



**City of Belleville**  
**FIRE MASTER PLAN**  
January 25, 2024

**Presented to:**



**Presented by:**

Behr Integrated Solutions Inc.  
Unit 4, 545 Trillium Drive  
Kitchener ON N2R 1J4  
[www.behrintegrated.com](http://www.behrintegrated.com)





## **PREFACE**

This document serves as the City of Belleville’s Fire Master Plan. The primary motivation for developing this document is to assist the City and specifically Belleville Fire and Emergency Services in establishing a long-term strategy based on community risk, safety, corporate priorities, and city council approved budget allocations. This document will be used as a tool to evaluate and forecast immediate and future emergency service needs of the community.

## **ACKNOWLEDGEMENTS**

Behr would like to specifically acknowledge the leadership, diligence and continuous improvement focus of Fire Chief, Dan Smith. While there are some challenges for the city and emergency services, Chief Smith remains positive in his efforts to enhance the department and public safety for the community and its citizens. The City of Belleville Fire and Emergency Services leadership and firefighters are dedicated and engaged in all facets of their community. Their pride in the department and their service is clear.

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## ACRONYMS

Acronym	Definition
AHJ	Authority Having Jurisdiction
BFES	Belleville Fire and Emergency Services
CLAC	Christian Labour Association of Canada
CRA	Community Risk Assessment
DG	Dangerous Goods
EMS	Emergency Medical Services
ERF	Effective Response Force
FF	Firefighter
FMP	Fire Master Plan
FPPA	Fire Protection and Prevention Act
FT	Full-Time
FUS	Fire Underwriters Survey
HIRA	Hazard Identification and Risk Assessment
HR	Human Resources
IAP	Incident Action Planning
ICS	Incident Command System
II	Two
KPA	Kilopascals
LPM	Litres Per Minute
MVC	Motor Vehicle Collisions
NFPA	National Fire Protection Association
OBC	Ontario Building Code
OFM	Ontario Fire Marshal
PPE	Personal Protective Equipment
SCBA	Self-Contained Breathing Apparatus
SOG	Standard Operating Guidelines
SOP	Standard Operating Procedures
ULC	Underwriters Laboratories of Canada



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## EXECUTIVE SUMMARY

### Introduction

Today's fire and emergency services are continually being challenged by budget constraints, rising call volumes, and increasing and unusual risks against a backdrop of expectations to do more with less. The demand for emergency response and emergency management services has expanded, causing the role to shift and for services to diversify. Failing to realize and address these challenges could leave both the community and its responders vulnerable.

Effective management of an emergency services department requires a clear understanding of risk and the ability to provide an appropriate response to mitigate the risks. Contemporary fire, rescue and emergency services have evolved into a critical component of a community's social safety net. Whereas early fire departments were established specifically to combat structure fires that, at the time, were often devastating. Today's fire departments are also called upon to respond to medical emergencies, various rescues, motor vehicle incidents, dangerous goods releases, wildland fires and natural disasters. As a result, fire departments must be resourced and equipped to provide these services safely, efficiently, effectively, and competently.

The goal of developing this project is to conduct a comprehensive Community Risk Assessment (CRA) leading to the development of a Fire Master Plan (FMP). The objective of the Fire Master Plan is to conduct an in-depth review of the City of Belleville's fire and emergency services including, but not limited to, station location, performance, and the current response capabilities to mitigate risks identified in the CRA. The FMP will assist in conveying information to the public, staff, and City council about what to expect in the City's approach to fire and emergency service planning and service delivery, while highlighting opportunities for improved effectiveness, efficiencies, and public and responder safety.

While risks are the basis for triggering response decisions, our analysis has also investigated the needs of the community and will provide a point of reference upon which future decisions and priorities can be evaluated and implemented. This included identifying priorities, challenges, and opportunities for the improvement of the delivery of emergency services to the community, businesses, and overall public safety. This CRA and FMP has considered applicable legislation, industry-leading practices, and standards, along with current and anticipated risks to provide unbiased analysis and evidence-based recommendations.

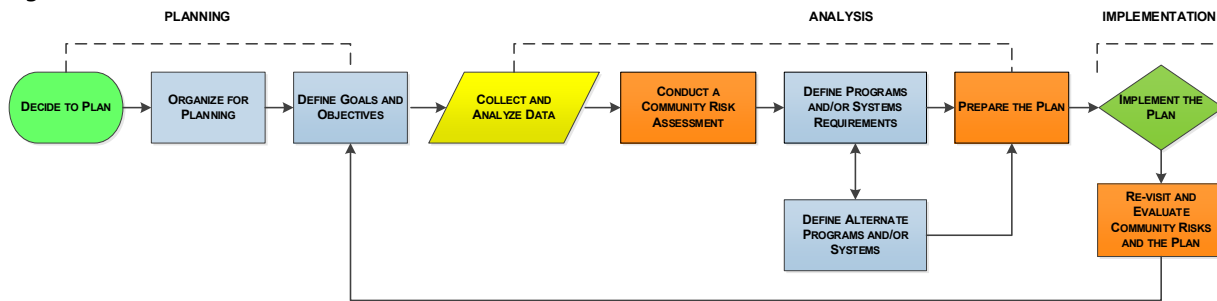
Ultimately the goal of this project is to identify the needs of the community by providing a point of reference, for the next 5 - 10 years, upon which future decisions and priorities can be evaluated and implemented by identifying priorities, risks, challenges, and opportunities for the improvement of the delivery of emergency services to the community, businesses and public safety while considering municipal goals, fiscal realities, and other competing demands.

## Fire Master Plan Process

The following diagram illustrates the process used to complete this FMP. The FMP is sometimes referred to as a ‘road map’ to the future and used as a guiding document for current and future department leaders and decision makers.

As described in the ‘implementation’ phase, it is highly recommended that this plan be reviewed and evaluated, at minimum, on an annual basis or when there are unusual changes in risk, response demands, population and residential or industrial development activity. When reasonably practicable, we also recommend a third-party update of the FMP at the five-year mark to apply an unbiased review into the operation and provide further credibility to the master plan process.

Figure 1: Fire Master Plan Process



## Consultation and Comparative Analysis

### Community and Fire Station Tour

The community and station tour focused on the overall footprint, topography, transportation infrastructure of the community and the various response zones. Touring the stations provided an opportunity to conduct a general condition and operational functionality assessment. This tour also provided the opportunity to meet with various BFES staff and discuss their respective interests regarding the FMP development.

### Fire Master Plan Workshop

This interactive workshop engaged the labour union leaders and other representatives of the Belleville Fire & Emergency Services regarding the current state and future advancement. The workshop was a precursor to the development of the Fire Master Plan.

The core themes that emerged from the workshop included an optimistic, although guarded view, toward building a more cohesive team with a vision of working together. There was considerable positive feedback regarding the opportunity to obtain clarity on the fire master plan process.

The group discussion revealed that there is considerable alignment and consensus amongst the Belleville Fire and Emergency Services members regarding the need for change, however the respective collective bargaining agreements, separate response zones and current



relationship between the volunteer and career members are barriers that may prevent increased interoperability and the opportunity to better serve the community through a fully integrated fire service.

### **Targeted Interviews**

Targeted interviews are part of the data and information collection process. The participants listed in the following table were asked questions related to their areas of purview and expertise. An interview guide was used to conduct the interviews. The interview itself was used to promote an open discussion about the community, risks, general concerns related to the community and municipal operations.

