to an undeveloped portion in the northwest corner of the area. The partially built development is situated in C-3 fuels and the town indicates that it may be several years before this area is fully developed based on current building rates. The result is an intermix of wildland fuels and residential development at high to extreme hazard.

New development is proposed on the Salt River First Nations lands in the southwest corner of the Town West zone. The proposed development will include residential and commercial development and is phased over the next several years (Figure 2). The present area is a heavily forested C-2/C-3 fuel type and presents extreme wildfire hazard and risk to present adjacent development and future development within this subdivision.



Figure 2: Salt River First Nation New Development Area





Map 5 - FireSmart Hazard

- NWT/Alberta Border
- Fort Smith Planning Area Boundary
- Development Zones
- Smith Landing First Nation

- Low
- Moderate
- High
- Extreme



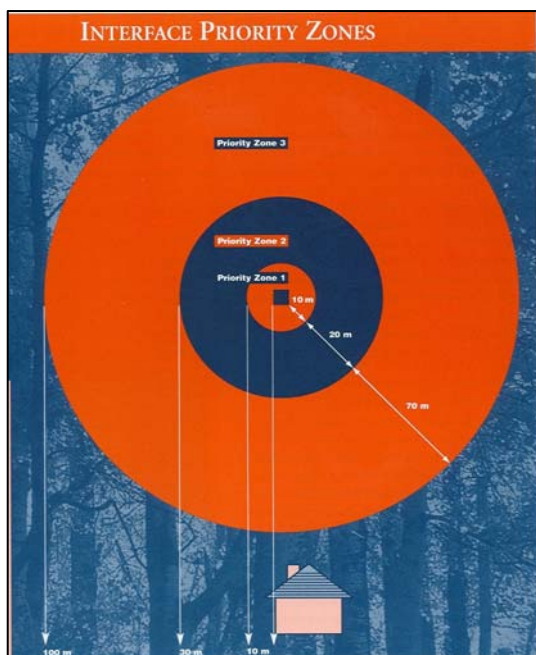
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## 4. Vegetation Management Options

The goal of vegetation management is to create a fuel-reduced buffer between structures and flammable wildland vegetation to reduce the intensity and rate of spread of wildfire approaching or leaving the development. Vegetation management options are proposed at the appropriate scale, based on hazard and risk, to reduce the threat of wildfire to developed areas. While fuel modification projects reduce the threat of wildfire to developments, they do not ensure structure survival under all hazard conditions.



Vegetation management consists of one or any combination of the following options:

- Fuel removal
- Fuel reduction
- Species conversion

Complete descriptions of the methods included in each of the above options are included in “*Fire-Smart Protecting Your Community from Wildfire*” (PIP 2003).

*FireSmart* standards refer to three interface priority zones with vegetation management for interface structures recommended in Zones 1 and 2 at a minimum and in Zone 3 based on hazard and risk.

### 4.1 Existing Vegetation Management

Fuels reduction projects have been completed by the GNWT ENR Department in several locations within the planning area (Map 6) in the form of fuels reduction or woodlot harvesting and the Town of Fort Smith fire department conducts annual spring hazard reduction burns in several areas to reduce cured-grass fuel loads.

**Table 4: Existing Vegetation Management Areas**

Name	Area (ha)	Year	Agency	Comments
Axe Handle Hill/Carls Dr	14.5	2010	Town of Ft. Smith	In progress
Axe Handle Hill Park	5.7	~1996/97	GNWT ENR	Maint required
Hwy 5 East/Primrose Lane	4.3	2008/09	GNWT ENR	Maint required
NWT Power Corp	5.3	2005	Town of Ft. Smith	Maint ongoing
Portage Ave.	0.9	2007/08	GNWT ENR	
Wilderness Road	2.4	2009	GNWT ENR	
GNWT ENR Office	1.9	~2000	GNWT ENR	
Wandering Spirit/Wren	4.3	2002/03	GNWT ENR	Maint required
Woodlots		Ongoing	GNWT ENR	Maint required



Hwy 5 East/Primose Lane Fuels Reduction - 2008



Wilderness Road Fuels Reduction – 2009

Several of the existing areas require maintenance to remove blowdown trees, ground and surface fuel accumulations to ensure the effectiveness of the area as a guard (Table 4).

**Recommendation:** Ensure that all fuel modification projects are inspected on a regular basis and maintained as necessary to ensure effectiveness.