### **Online Firefighter Survey**

To obtain balanced input, we also employed an online firefighter survey. Our survey methodology offers several unique benefits. First, it offers an opportunity to gather opinions from an entire group as opposed to a limited sample of opinions from a select few. The online survey also offers an extremely flexible approach to the collection of data as respondents can complete the survey questions when it is convenient for them. Additionally, the anonymity of participants is easy to control and therefore may yield more candid and valid responses. Finally, surveys are also extremely time and cost-efficient methods to engage large groups while capturing extensive data.

### **Municipal Comparative Analysis**

An industry peer comparative analysis of BFES was conducted as a method of benchmarking the performance of departments to similar municipalities. These benchmarks include budgets, performance, effectiveness, and efficiencies. Although fire and emergency services have the same goal of protecting life and property, each community has its unique features in how to accomplish their goals. Our main criteria for the comparative analysis are indicators of effectiveness and efficiencies amongst the communities for risk and mitigation.

## **Community and Risk Overview**

The City of Belleville is located on the north shore of the Bay of Quinte (northern Lake Ontario). The closest urban centres are Kingston Ontario located 83 km to the east, and Toronto, Ontario located 189 km to the west. It is also conveniently located 126 km east of the US/Canada Thousand Islands Bridge border crossing.

The city has a land-based area of 247.15 km<sup>2</sup>, with a population density of 222.8 per km<sup>2</sup>.<sup>1</sup> The land use area is a diverse mix of rural and urban use, classified as residential, with a substantial industrial area to the north of the city centre, as well as to the southeast along the lake. The industrial classifications are divided into seven main sectors: industrial, waterfront industrial, industrial mall, industrial/commercial, rural industrial, waste disposal and service industrial.

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<sup>1</sup> Statistics Canada Population Census, 2021.



Outside of the core of the city - to the north and east – the area is designated as agricultural and rural residential<sup>2</sup>. The Bay of Quinte and Moira River watersheds are areas of natural and scientific interest and provide an abundance of wetlands, woodlands, valley, and agricultural lands, as well as fish and wildlife habitat<sup>3</sup>.

Every municipality has unique challenges and characteristics contributing to the overall risk profile of the community. Specifically, for the CRA this project has addressed the following nine mandatory profiles:

- 1) Geographic profile
- 2) Building stock profile
- 3) Critical infrastructure profile
- 4) Demographic profile
- 5) Hazard profile
- 6) Public safety response profile
- 7) Community services profile
- 8) Economic profile
- 9) Past loss and event history profile

The evaluation of fire or rescue risks considers both the probability and consequence of emergency event types. The probability of an event is quantified by analyzing historical, current, and projected data. The consequence of the event type or risk is based on an informed assessment of the potential impact on a community should the event occur.

The City's Hazard Identification and Risk Assessment was reviewed and updated as recently as February of 2023 indicating that Belleville has complied with its legislative requirements. As a component of the risk assessment and risk analysis process, the top risks in Belleville were identified. The HIRA assigned likelihood and consequence levels to a list of hazards based on the potential for impacts to people, property, and the environment. As a result of this analysis, the top hazards in the city include the following:

- Flooding
- Windstorm/Tornado
- Ice Storm
- Snowstorm
- Pandemic

During our consultation process and analysis regarding the response data, the following risk factors were identified:

- Community growth and anticipated changes to building stock in city and county response areas.

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<sup>2</sup> As retrieved from <https://opendata-bellevillegis.hub.arcgis.com/>

<sup>3</sup> City of Belleville Official Plan 2022.





- Group C multi unit residential units and Group F industrial units represent higher risks
- High number of vulnerable occupancies including a hospital and several long-term care residences.
- Multiple road transportation corridors
- Major rail transport system
- Dangerous goods release
- Limitations of the Paid-On-Call volunteer fire suppression staffing model
- Lack of interoperability rural and urban responses areas

## Department Overview

In 1998 the City of Belleville amalgamated with the surrounding Township of Thurlow as part of the Ontario-wide municipal restructuring. This resulted in the amalgamation of the Thurlow Volunteer Fire Department with the Belleville Fire Department.

The present day BFES is a composite (career and volunteer staff) fire department operating out of five fire stations. The two urban area stations are staffed with career firefighters and the three rural area stations being staffed with volunteer firefighters. Except for management and administrative functions, the career and volunteer components of BFES operate independently. This issue is considered as an interoperable service delivery shortfall and is discussed further in this FMP.

The two central fire stations and are responsible for fire and emergency services to the identified urban areas of the City of Belleville. The three rural volunteer fire stations respond on an as-available basis for fire and emergency services for the identified rural areas within the City of Belleville. BFES currently consists of the following full-time and volunteer staff to deliver emergency services to the urban and rural areas within the City of Belleville boundaries:

- 1 fire chief (full-time)
- 2 deputy fire chiefs (full-time)
- 1 administrative support (full-time)
- 52 full-time career firefighters (including officer positions)
- 47 volunteer firefighters (including officer positions)
- 3 training officers (1 full-time and 2 volunteer)
- 4 full-time firefighters assigned to communications division (transitions in February 2024 to suppression staff)
- 7 fire prevention and investigations staff (5 full-time and 2 volunteer)

BFES had an established Communications Branch that provides emergency dispatch and support services to all 17 municipal fire services in Hastings County. This will transition in February 2024 to a contracted service with the City of Peterborough.



## Summary of Observations and Recommendations

The following recommendations are drawn from findings presented throughout the report. They are grouped into four categories according to priority: critical, short term, intermediate and long term. A colour code is applied to each recommendation according to prioritization and completion. Some of the recommendations presented in this report are achievable using existing staff or members’ time and will therefore not pose significant additional costs to the community. Other recommendations regarding staffing, equipment and infrastructure will have associated costs. Costs are rough order of magnitude estimates only and will require further investigation. Cost ‘neutral’ refers to the use of internal staff through a normal work schedule. Undertaking of these cost neutral recommendations are also contingent upon staff availability.

A timeframe within 1 – 120 months (1 – 10 years) has been assigned to each recommendation, recognizing that the start and completion of any recommendation is based on annual corporate priorities and council approved budget allocations.

Critical (C)	1 -12 months
Short-Term (S)	12 - 48 months
Intermediate (I)	48 - 60 months
Long-Term (L)	60 - 120 months

**Observation #1:** The online survey was available from January 24<sup>th</sup> to May 2<sup>nd</sup> with several prompts made requesting staff participation from BFES management. Typical online survey responses for FMP range from 50% to 80%. Participation in the survey represented approximately 28% of the BFES staff.

Reference: 1.6.4 Online Firefighter Survey p. 8

**Recommendation #1: The Fire Chief enhances engagement and input to ensure all staff are aware or informed of change initiatives.**

*(Suggested completion: 6-12 months and ongoing)*

**Rationale:** *The successful implementation of the fire master plan recommendations will require comprehensive communication with all staff. During change initiatives it is imperative that staff are aware of the change, understand and accept the need for change as part of their role within the organization. This approach will increase overall cohesiveness and reduce resistance.*

**Observation #2:** It can be valuable for a fire department to identify additional potential high fire life-safety risk considerations. This includes day care facilities and schools. Children, due to age and potential cognitive or physical limitations may prevent or delay self-evacuation in the event of an emergency. High life-safety risk occupancy considerations include schools and licensed day care facilities. The CRA identified that there are 29 schools, 3 daycare facilities and 5 additional institutional facilities dedicated to special education/training.

Reference: 2.13.1 Registered Vulnerable Occupancies, p. 33



**Recommendation #2: Develop a proactive fire code inspection schedule, targeted public education programs and rigorous pre-emergency planning, for high life-safety risk occupancies.**

*(Suggested completion: 36-60 months)*

**Rationale:** Pre-planning activities increase fire department personnel familiarity with buildings of special interest. A fire department can help reduce the risk faced by vulnerable individuals, vulnerable occupancies or high risk occupancies, by performing regularly scheduled fire safety inspections; approving and witnessing fire drill scenarios; providing public education on fire safety issues; conducting pre-planning exercises to increase fire department personnel's familiarity with the facility; reviewing fire safety plans for accuracy and encouraging facility owners to update facilities as needed; providing staff training; and encouraging fire drills.

**Observation #3:** The BFES core services are identified in the Bylaw to Establish and Regulate a Fire Department and Emergency Services dated 2011 is outdated. Further. This bylaw does not reference response time expectations, response performance targets or minimum response capacity. BFES response capacity within each response area should be assessed to inform service level decisions. The outcome of this process results in a standard of cover policy including service level recommendations to be considered for approval by the City of Belleville Council. The standard of cover or service policy must be included in the updating of the establishing and regulation bylaw. The community risk assessment conducted as part of this plan will provide the information to ensure that all core services align with the risk factors and define what the level of service is required. Levels of service do not have to be standardized across a community. However, core services that are aligned to identified community risks will assist with ensuring that staffing, training, SOG's and equipment are focused on those service level needs.

Reference: Section 3.1 Department Overview p. 39

**Recommendation #3: Undertake a complete review of the 'Bylaw to Establish and Regulate a Fire Department and Emergency Services' dated 2011 and include response capacities and performance targets for the core services.**

**Alternatively, Council approves as separate service delivery policy for Belleville Fire and Emergency Services that is not part of the Bylaw as outlined in recommendation #21.**

*(Suggested completion: 24-36 months)*

**Rationale:** The Centre for Public Safety Excellence and International Association of Fire Chiefs developed a standard of cover framework to support the process of establishing fire department service types and service levels. It is a comprehensive process to identifying community risks, assessing fire department capability, and establishing appropriate emergency response service levels to mitigate community risks.

NFPA 1201: Standard for Providing Emergency Services to the Public discusses the importance of formally establishing service types and service levels. Section 4.5.3.1 states:



*“The fire and emergency services administration (FESA) leader shall develop and adopt a formal policy statement that includes the specific types and levels of services to be provided by the organization, the service area, and the delegation of authority to subordinates.”*

*As the population and geographic footprint of a community increase, a fire department will experience an increase in concurrent requests for service, longer travel distances and a higher frequency of complex and concurrent incidents. Developing formalized service levels and reporting performance informs council on current performance and the fire department’s capacity to manage community risks.*

**Observation #4:** During the consultation process and our review of the Belleville Fire and Emergency Services leadership group, recurring themes emerged regarding the chief officers being predisposed to complete operational, routine administrative and day to day tasks. As an example, the deputy chiefs are required to move response vehicles between stations for maintenance and operational requirements.

Basic platoon management for aspects such as minimum staffing, payroll, scheduled absences, and overtime are being managed by the deputy chiefs. Given the above, the chief officers do not have the workload capacity to effectively lead Belleville Fire and Emergency Services and create a future for the department that is responsive to change and is sustainable and efficient.

The on-duty captains must remain within their respective response zones and cannot be tasked for duties that affect the response capacity. The number of administrative responsibilities assigned to the on-duty captains negatively impacts training and recurring skills maintenance for the platoons. The urban training officer is challenged to effectively manage the training program by being tasked with consumable inventories management, and other support functions.

It must be noted that the community risk assessment and structural risk assessment in this plan identifies an increase in high-rise buildings, multi-unit residential and high-density developments. Structure fires in these types of occupancies are extremely complex, labour intensive and high risk for the firefighters. The current on-duty response staffing with one captain and four firefighters at each station has an extremely limited fire suppression critical task capability. This staffing would be overwhelmed by a single-family residential fire that has extended to an adjacent structure or if interior operations are required to extricate occupants. Furthermore, the command-and-control function and ability to sector operations is absent for major events such as high-rise buildings, multi-unit residential and high-density developments.

Additionally, as a strategic initiative this plan has identified the need to significantly improve the interoperability between the urban and rural services, integration of the suppression, training, fire prevention and public education functions. The limitations of the volunteer service in the rural response zone and the need to normalize fully integrated service delivery throughout the city is deemed a critical priority for Belleville Fire and Emergency Services.

The culmination of these factors is deemed to be an administrative, management and operational shortfall for Belleville Fire and Emergency Services.

Reference: Section 3.2.2 Department Management and Leadership p. 44



**Recommendation #4: Establish a Platoon Chief position on each of the four platoons, requiring an addition of four career positions.**

*(Suggested completion: 12-18 months)*

**Rationale:** *Platoon Chiefs' responsibilities would include functions such as emergency response command and control, platoon supervision and management and day-to-day administrative requirements to address the current Belleville Fire and Emergency Services administrative, management and operational shortfall.*

**Observation #5:** Upon review of the job descriptions there were several missing while others are out of date or of inconsistent format.

Reference: Section 3.2.3 Belleville Fire and Emergency Services Administration Positions p. 46

**Recommendation #5: Undertake a complete review and update as required of all job descriptions.**

*(Suggested completion: 6-18 months)*

**Rationale:** *Updated job descriptions should accurately describe each positions respective job functions, responsibilities, necessary skills, knowledge, abilities along other recommended qualifications. Current job descriptions serve as a foundation for hiring, training, promotions, compensation, and performance management. Each job description should be consistent in format and made readily available to incumbents and other persons considering one of these positions.*

**Observation #6:** There are several long-standing critical deficiencies that need to be addressed in order improve the interoperability between the urban and rural response services. For the Belleville Fire and Emergency Service to establish itself as a fully integrated fire service it is understood that there are several complexities to achieve this.

- The amendment of fire protection taxation rates for urban and rural service will be a challenging public issue that will require extensive public consultation and communications.
- The 'no contract out' provision in both the International Association of Fire Fighters and CLAC collective agreements will be a labour relations issue requiring a negotiated resolve.

Under the Fire Protection and Prevention Act, council essentially has the overall responsibility to establish the level of service for the municipality. The operation under the current structure of a rural and urban area has become more cumbersome to provide an effective and efficiency service. The updating of the various response areas to achieve the desire performance and service levels is critical as the city continues to grow. Integration of the suppression, training, fire prevention and public education programs will be met with resistance and will challenge the chief officers' leadership and resiliency.