## 4.2 Proposed Vegetation Management

### 4.2.1 Zone 1

Zone 1 vegetation management is the responsibility of property owners and is required throughout the planning area. Residents require public awareness on the need to reduce and maintain surface fuels and combustible material piles near their structures to reduce the threat of wildfire.



FireSmart Zone 1 vegetation management options within 10 metres of the structure include:

- Removal of flammable forest vegetation within 10 metres of structures.
- Removal of all coniferous ladder fuels (limbs) to a minimum height of 2 metres from ground level on residual overstory trees.
- Removal of all dead and down forest vegetation from the surface.
- Increased maintenance to ensure that all combustible needles, leaves, and native grass are removed from on and around structures.
- Establishment and maintenance of a non-combustible surface cover around the structure.
- Removal of all combustible material piles (firewood, lumber, etc) within 10 metres of the structure.

For more information on FireSmart Zone 1 standards refer to *FireSmart – Protecting Your Community from Wildfire* (PIP 2003).

**Recommendation:** Public education and awareness regarding acceptable FireSmart Zone 1 standards are recommended for all residents.



### 4.2.2 Zone 2-3

Zone 2-3 vegetation management is the responsibility of the GNWT on Commissioner Lands, private landowners or the Salt River First Nation on the larger undeveloped deeded parcels of land, or the Town of Fort Smith on municipal lands (Map 2).



Perimeter developments at the highest risk to wildfire include:

1. Carl's Drive/Axe Handle Hill
2. Frontier Village/Indian Village
3. Bell Rock Estates
4. Towering Pines Trailer Park

These areas are recommended as priorities for Zone 2-3 fuel management projects and are divided into several smaller units. Fuels reduction projects have been prioritized into Priority A or B, based on hazard and risk and the need to progressively complete areas (Table 5). The intent is to establish fireguards around the development area perimeters as the first priority with fuels reduction inside the developed areas as second or third priority. Vegetation management has not been proposed in areas along the unstable banks of the Slave River to reduce the risk of further slumping.

Proposed areas are conceptual at this time and will require detailed fuels reduction planning to identify fuels management prescription, unit boundaries, and operational constraints.

**Table 5: Priority Vegetation Management Areas**

Priority	Name	Area (ha)	Type	Land Status Authority
A1	Southeast Perimeter	22.5	Fuel Reduction	Commissioner/AB. SRD
A2	Northwest Perimeter	14.6	Fuel Reduction	Commissioner
A3	Northwest Perimeter	7.5	Fuel Reduction	Salt River First Nation
A4	Southwest Perimeter	5.4	Fuel Reduction	Commissioner
A5	Bell Rock Estates	28.5	Fuel Reduction	Commissioner
A6	Towering Pines	5.2	Fuel Reduction	Municipal
B1	Kaesar/Bevington Lands	7.3	Fuel Reduction	Private
B2	West Grove	2.8	Fuel Reduction	Municipal

#### **A1 – Southeast Perimeter**

The project is on lands administered by the GNWT Commissioner and Alberta Sustainable Resource Development and consists of four new fuels reduction units and maintenance of two existing units. Fuels are primarily C-3 with C-2 fuels in the Hwy 5/Primrose Lane unit.

Full fuels reduction consisting of overstory/understory thinning and ground and ladder fuels removal for a minimum width of 100 metres from development is proposed. Maintenance required in the existing blocks consists of removal of dead and down and minor improvements to overstory spacing and pruning. The Town of Fort Smith is presently conducting fuels reduction (Jan/2010) on the NWT portion of these lands.

#### **A2/A3 – Northwest Perimeter**

This unit is on lands administered by Salt River First Nation and the GNWT Commissioner. It consists of three sub-units, one on the Salt River proposed development block, and two on the west side of Wintergreen Street, north and south of

McDougall Road. Fuel types consist of heavy C-3 and C-2 fuels on the Salt River block and C-3 fuels on the Commissioner lands.

Full fuels reduction is proposed for these units for a minimum width of 100 metres from development edge. Detailed fuel modification prescription planning will need to consider the most recent development plans and timelines for the Salt River block prior to determining actual fuel reduction unit location.

#### **A4 – Southwest Perimeter**

This unit is on lands administered by the GNWT Commissioner. The project consists of new fuels reduction to widen the existing strip of 2002/03 fuels reduction to a minimum width of 100 metres and maintenance of the existing fuel reduced strip. Fuel types consist of moderate to heavy C-2 and C-3 fuels.

Future development of the block to the west of Frontier Village by the Salt River First Nation will reduce the threat of wildfire to development in Frontier Village however final completion of the Salt River block is not scheduled for several years.

Full fuels reduction consisting of overstory/understory thinning and ground and ladder fuels removal is proposed in the new unit and maintenance in the existing blocks consists of removal of dead and down and minor improvements to overstory spacing and pruning.

#### **A5 – Bell Rock Estates**

This unit is on lands administered by the GNWT Commissioner and consists of two fuels reduction units on the west and south sides of Bell Rock Estates, north and south of Hwy 5. Fuels are primarily C-3 with scattered patches of C-2.

Full fuels reduction consisting of overstory/understory thinning and ground and ladder fuels removal for a minimum width of 100 metres on the west and 150 metres on the south is proposed.

#### **A6 – Towering Pines**

This unit is on lands administered by the Town of Fort Smith and consists of fuels reduction around the outside perimeter of the Towering Pines development. Fuels are moderate to light C-3 with heavier C-3 fuels on the north side between the development and the Queen Elizabeth Park and campground. The existing 30 metre wide fireguard and active woodlot harvesting to the northwest provides a good Zone 3 fireguard.

Full fuels reduction consisting of overstory/understory thinning and ground and ladder fuels removal for a minimum width of 100 metres is proposed with a priority on the north side of the development before the south and west sides.

### **B1 – Bevington/Kaeser Properties**

The Bevington and Kaeser properties are two privately-owned blocks of forested land within the developed town area, immediately adjacent to developed lots. Fuel types are primarily moderate to heavy C-3 fuels with patches of scattered C-2 and provide significant wildland fuel to threaten urban development.

Full fuels reduction consisting of overstory/understory thinning and ground and ladder fuels removal for a minimum width of 75 metres surrounding development on McDougal Rd., Wilderness Rd., and Field St. is proposed.

### **B2 – West Grove**

This unit is on lands administered by the Town of Fort Smith and is planned for development in the future however the Town does not anticipate the area will be fully developed for several years. Fuels are primarily C-3 and are located immediately within and adjacent to new homes in the West Grove subdivision.

Full fuels reduction consisting of overstory/understory thinning and ground and ladder fuels removal in the area based on the future development timelines for the area.

**Recommendation:** All stakeholders should implement fuels reduction projects based on the priorities identified in this plan.

### **4.2.3 Zone 3**

It is important to recognize the importance of establishing containment lines outside the community to provide fire managers with the opportunity for burnout/backfire or other wildfire containment options to reduce the threat of landscape-level wildfire from entering into the developed area.

A containment line strategy is recommended along the south and west perimeters of Bell Rock Estates and to the south of the airport where wildland fuel types and ground conditions dictate to the intersection with the fireguard constructed by Alberta during the 2005 fire season (Table 6/Map 6). Proposed fuel removal widths of 40-60 metres are recommended using mechanical mulching.

The existing Towering Pines and 2005 Alberta/Smith Landing containment lines will require regular maintenance to ensure effectiveness.





**Table 6: Existing and Proposed Containment Lines**

Priority	Name	Length (m)	Type	Land Status Authority
C1	Bell Rock	6700	Fuel Removal - Mulch	Commissioner
C2	Airport South	3500	Fuel Removal - Mulch	Commissioner
C3	Towering Pines	1400	Mulch/Mow	Commissioner
C4	Alberta/Smith Landing	4500	Mulch/Mow	AB. SRD Smith Landing FN

**Recommendation:** Establish Zone 3 containment lines on the south and west perimeters of the planning area.

The woodlot harvesting program that is currently being conducted on Commissioner lands is providing landscape-level fuels reduction in various locations throughout the planning area. This program should continue however harvesting debris needs to be piled and burned on a regular basis to reduce fine fuel loading in these blocks.

**Recommendation:** The ongoing woodlot harvesting program should be continued with more frequent disposal of harvesting debris to reduce fine fuel loading.