Reference: Section 3.5.1 Service Interoperability and Efficiency p. 52

**Recommendation #6: Mayor and Council must mandate that the Belleville Fire and Emergency Services be established as a fully integrated service delivery system.**



(Suggested completion: 6-12 months)

**Rationale:** *The outcome would be reduced duplication, service level inconsistencies and fragmentation. The transformation of the Belleville Fire and Emergency Services organization culture to a cohesive team that fully supports working together to improve service delivery, public safety, and fire fighter safety.*

**Observation #7:** The projected residential and economic development will increase the risk potential and demand for various emergency services and therefore Belleville Fire and Emergency Services' call volume trends will continue to increase. The structural risk assessment in this plan identifies an increase in high-rise buildings, multi-unit residential and high-density developments. As previously identified, structure fires in these types of occupancies are extremely complex, labour intense and high risk for the firefighters. The current on-duty response staffing has an extremely limited fire suppression critical task capability. This staffing would be overwhelmed by a single-family residential fire that has extended to an adjacent structure or if interior operations are required to extricate occupants.

Other emergency responses such motor vehicle incidents with more than two vehicles and several casualties, dangerous goods spills over 100 litres, and confined space and technical rescues depending upon the scope of the situation will challenge the current response capacity and the completion of the various critical tasks. There is a disproportion reliance on the call back of off duty career staff and in extreme situations mobilization of the rural volunteer service for emergencies greater than minor events. Furthermore, response that require both urban station companies to deploy, reduces the response capacity for coincidental and sequential emergencies.

The Belleville Fire and Emergency Services response capacity deficiencies that can be asserted from the factors above and the section 4 analysis are as follows:

- Reduced effective response force in the urban area has a direct impact on firefighter and public safety and increases the risk potential for loss of life, extensive property loss and environmental damage.
- Prolonged rural area response time and assumed inconsistent achievement of the recommended effective response force has a direct impact on firefighter and public safety and increases the risk potential for loss of life, extensive property loss and environmental damage.

Reference: Section 3.5.2 Core Services p. 53





**Recommendation #7: Establish a third engine company by increasing the career staffing by 16 firefighter positions.**

*(Suggested completion: 12-36 months)*

**Rationale:** *The addition of a third engine company will provide additional response capacity to enhance the urban area effective response force, reduce the reliance on the recall of off duty career and/or mobilization of the volunteer firefighters, increase the ability to manage coincidental and sequential emergencies and to bolster the rural areas response time and effective response force challenges.*

*There is also a potential for an offset of four (4) firefighters with the decision to contract the communications and dispatch service to an external agency is implemented.*

**Observation #8:** The ability to assess the effectiveness of the current volunteer response model effective response force was not possible. The response data provided did not include the number of firefighters that arrive on scene. Further, station 5 is currently a satellite facility that does not have an operational assignment for emergency response. The disposition of this station must be considered as part of the recommendation to establish a service delivery policy and the optimal effective response force.

Reference: Section 3.5.3 Structural Fire Suppression p. 57

**Recommendation #8: Commence an analysis of both the rural area responses and urban area responses to accurately determine the overall operational effectiveness and determine the achievement of the overall optimal effective response force for the municipality.**

*(Suggested completion: 12-18 months)*

**Rationale:** *The consistent achievement of the recommended effective response force has a direct impact on firefighter and public safety and increases the risk potential for loss of life, extensive property loss and environmental damage. The utilization of full-time staff units into rural areas would allow for additional support to the rural area and provide a more effective response improving both fire fighter and public safety.*

**Observations #9:** The BFES fire Prevention Division consists of five urban fire prevention officers and two rural fire prevention officers designated, along with the fire chief, as assistants to the Fire Marshal to carry out all directives required within the Fire Protection and Prevention Act, 1997 to the City of Belleville. There have been multiple turnovers in the rural fire prevention program. The rural fire prevention officers require the same level of certification and qualifications as the urban fire prevention officers. This has provided a challenge to BFES to maintain qualified rural fire prevention officers.

Reference: Section 3.6 Fire Inspection, Investigation and Public Education Programs p. 62





**Recommendation #9: The urban and rural fire prevention, inspections, investigation, and public educations should be integrated into a centralized service.**

*(Suggested completion: 18-24 months)*

**Rationale:** The centralized approach will allow for effectiveness, consistency, and cost efficiencies in the delivery of fire prevention services across the entire city. This will allow for appropriate training and mandatory provincial certification is achieved and maintained by all required staff.

**Observation #10:** BFES established a formalized pre-incident planning process in 2023 in the urban response area with plans to expand this program to the rural response area. These plans evaluate firefighting and other emergency considerations such as construction type, occupancy, building status, emergency contacts, utility shutoff locations, fire suppression and detection systems, exposure information, water supply availability, access issues, staging locations, and other hazards.

Reference: Section 3.6.3 Pre-Emergency Plans p. 63

***Recommendation #10: Continue the expansion of the formal pre-incident planning process of all department response areas.***

*(Suggested completion: 1-24 months)*

**Rationale:** *The information contained in a pre-incident plan is critical to emergency responders when there is no property representative on-site who knows the intimate details of the building or complex. The use of common light weight construction materials can be identified and informing response crews of potential risks and assist in developing operational plans. The fire pre-plans are useful for any emergency, not just in the event of a structure fire.*

**Observation #11:** BFES current operates a full-service operation as defined in Ontario Regulation 343/22, which includes interior attack, auto-extrication and hazardous materials response and provide additional technical rescues. BFES crews are supervised and lead by Company Officers, provide fire inspections, conduct fire investigations, and deliver public education programming. All of these require initial training and mandatory certification within timeframes outlined in the regulation. Further BFES should ensure that competency/ refresher training is maintained in all the skill sets to ensure fire fighter and public safety. This includes regular and ongoing training and annual drills such as live fire training sessions, technical rescue practical scenarios and currency of skills and techniques in all areas. The training and certifications are required regardless of if personnel are urban or rural assigned. The increased in training and certification requirements may put added expectations on rural volunteers.

Reference: Section 3.11.1 Industry Recommended Qualifications p. 69

**Recommendation #11: Ensure all firefighters and fire service staff are certified to the appropriate levels defined under O Reg 343/22 for duties they are required to perform as key responsibilities within the defined services levels approved by Council.**

*(Suggested completion: 12-24 months)*

**Rationale:** Once Council has established the service levels to be provided by the fire service the municipality and fire service must ensure compliance with Ontario Regulation 343/22 mandating all fire fighters are certified at a minimum to the corresponding certification standard set out in the regulation. This includes all technical rescues provided by the fire service.

**Observation #12:** An assessment of all five fire stations utilized by BFES has shown that three of the fire stations are in good condition and meeting the needs of the BFES. Two of the fire stations are not meeting the needs of BFES and pose potential safety risks to the personnel working out of these buildings. Fire station #2 is utilized by the career firefighters, and fire station #4 is utilized by the volunteer firefighters.

It must be recognized that fire stations utilized by full-time fire services are heavily used 24-hours per day, seven days per week. The BFES fire station currently must be able to accommodate a minimum of six firefighters. Future staffing requirement should be anticipated and planned for. As well the volunteer fire stations, while not staffed as are in career stations, none the less are subject to significant usage along with wear and tear.

Reference: Section 3.12.1 Fire Station Overview and Assessment p. 70

**Recommendation #12: Replacement of current fire station 2 to the proposed location contained in Section 4 of this FMP. Further with the replacement of a new station 2, that station 4 be evaluated for operational viability including the need to replace this deficient station.**

*(Suggested completion: 24-48 months)*

**Rationale:** A properly designed and equipped and located fire station will ensure optimum response capabilities, safety of firefighters and staff, and equipment longevity. This would include confirming a proper location which is suitable for optimum response and building size. The new fire station 2 would include all the features of a fully functioning fire station that conforms to occupational health and safety standards, Canadian Standards Association standards, National Building and Safety Codes and NFPA standards. The process of constructing a new fire station could take up to two years.