#### 4.3 Fuel Reduction and Maintenance Costs

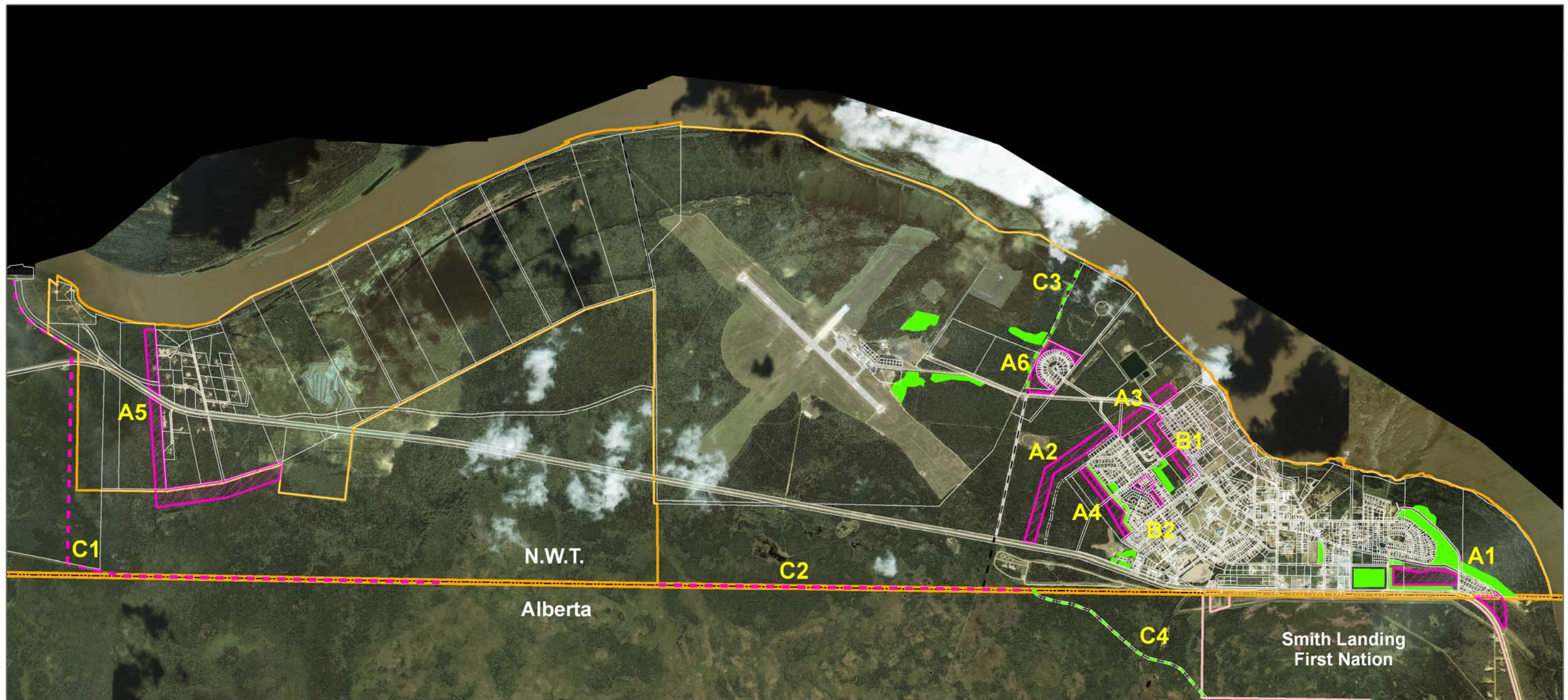
Fuel reduction costs are variable based on fuel type and density, unit size, harvest and debris disposal methods, and time of season.

Based on previous projects completed in the Fort Smith area, an average cost of approximately \$15,000 per hectare is recommended for standard Zone 2-3 fuels reduction projects.

Zone 3 containment lines should be completed and maintained using mechanical equipment. Average costs for mechanical mulcher construction are estimated at \$5000 - \$8000 per hectare and production rates are estimated at .75 – 1.5 ha per machine per 10 hour shift. Costs do not consider mobilization or travel costs to Fort Smith.





Maintenance of existing fuel reduction areas should consider an average cost of \$3000 to \$5000 per hectare.





**Map 6 - Existing and Proposed Fuel Modification**

-  NWT/Alberta Border
-  Fort Smith Planning Area Boundary
-  Development Zones
-  Smith Landing First Nation

-  Existing Fuel Modification Area
-  Proposed Zone 2-3 Fuel Reduction Area
-  Existing Zone 3 Containment Line
-  Proposed Zone 3 Containment Line



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February/2010



## 5. Development Options

Municipalities must incorporate wildfire at the planning stage of the development and ensure that adequate structural and infrastructure options are implemented to minimize the interface hazard. Wildfire must be identified as a risk and incorporated into land use and development planning at the initial stages of any development that is located in the wildland/urban interface.

### 5.1 Structural Options

Structural characteristics that contribute to a structure's ability to withstand wildfire ignition include type of roofing and siding material, structure siting with respect to steep forested slopes, and proper construction and maintenance of eaves, vents, and openings that can accumulate flammable debris and allow wildfire to gain entry to the structure. Structure design and exterior structural materials may be controlled through municipal development bylaws and regulation while others such as combustible woodpiles locations are best dealt with through public education and awareness.



The most common roofing material in the planning area is asphalt shingle. Combustible wood-shake roofing materials are uncommon however they are present on structures in the planning area including the Fort Smith Health Centre, Kaesers Stores and Bank of Montreal and a few homes.

The most common siding materials are combustible vinyl and wood with a smaller amount of non-combustible stucco and metal.

Exposed combustible decks and porches are present on many of the dwellings in the planning area.

**Recommendation:** Revise the Town of Fort Smith Zoning Bylaw 794 to regulate the use of combustible roofing and siding materials based on wildfire hazard and risk (Refer to Section 7 - Legislation).



## 5.2 Infrastructure Options

Infrastructure options include provision of adequate access standards to ensure quick and safe ingress and egress for residents and emergency responders during a wildfire, adequate and accessible water supply for structure protection and suppression, and utility installation standards that do not increase risk to emergency responders during a wildfire emergency.

### 5.2.1 Access

Access road standards throughout the planning area are mainly adequate for an interface community. Most access roads are paved loop-road design and cul-de-sacs have adequate turnaround dimensions for fire apparatus.

Access driveways to several dwellings in Bell Rock Estates are narrow with inadequate turnaround room for fire apparatus making them unsafe for response personnel during an interface fire.

**Recommendation:** Ensure that all new main and driveway access roads meet FireSmart standards (PIP, 2003) and are adequate for fire suppression responders and apparatus.

### 5.2.2 Water Supply

The Fort Smith town centre and airport areas are provided with municipal hydrant supply with adequate volume and pressure for interface fire incidents.

Bell Rock Estates has no dedicated fire suppression water supply and presently depends on mobile water tender supply.

Development of borrow pits has been discussed in the Fort Smith Community Interface Protection Guide (SRD, 2005) and the Town of Fort Smith Community Protection Plan (Golder, 2006) and both recognize the difficulty and expense of trying to establish water holding pits in the sandy soils of the area. Consideration of high-volume pumps and hose may be a more practical and economical solution to provide structure protection water supply to the Bell Rock Estates development.

**Recommendation:** The Town of Fort Smith should develop a water supply plan for use of high-volume pumps and hose to provide structure protection water supply from the Slave River to the Bell Rock Estates development during an interface fire.

### 5.2.3 Franchised Utilities

Franchised utilities affected by an interface fire include electrical power and gas. Proper installation and maintenance of these services can minimize the risk to residents and emergency services personnel.



#### Electrical Power

Power distribution and residential service is provided through above-ground transmission and distribution lines. Overhead distribution and service lines in the area are at risk to hazard trees which could result in wildfire ignition or downed lines during a wildfire resulting in a risk to emergency responders and a loss of power, and critical services, during the emergency.

**Recommendation:** Communicate with the Northwest Territories Power Corporation to establish a powerline tree-freeing program to reduce the threat of wildfire ignition from downed powerlines.

#### Gas

Gas distribution is provided by heating oil or propane. Some of the propane tanks in Bell Rock Estates do not have adequate defensible space from wildland fuels, creating a safety hazard for residents and responders during an interface fire.



**Recommendation:** Revise the Town of Fort Smith Zoning Bylaw 794 to regulate FireSmart defensible space standards around propane tanks and educate the public on the these standards and their importance to public and responder safety.

## 6. Education and Communication Options

Education and communication is a large part of the solution to success. Residents, business owners, developers, municipal administration and elected officials all need to be aware of the issues related to *FireSmart* development and the solutions to minimizing the risk and need to become a partner in implementation of the solutions in their communities. If stakeholders understand the issues relating to wildland/urban interface hazard they will be more likely to take action on their own property or to support actions taken by the Town of Fort Smith.

### Key Messages

Hazard assessments identified the need for the following key messages to target audiences in the planning area.