Station 4 is well past its functional use as a fire station. Building is in a poor state of repair. Building was never designed to be a fire station. Built in approximately 1950 it was originally a cheese factory. This building was converted into a volunteer-based station. An addition was added to the station in approximately 1994 and is attached to the community centre.



**Observation #13:** BFES has sufficient facilities within their fire stations for classroom needs, however, have limited training areas to conduct hands-on training. Their training typically occurs in their apparatus bay, outside in areas around the station, or elsewhere in the community. Vehicle extrication training is done by taking advantage of permission with local wrecking yards. The only practical live fire training facility near Belleville is the regional centre in Quinte West.

Reference: Section 3.12.2 Training Facilities p. 86

**Recommendation #13: Conduct an internal training needs assessment followed up by a training facility feasibility study.**

*(Suggested completion: 12-24 months)*

**Rationale:** A comprehensive study to determine if an in-house training facility is financially and operationally beneficial balanced against the other available options that are available to meet the needs of the department.

**Observation #14:** The design of fire apparatus should take into consideration the immediate and forecasted needs of the community. Consultation with those who use, service, and maintain the apparatus provide valuable insight to critical components for consideration.

Reference: Section 3.13.1.3 Fire Apparatus Design and Procurement p. 91

**Recommendation #14: Develop a life cycle replacement and design of fire apparatus process that includes input from frontline staff, procurement staff, and the fire chief.**

*(Suggested completion: 3-6 months)*

**Rationale:** Careful consideration around the design and functionality of replacement fire apparatus will assist with ensuring the needs are met now and into the future.

**Observation #15:** A leading practice is to designate a lifecycle to each piece of apparatus and contribute annually to a reserve fund to ensure enough funds are available when the replacement is needed. BFES has a reserve fund for the replacement of their apparatus and light vehicles and forms part of the City's annual budget process. The process of determining an appropriate fire apparatus life cycle is significantly more challenging than for normal commercial vehicles. When emergency vehicles are deployed, they are subjected to very demanding usage and reliability cannot be compromised. The current annual contribution to the BFES may not be sufficient to sustain the fleet and life cycle replacements

Reference: Section 3.13.1.5 Fire Apparatus Replacement and Dispersal p. 92

**Recommendation #15: Review the capital budget reserve contributions to determine the appropriate investment to sustain the fleet of emergency vehicles.**

*(Suggested completion: 36-60 months)*

**Rationale:** An established capital reserve fund that has been properly assessed and funded will assist with budgeting and replacement strategies for BFES apparatus and light-duty vehicles.



**Observation #16:** Light vehicles are not subject to the same replacement schedule identified in NFPA 1901; however similar criteria should be established for the life cycle replacement of light vehicles.

Reference: Section 3.13.1.5 Fire Apparatus Replacement and Dispersal p. 92

**Recommendation #16: Develop criteria for the replacement of light vehicles.**

*(Suggested completion: 12-30 months)*

**Rationale:** *BFES light vehicles are subject to considerable wear and tear. Annual assessment of all vehicles will assist with maintaining a functional and reliable fleet.*

**Observation #17:** The self-contained breathing apparatus inventory is sufficient for normal operations. A plan to maintain a consistent make and model of self-contained breathing apparatus and breathing air cylinders would enhance effectiveness and operability.

Reference: Section 3.15.1 Self-Contained Breathing Apparatus p. 99

**Recommendation #17: Develop a self-contained breathing apparatus management program that includes a consistent inventory of air packs and bottles.**

*(Suggested completion: 24-36 months)*

**Rationale:** *Establishing and maintaining a consistent and sufficient inventory of SCBA and air bottles will allow every BFES firefighter the opportunity to utilize this critical component of firefighter safety when required.*

**Observation #18:** The interview process determined that the current asset management program is not sufficient to meet the needs of the department. A thorough review should consider the unique needs and requirements of the department.

Reference: Section 3.17 Asset Management p. 102

**Recommendation #18: Undertake a needs assessment for an appropriate asset management system and procure the desired system, alternatively a centralize corporate system may be the better option.**

*(Suggested completion: 12-18 months)*

**Rationale:** *An effective asset management program will assist with efficient oversight of the department assets.*



**Observation #19:** The five-year 90<sup>th</sup> percentile compliance with the NFPA 1710 80 second turnout time standard for career fire stations was 41%. Additionally, the turnout times for volunteer stations were trending upward.

Reference: Section 4.4.2 Turnout Time p. 120

**Recommendation #19:** *Turnout performance should be monitored and reported to staff with the aim of identifying improvement opportunities and establishing performance goals for career stations.*

*(Suggested completion: 24 –120 months)*

**Rationale:** *Working with volunteer and career firefighters, BFES administration/senior officers should identify opportunities to improve turnout times and establish achievable turnout performance goals. The time taken to respond can be affected by several factors including station design, apparatus assignments, notification processes and activities within the station. Any improvement in turnout time will improve total response time performance.*

*Turnout times should be monitored and reported in a timely fashion to firefighters at these stations. BFES administration should consider implementing an exception report for a limited period with the sole purpose of analysing the root cause of the extended turnout times.*

**Observation #20:** In general, BFES has historically managed the city’s common risks and continues to serve the residents well. However, Belleville City Council has not formally identified desired response time service levels in policy. By-law Number 2011-59 outlines which services can be provided by the BFES. This policy does not reference response time expectations or minimum response capacity.

Reference Section 4.4.4 Total Response Time p. 123

**Recommendation #20:** *Establish council approved service levels for Belleville Fire and Emergency Services*

*(Suggested completion: 18-24 months)*

**Rationale:** *NFPA 1201: Standard for Providing Emergency Services to the Public discusses the importance of formally establishing service types and service levels. Section 4.5.3.1 states:*

*“The fire and emergency services administration (FESA) leader shall develop and adopt a formal policy statement that includes the specific types and levels of services to be provided by the organization, the service area, and the delegation of authority to subordinates.”*

*As the population and geographic footprint of a community increase, a fire department will experience an increase in concurrent requests for service, longer travel distances and a higher frequency of complex and concurrent incidents. Developing formalized service levels and reporting performance informs council on current performance and fire department capacity to manage community risks.*



**Observation #21:** BFES standard operating guidelines do not identify the number of firefighters and resources required to complete tactical or critical tasks. Critical task analyses will clarify incident resource requirements and identify the critical tasks to clarify firefighter tasks and manage an incident efficiently and safely.

Reference: Section 4.5 Critical Task Analysis p. 126

**Recommendation #21: Complete and maintain as required critical task analyses for common incident types and include them in response operational guidelines or response policies.**

*(Suggested completion: 12-120 months)*

**Rationale:** Critical task analyses should be used to identify operational limitations in policy to clarify incident command objectives and maintain safe operations. As described above, low to medium incidents will often require more than 10 firefighters to complete concurrent critical tasks safely and minimize intervention time. The most common number of initial responders for BFES urban structure fire incidents is 10 (see Section 4.6). As a result, critical task analysis will identify incident types where tactical firefighting objectives may require modification and immediate call back or mutual aid requests can be automated.