#### **FireSmart Hazard Reduction – It All Starts at Home**

Residents and business owners require education and awareness on managing hazard and risk on their own properties including:

- Zone 1 fuels management – trees and grasses
- Structure and site maintenance – vegetation, combustible materials piles, vegetation debris management (needles/leaves)
- Propane tank defensible space

#### **FireSmart Community Protection – It's a Team Effort**

Hazard reduction needs to occur beyond the yard:

- Zone 2 and 3 vegetation management – fuels reduction or removal, fire department spring hazard reduction burning
- Powerline tree-freeing

#### **Wildfire – Be Prepared**

Stakeholders need to be aware of the steps to take to ensure theirs and others safety during a wildland/urban interface fire.

- Evacuation planning
- Municipal wildfire pre-planning

**Recommendation:** Prepare and provide *FireSmart* information at least twice per year to all stakeholders. Priority issues include:

- Zone 1, 2, and 3 fuels management.
- FireSmart structure and site maintenance focusing on annual maintenance items. A FireSmart Spring Cleanup newsletter is suggested for this purpose.
- Emergency planning including structure and site preparation for wildfire impingement and evacuation planning.



## 7. Legislation Options

Legislating *FireSmart* requirements can assist municipalities to achieve their FireSmart objectives. The Town of Fort Smith uses the Fort Smith General Plan (Town of Ft Smith, 2008) and the Fort Smith Zoning Bylaw (Town of Ft Smith, 2008) to control land use and development within the planning area.

### 7.1 Town of Fort Smith General Plan

The purpose of the General Plan is to describe the manner in which development, or redevelopment projects may be best carried out to contribute to the economy, character, and future of the Town of Fort Smith. The General Plan:

- provides guidelines to Council and administration for the consistent review of subdivision and development applications;
- establishes a strategy for future development that takes growth and the effect on existing municipal reserves into account;
- includes proposals for the financing of public development projects; and
- identifies objectives to be accomplished in the Zoning bylaw.

The General Plan recognizes the threat of wildfire to community development and offers objectives, policies, and strategies and guidelines to manage the threat.

Objective UR(c), within Section 3.9 Future Urban Use, identifies the need to reduce the risk to buildings and other infrastructure from forest fires by managing undeveloped areas within the Town boundaries and Policy UR5 states that fuel breaks may be constructed within the Future Urban Use area to act as a buffer to fire spread so that fires burning into them can be more readily controlled. The strategies and guidelines to accomplish this states that Council shall consider developing a management plan for forested areas in the community in cooperation with relevant government agencies and community groups to address the management of timber, wildlife habitat, and wildfire risk.

Objective E(b), within Section 3.12 Landscaping and Environmental Protection, identifies the need to maintain natural stands of trees throughout the community as a feature of Fort Smith while providing protection from forest fires and Policy E6 states that a defensible space of treated forest fuels shall be established surrounding all buildings and infrastructure where a forest fire hazard is identified as part of a Community Forest Management Plan.

## 7.2 Town of Fort Smith Zoning Bylaw

The purpose of the Zoning bylaw is to regulate the use and development of land and buildings within the Town of Fort Smith in a balanced and responsible manner pursuant to the N.W.T. Planning Act and applicable General Plan. It divides the Town of Fort Smith into zones and establishes subdivision design and development standards for each zone.

It is within the Zoning bylaw that specific FireSmart development regulation can be achieved with respect to exterior structural materials and design, infrastructure and vegetation management.

The current Zoning bylaw does not regulate FireSmart standards in developments, including controls on combustible roofing and siding materials. The following recommendations are offered to assist with future revisions to the Town of Fort Smith Zoning bylaw.

**Recommendation:** Revise the Fort Smith Zoning bylaw to include the following:

All roofing materials on new, replacement, or retro-fitted residential, commercial, or accessory buildings shall have a minimum Class C U.L.C. fire rating or as determined by the Development Authority based on wildland/urban interface hazard.

All siding materials on new, replacement, or retro-fitted residential, commercial, or accessory buildings within 30 metres of high or extreme hazard combustible wildland fuels and as determined by the Development Authority shall be fire-resistant material including, but not limited to, stucco, metal, brick, cement shingles, concrete block, poured concrete, rock, or fibre-cement siding extending from ground level to roofline.

All new dwellings, accessory buildings, and commercial buildings with exposed undersides and/or raised decks and porches less than 2 metres from ground level shall be sheathed from the floor level to the ground level with fire-resistant material, to prohibit the entry of sparks and embers under the structure.

All new dwellings, accessory buildings, and commercial buildings shall establish and maintain FireSmart defensible space for a minimum of 10 metres or to lot boundary.