Further, volunteer station response can may be somewhat uncertain. The number of firefighters arriving may be staggered or limited. As a result, tactics and task assignments should be scaled to reflect available resources. For example, if the number of assembled firefighters or water supply are not sufficient to support an interior fire attack or rescue, fire tactics should be limited to exterior and defensive operations.

**Observation #22:** The data to assess the number of firefighters responding to structure fires in the rural response areas 3, 4 and 5 was not available. The number of firefighters responding to these incidents from Stations 3, 4 and 5 was not linked to the response or incident data. Further, department policy does not identify the minimum number of firefighters that must assemble on a fire engine or rescue truck before the apparatus can respond. Additionally, firefighters may respond directly to an emergency incident as opposed to responding on a fire apparatus making it difficult to assess response time.

Reference: Section 4.6 Effective Response Force p. 130

**Recommendation #22: Record and monitor the minimum number of firefighters responding to emergency incidents from Stations 3, 4 and 5**

*(Suggested completion: 1-120 months)*

**Rationale:** A volunteer fire and rescue departments' ability to respond with an effective response force hinges on firefighter availability and ability to respond. Sustaining adequate numbers of fully trained firefighters is increasingly difficult as regulated training and certification requirements evolve. This information is essential in assessing the effectiveness and future sustainability of the volunteer firefighter model. This is not to say the response is ineffective. The intention of the recommendation is to highlight that this





*data is not available making it difficult to fully assess the effective response force for response areas 3,4 and 5.*

**Observation #23:** Both locations will serve the community well and support a 10-minute response time for most of Belleville. Like any development in an urban area, the availability of the land area required to build a new fire station and the cost of the land are key limitations to either option. Alternative sites in these general areas would also be reasonable to consider.

Reference: Section 4.7.4 Station Location Analysis p. 142

**Recommendation #23: The location of proposed Station 2 in Map 6 on page 143 is the recommended option.**

*(Suggested completion: 48-60 months)*

**Rationale:** *By locating Station 2 slightly further southward provides response coverage to the southwest sector of the city that is a higher demand area for emergency response.*

**Observation #24:** BFES has not provided City of Belleville Council with an annual report or regular updates on service pressures and service performance. Formalized service levels and performance expectations have not been established. Further, current alarm processing and chute times are somewhat extended and may offer the opportunity to improve overall response performance if improved. BFES currently uses a Crisis records management system which is believed to be capable of developing adequate reports.

Reference: Section 4.8 Measuring, Managing and Reporting Performance p. 146

**Recommendation #24: Develop appropriate performance reports for Belleville City Council and BFES staff.**

*(Suggested completion: 12-18 months)*

**Rationale:** *Fire departments are typically data-rich organizations. Performance data will assist with developing achievable service levels and performance goals. Timely reporting of operational performance also supports initiatives to improve overall response times. Under the Fire Protection and Prevention Act 6.(3), the fire chief is ultimately responsible to council of the municipality that appointed him or her for the delivery of fire protection services. In the absence of this information, neither the fire chief, city council, senior city administration or the fire department staff know whether they are successful in meeting service expectations defined by Council.*





### Table of Recommendations Overview

The following table shows the recommendations, along with cost implications and timeline for implementation. A timeframe within 1 – 120 months (1 – 10 years). A colour code is applied to each recommendation according to prioritization and completion.

	Recommendation	'23	'24	'25	'26	'27	'28	'29	'30	'31	'32	'33	Source	Est. Cost	Comments
1	The Fire Chief enhances engagement and input to ensure all staff are aware or informed of change initiatives.	C	C										Staff Time	Cost Neutral	
2	Develop a proactive fire code inspection schedule, targeted public education programs and rigorous pre-emergency planning, for high life-safety risk occupancies.				I	I	I						Staff Time	Cost Neutral	
3	Undertake a complete review of the 'Bylaw to Establish and Regulate a Fire Department and Emergency Services' dated 2011 and include response capacities and performance targets for the core services.			S	S								Staff Time	Cost Neutral	
4	Establish a Platoon Chief position on each of the four platoons, requiring an addition of four career positions.		C	S										Approximately \$160,000 per position, includes corporate loading.	
5	Undertake a complete review and update as required of all job descriptions.		C	S									Staff Time	Cost Neutral	
6	Mayor and Council must mandate that the Belleville Fire and Emergency Services be established as a fully integrated service delivery system.		C	S									Staff Time	Cost Neutral	



	Recommendation	'23	'24	'25	'26	'27	'28	'29	'30	'31	'32	'33	Source	Est. Cost	Comments
7	Establish a third engine company by increasing the career staffing by 16 firefighter positions.		S	S	S									\$125,000 per position, includes corporate loading	
8	Commence an analysis of both the rural area responses and urban area responses to accurately determine the overall operational effectiveness and determine the achievement of the overall optimal effective response force for the municipality.		S	S									Staff Time	Cost Neutral	
9	The urban and rural fire prevention, inspections, investigation, and public educations should be integrated into a centralized service.			S									Staff Time	Cost Neutral	
10	Continue the expansion of the formal pre-incident planning process of all department response areas.	C	C	S										Between \$5M - \$15M. Required the need to do a fire hall needs analysis and costing study	
11	Ensure all firefighters and fire service staff are certified to the appropriate levels defined under O Reg 343/22 for duties they are required to perform as key responsibilities within the defined services levels approved by Council.		S	S									Staff Time	Cost Neutral	Training facility feasibility study - \$10k - \$15k



	Recommendation	'23	'24	'25	'26	'27	'28	'29	'30	'31	'32	'33	Source	Est. Cost	Comments
12	Replacement of current fire station 2 to the proposed location contained in Section 4 of this FMP. Further with the replacement of a new station 2, that station 4 be evaluated for operational viability including the need to replace this deficient station.			I	I	I							Staff Time	Cost Neutral	
13	Conduct an internal training needs assessment followed up by a training facility feasibility study.		S	S										Cost neutral to establish a contribution to reserve	
14	Develop a life cycle replacement and design of fire apparatus process that includes input from frontline staff, procurement staff, and the fire chief.		C										Staff Time	Cost Neutral	
15	Establish an apparatus and light vehicle capital reserve fund.				I	I	I						Staff Time	Cost Neutral	
16	Develop criteria for the replacement of light vehicles.		S	S	S								Staff Time	Cost Neutral	
17	Conduct a review of alarm processing and identify improvement opportunities.			S	S								Staff Time	Cost Neutral	
18	Undertake a needs assessment for an appropriate asset management system and procure the desired system, alternatively a centralize corporate system may be the better option.		S	S									Staff Time	Cost Neutral	



	Recommendation	'23	'24	'25	'26	'27	'28	'29	'30	'31	'32	'33	Source	Est. Cost	Comments
19	Turnout performance should be monitored and reported to staff with the aim of identifying improvement opportunities and establishing performance goals for career stations.			L	L	L	L	L	L	L	L	L	Staff Time	Cost Neutral	
20	Establish council approved service levels for Belleville Fire and Emergency Services.			S									Staff Time	Cost Neutral	
21	Complete and maintain as required critical task analyses for common incident types and include them in response operational guidelines or response policies.		L	L	L	L	L	L	L	L	L	L	Staff Time	Cost Neutral	
22	Record and monitor the minimum number of firefighters responding to emergency incidents from Stations 3, 4 and 5.	L	L	L	L	L	L	L	L	L	L	L	Staff Time	Cost Neutral	
23	The location of proposed Station 2 in Map 6 on page 143 is the recommended option														
24	Develop appropriate performance reports for Belleville City Council and BFES staff		S	S											



## Conclusion

This fire master plan was completed to assist the City of Belleville and the Belleville Fire Emergency Services in evaluating the current service delivery model and develop a strategy to inform future investments in fire, rescue, and emergency services. The plan involved a comprehensive analysis of all key elements of service delivery. This analysis included a review of the operational and administrative aspects of the Belleville Fire Emergency Services, community profile and risks, staffing, core service and program delivery, training, recruitment and retention, facilities, and major equipment.

Further, Belleville Fire Emergency Services response data was assessed with a focus on the current performance, capabilities and alignment with both existing and projected risks and levels of demand.

There are several observations and recommendations provided in this master plan to improve operational effectiveness and efficiencies. Key among the 23 recommendations is:

- Mayor and Council must mandate that the Belleville Fire and Emergency Services be established as a fully integrated service delivery system. The outcome would be reduced duplication, service level inconsistencies and fragmentation. The transformation of the Belleville Fire and Emergency Services organization culture to a cohesive team that fully supports working together to improve service delivery and public safety.
- Belleville Fire Emergency Services undertake a complete review of the Bylaw to Establish and Regulate a Fire Department and Emergency Services dated 2011 and include response capacities and performance targets for the core services. Alternatively, Council approves as separate service delivery policy for Belleville Fire and Emergency Services that is not part of the Bylaw.
- Establish a third engine company by Increasing the career staffing by 16 firefighter positions and one platoon chief position on each of the four platoons. The additional of a third engine company and platoon chief will provide additional response capacity to enhance the urban area effective response force, reduce the reliance on the recall of off duty career and/or mobilization of the volunteer firefighters, increase the ability to manage coincidental and sequential emergencies and to bolster the rural areas response time and effective response force challenges.
- Belleville Fire Emergency Services commence an analysis of the rural area responses to accurately determine the operational effectiveness and the achievement of the effective response force. The consistent achievement of the recommended effective response force has a direct impact on firefighter and public safety and increases the risk potential for loss of life, extensive property loss and environmental damage.
- Replacement of current fire Station 2 to one of the proposed locations contained in Section 4 of this FMP. Further with the replacement of a new Station 2, that station 4 be evaluated for operational viability including the need to replace this dysfunctional station.



Although each recommendation has a corresponding timeframe, it is important to note this FMP needs to be revisited on a regular basis to confirm that the observations and recommendations remain relevant. The recommendations outlined in this Fire Master Plan will better position the city and the Belleville Fire Emergency Services to mitigate and manage community risks, monitor response capabilities and performance, and maintain excellent community relationships and value for money.

Our interactions with the staff revealed a highly professional and dedicated organization that is committed to providing the best possible service to the citizens of Belleville.

## SECTION 1 INTRODUCTION

### 1.1 Background and Significance

Community leaders across Canada continue to search for innovative approaches to improve the efficiency and effectiveness of service delivery. Effectiveness refers to the ability to achieve the desired results or outcomes. Efficiency refers to optimizing the use of available resources – whether it is time, money, or effort. The notion of efficiency in service delivery is often described as ‘doing more for less’ or ‘value for money.’

Elected officials, CAOs (Chief Administrator Officer’s), directors and managers are often faced with the ongoing challenge of achieving efficient and effective service delivery models. Public safety is most often one of the top priorities within most communities, but achieving this goal comes at a relatively high cost. The services charged with achieving this outcome, including police, fire, EMS, and emergency management services, are essential components of any community’s social safety net. Service effectiveness is not an option. However, the need to be fiscally responsible and to review operational efficiency and effectiveness cannot be ignored. Senior community officials must continue to be vigilant in their search for innovative and sustainable practices and finding the balance between service levels and expenditures to ensure their citizens are getting ‘value for money.’

### 1.2 Goals and Objectives

The goal of developing this project is to conduct a comprehensive Community Risk Assessment (CRA) leading to the development of a Fire Master Plan (FMP). The objective of the Fire Master Plan is to conduct an in-depth review of the City of Belleville’s fire and emergency services including, but not limited to, station location, performance, and the current response capabilities to mitigate risks identified in the CRA. The FMP will assist in conveying information to the public, staff, and City council about what to expect in the City’s approach to fire and emergency service planning and service delivery, while highlighting opportunities for improved effectiveness, efficiencies, and public and responder safety.

While risks are the basis for triggering response decisions, our analysis also investigated the needs of the community and will provide a point of reference upon which future decisions and priorities can be evaluated and implemented. This includes identifying priorities, challenges, and opportunities for the improvement of the delivery of emergency services to the community, businesses, and overall public safety. This CRA and FMP considers applicable legislation, industry-leading practices, and standards, along with current and anticipated risks to provide unbiased analysis and evidence-based recommendations.

Ultimately the goal of this project is to identify the needs of the community by providing a point of reference, for the next 5 - 10 years, upon which future decisions and priorities can be evaluated and implemented by identifying priorities, risks, challenges, and opportunities for the improvement of the delivery of emergency services to the community, businesses and public safety while considering municipal goals, fiscal realities, and other competing demands.





The CRA and FMP will also serve as a guide for council, fire department leadership and municipal administration in making informed and sound decisions for high-level and risk-based effective and efficient fire and emergency services delivery while navigating through current and future challenges.

The Community Risk Assessment is based upon the following:

- The Community Risk Assessment will be in a form that is approved by the Ontario Fire Marshal by reviewing the nine mandatory profiles.
- The Technical Guideline TG-02-2019: Community Risk Assessment Guideline will be used as guidance in formatting the risk assessment.
- Utilization of the charts as provided in the technical guideline or as a minimum, all the points outlined in the guideline.
- The Community Risk Assessment will be made readily available if the Fire Marshal conducts a review of the municipality under the FPPA(Part III, 9.(1)(a)).
- As part of the Fire Master Plan, complete a review of all current fire services and programs, based upon the above risk assessment. This analysis includes an examination of the department's core functions, including, but not limited to administration, fire prevention, public education, training, fire suppression, apparatus, facilities, and training, as identified in Section 3.

Specifically, for the Community Risk Assessment, this project has addressed the following nine mandatory profiles required under Schedule 1 of O. Reg. 378/18 CRA:

- 1) Geographic profile
- 2) Building stock profile
- 3) Critical infrastructure profile
- 4) Demographic profile
- 5) Hazard profile
- 6) Public safety response profile
- 7) Community services profile
- 8) Economic profile
- 9) Past loss and event history profile

Specifically, for the Fire Master Plan, we will include prioritized set of recommendations for immediate, short, and long-term recommendations. The report shall include but shall not be limited to:

- a. Solutions for risks that require immediate mitigation.
- b. Solutions for any identified risks, gaps, pain points or vulnerabilities
- c. Opportunities to serve unmet needs.
- d. Metrics for measuring fire service performance.



- e. Protect firefighters by ensuring appropriate measures, training, safe equipment, and adequate staffing is available 24/7
- f. Explore opportunities to adjust and revise the fire department's structure.

**Note:** All information and documents provided to the municipality will be made accessible according to the Accessibility for Ontarians with Disabilities Act (AODA). All material shall conform to the Web Content Accessibility Guidelines 2.0 Level AA standard. All digital deliverables shall be in a form that is reproducible and compatible with the client's format and standards.