All above-ground propane tanks greater than or equal to 80 U.S. gallons (420 lbs) shall have a minimum of 3 metres clearance from combustible vegetation and materials.

## 8. Inter-Agency Cooperation and Cross-Training Options

Interagency cooperation and cross-training between all stakeholders is necessary to ensure cooperative and effective implementation of wildland/urban interface mitigation options and to coordinate an effective response to a wildland/urban interface fire.

Interagency stakeholders within the planning area include:

- Town of Fort Smith Fire Department
- GNWT Environment and Natural Resources (ENR)
- GNWT Municipal and Community Affairs (MACA)
- Parks Canada – Wood Buffalo National Park

Cross-training for wildland/urban interface response personnel should include wildland fire, wildland/urban interface fire, and incident command system training courses. Formalized structural fire training should only be provided to fire department members although fire department orientation sessions could be provided to wildland agency members to familiarize them with structural terminology and procedures.

The following cross-training courses are available.

### **Wildland Fire**

- Wildland Firefighter – NFPA 1051 Level I
- Wildfire Orientation

### **Wildland/Urban Interface Fire**

- Structure and Site Preparation Workshop (S-115)
- Fire Operations in the Wildland/Urban Interface (S-215)

### **Incident Command System**

- ICS Orientation (I-100)
- Basic ICS (I-200)
- Intermediate ICS (I-300)
- Advanced ICS (I-400)

**Recommendation:** Town of Fort Smith fire department, GNWT MACA & ENR, and Parks Canada should partner on cross-training initiatives to ensure emergency responders are cross-trained to the following minimum standards:

- Wildland Firefighter (NFPA 1051 Level I)
- Structure and Site Preparation Workshop (S-115)
- Fire Operations in the Wildland/Urban Interface (S-215)
- Incident Command System (I-100 to I-400) as applicable



## 9. Emergency Planning Options

Emergency preparedness is an important part of any disaster planning. The need for organization, clear chain of command, and an understanding of job responsibilities during an interface fire are of paramount importance.

A review of the Town of Fort Smith Emergency Response Plan (TOFS, 2009) was conducted. The Plan outlines the plan objectives, composition and responsibilities of the Emergency Response Advisory, location of the Municipal EOC, and emergency implementation and termination protocols and procedures. The Plan is a general all-hazards document and does not deal with specific procedures to be followed during a wildland/urban interface incident.

At present the Town does not have a wildfire pre-plan to provide emergency responders with tactical information with respect to values at risk and operational strategies and tactics to minimize losses during a wildland/urban interface fire. A suggested outline is as follows:

- Planning Area Jurisdictional Authority
- Values at risk (life, structures, infrastructure)
- Fire operations plan (strategies/tactics, water sources, equipment, communications plan)

**Recommendation:** Develop a Community Wildfire Pre-Plan for the Town of Fort Smith to provide greater operational detail to emergency responders during a wildland/urban interface incident.

The Town of Fort Smith has not been involved in a tactical wildland/urban interface incident deployment. A wildfire exercise may assist the Town and their partners with future wildfire planning and response protocols.

**Recommendation:** Conduct a wildland/urban interface emergency exercise to train local emergency responders from Town of Fort Smith, GNWT MACA & ENR, and Parks Canada, test the pre-plan for operational effectiveness, and educate residents of the issues and impacts related to interface fire incidents.

## 10. Implementation Plan

The goal of the implementation plan is to identify the responsible stakeholders for each of the recommendations and set timelines for commencement and completion based on priorities and funding availability.

### 10.1 Implementation Plan – Vegetation Management

Issue	Recommendation	Responsible Agency	Timeline
<b>Zone 1</b>	1. Public education and awareness regarding acceptable FireSmart Zone 1 standards is recommended for all residents.	Town of Fort Smith	2010
<b>Zone 2-3</b>	2. All stakeholders should implement fuels reduction projects based on the priorities identified in this plan.	Town of Fort Smith GNWT ENR Salt River First Nation Deeded landowners	Completion by 2015 based on funding available
<b>Zone 3</b>	3. Establish Zone 3 containment lines on the south and west perimeters of the planning area and internal containment lines north and south of the airport.  4. The ongoing woodlot harvesting program should be continued with more frequent disposal of harvesting debris to reduce fine fuel loading.	GNWT ENR  GNWT ENR	Completion by 2015  Ongoing
<b>Maintenance</b>	5. Ensure that all fuel modification projects are inspected on a regular basis and maintained as necessary to ensure effectiveness.	Town of Fort Smith GNWT ENR Salt River First Nation Deeded landowners	2010 commencement with ongoing monitoring

## 10.2 Implementation Plan – Development

Issue	Recommendation	Responsible Agency	Timeline
<b>Exterior Structure Materials</b>	1. Revise the Town of Fort Smith Zoning Bylaw 794 to regulate the use of combustible roofing and siding materials based on wildfire hazard and risk (Refer to Section 7 - Legislation).	Town of Fort Smith	2010
<b>Access Standards</b>	2. Ensure that all new main and driveway access roads meet FireSmart standards (PIP, 2003) and are adequate for fire suppression responders and apparatus.	Town of Fort Smith	2010
<b>Water Supply</b>	3. The Town of Fort Smith should develop a water supply plan for use of high-volume pumps and hose to provide structure protection water supply from the Slave River to the Bell Rock Estates development during an interface fire (see Emergency Planning Recommendation 1).	Town of Fort Smith GNWT ENR	2010
<b>Propane Tanks</b>	4. Revise the Town of Fort Smith Zoning Bylaw 794 to regulate FireSmart defensible space standards around propane tanks and educate the public on the these standards and their importance to public and responder safety (Refer to Section 7 – Legislation).	Town of Fort Smith	2010
<b>Overhead Powerline Right-of-Ways</b>	5. Communicate with the Northwest Territories Power Corporation to establish a powerline tree-freeing program to reduce the threat of wildfire ignition from downed powerlines.	Town of Fort Smith GNWT ENR NWT Power Corp.	2010

## 10.3 Implementation Plan – Public Education

Issue	Recommendation	Responsible Agency	Timeline
<b>Public Awareness Priorities</b>	1. Prepare and provide <i>FireSmart</i> information at least twice per year to all stakeholders. Priority issues include: <ul style="list-style-type: none"> <li>▪ Zone 1, 2, and 3 fuels management.</li> <li>▪ FireSmart structure and site maintenance focusing on annual maintenance items. A FireSmart Spring Cleanup newsletter is suggested for this purpose.</li> <li>▪ Emergency planning including structure and site preparation for wildfire impingement and evacuation planning</li> </ul>	Town of Fort Smith	2010 - ongoing



#### 10.4 Implementation Plan - Legislation

Issue	Recommendation	Responsible Agency	Timeline
<b>Town of Fort Smith Zoning Bylaw</b>	1. Revise the Fort Smith Zoning bylaw to include regulation relating to the following: <ul style="list-style-type: none"> <li>▪ Roofing and siding materials</li> <li>▪ Sheathing requirements</li> <li>▪ Defensible space requirements</li> <li>▪ Propane tank clearances</li> </ul>	Town of Fort Smith	2010

#### 10.5 Implementation Plan – Interagency Cooperation & Cross-Training

Issue	Recommendation	Responsible Agency	Timeline
<b>Cross-Training</b>	1. Town of Fort Smith fire department, GNWT MACA & ENR, and Parks Canada should partner on cross-training initiatives to ensure emergency responders are cross-trained to the following minimum standards: <ul style="list-style-type: none"> <li>○ Wildland Firefighter (NFPA 1051 Level I)</li> <li>○ Structure and Site Preparation Workshop (S-115)</li> <li>○ Fire Operations in the Wildland/Urban Interface (S-215)</li> <li>○ Incident Command System (I-100 to I-400) as applicable</li> </ul>	Town of Fort Smith GNWT MACA GNWT ENR Parks Canada	2010 - ongoing

#### 10.6 Implementation Plan – Emergency Planning

Issue	Recommendation	Responsible Agency	Timeline
<b>Community Wildfire Pre- Planning</b>	1. Develop a Community Wildfire Pre-Plan for the Town of Fort Smith to provide greater operational detail to emergency responders during a wildland/urban interface incident.	Town of Fort Smith GNWT MACA GNWT ENR	2011
<b>Emergency Exercise</b>	2. Conduct a wildland/urban interface emergency exercise to train local emergency responders from Town of Fort Smith, GNWT MACA & ENR, and Parks Canada, test the pre-plan for operational effectiveness, and educate residents of the issues and impacts related to interface fire incidents.	Town of Fort Smith GNWT MACA GNWT ENR Parks Canada	2012

## 11. References

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