### 1.3 Project Scope

This analysis and the outcomes include applicable legislative requirements, industry-leading practices, and standards, along with current and anticipated risks identified in the community risk assessment to provide unbiased analysis and evidence-based recommendations. The outcome of our analysis has determined the optimum service delivery model and positions the Belleville Fire Department to be more effective and efficient in the delivery of emergency services through current and future challenges.

#### 1.3.1 Mandatory Requirements and Deliverables

The following elements, as stated in the request for proposal, will be completed to complete this project:

##### Administration Division

Evaluate all aspects of Belleville Fire and Emergency Services and determine optimal service levels for fire protections service delivery to meet the current and future needs and circumstances of the community, including:

- a) Fire protection delivery compliance
- b) Fire Protection and Prevention Act, Ontario Regulation 378/18 Community Risk Assessments
- c) Section 21 Guidance Notes - Best practices for protecting the health and safety of fire service workers in Ontario.
- d) Occupational Health and Safety Act and City By-laws
- e) National Fire Protection Association Standards
- f) Ontario Fire Marshal's Public Fire Safety Guidelines inclusive of the Ontario Fire Marshal's Review current administrative processes, workflow, and management practices
- g) Department communication strategies
- h) Identify enhanced processes for technology including future computer and information technology needs, system redundancies and failsafe backups, data and records management systems, incident reporting, and computer aided dispatch, mobile data terminals.
- i) Assess mutual aid and automatic aid agreements with neighboring municipalities.
- j) Develop a comprehensive community risk assessment in accordance with current



FPPA legislative changes to include all 9 profiles (Geographic, Building Stock, Critical Infrastructure, Demographic, Hazard, Public Safety Response, Community Services, Economic and Past Loss and Event history)

- k) Conduct a detailed trend analysis including issues and best practices regarding fire and emergency services to identify opportunities for continuous improvement, service optimization and innovation.

**Community Risk Reduction:**

- a) Assess and evaluate the current Public Fire Safety Education programs for efficiencies and effectiveness against applicable standards/legislation and analysis of data analytics.
- b) Evaluate the current Fire Prevention inspection and enforcement strategies to determine their adequacy and effectiveness against applicable standards/legislation and analysis of data analytics.
- c) Review current fire investigation practices and equipment against applicable standards,
- d) legislative requirements, and best practices.
- e) Conduct a comprehensive review of the current draft Community Risk Assessment (CRA) and provide comment for enhancement of this document.

**Fire Prevention and Public Education**

Assess and evaluate public fire safety education and fire safety standards and enforcement focusing on strategic deployment of resources, technological changes, efficiencies, and effectiveness with respect to inspection services, data gathering and current service delivery against applicable standard(s) / legislation analysis of data analytics for decision support for Public Education.

**Fire Suppression Division (Operations)**

- a) Detailed review of service delivery levels against accepted applicable standards, legislation, and industry leading practices.
- b) Assessment of all specialized service delivery and identification of opportunities for efficiencies and enhancements.
- c) Comprehensive examination of response performance times for each of the five stations against standards, legislation, and leading practices. Identify projected long-range needs and implementation strategies and timelines.
- d) Review of current and emerging technologies that may be employed to improve current and future services effectively and efficiently.



### **Station Location, Performance and Response Capabilities:**

- a) Evaluate all station locations, including a comprehensive study for future fire stations in direct correlation to related community growth, response capabilities, road network attributes and travel restrictions, building and population densities.
- b) Identify, analyze, evaluate, and prioritize risks to public safety and the age and infrastructure of all facilities.

### **Training and Professional Development**

- a) Evaluate professional qualifications and standards to determine current and future training needs for all positions within the fire services.
- b) Evaluate the current firefighter training and service delivery model against the Community Risk Assessment, Establishing and Regulating By-law, municipal needs and circumstances and the requirements of NFPA Fire Service Certification Ontario Regulation 343/22.
- c) Identify any limitations of the current training model; consider the limited training time available for rural volunteer members (CLAC Collective Agreement) and the mandated professional certifications.
- d) Identify opportunities and associated costs for enhancement and effectiveness of training practices to improve training delivery methods, infrastructure, props, tools, facilities, staffing, divisional organization and deployment and enhancement of the training environment.
- e) Complete a cost benefit analysis with a consistent service delivery model (recruitment and retention) in mind that compares training volunteer firefighters as compared to a fulltime firefighter.

### **Apparatus Procurement, Fleet Maintenance and Equipment**

- a) Analyze long range strategy for vehicle acquisition and replacement.
- b) Assess and evaluate the current apparatus fleet, vehicle and equipment condition, maintenance programs, replacement schedules and plans relative to existing and expected service demands, budget process, budget reserves and preventative maintenance requirements.
- c) Review applicable fire apparatus maintenance and repair standards, legislation, and best practices to identify opportunities to increase efficiencies.

### **Communications**

Based on the third-party review being prepared for Council's consideration regarding E911/Next Generation-911 current and future optimization and infrastructure requirements, we have reviewed all aspects of fire communications and compliance of NFPA 1221 standard along standard operating procedures and guidelines, operational formats, communication technology, telephone systems including business and cell phones.

## 1.4 Standards and References

This plan considers the following references and standards:

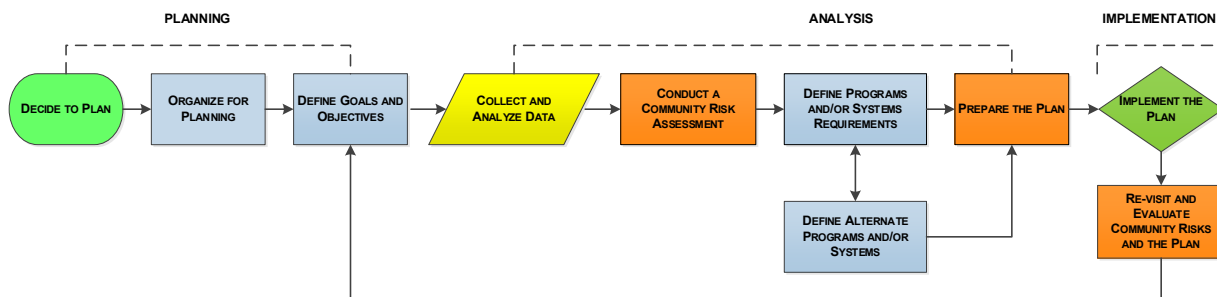
- Commission on Fire Accreditation International
- Canadian Standards Association (CSA)
- Fire Underwriters Survey (FUS)
- Ontario Emergency Management and Civil Protection
- Ontario Fire Protection and Prevention Act
  - O. Reg. 213/07: Ontario Fire Code
  - O. Reg. 378/18: Community Risk Assessments
  - O. Reg. 364/13: Mandatory Inspection – Fire Drill in Vulnerable Occupancy
  - O. Reg. 365/13: Mandatory Assessment of Complaints and Requests for Approval
- Fire Marshal Directives, including OFM-TG-02-2019
  - Communique No. 2022-001 released 02/25/2022.
- National Fire Protection Association (NFPA)
- Ontario Occupational Health and Safety Act
- Ontario Building Code
- Underwriters Laboratories (UL/ULC)

## 1.5 Fire Master Plan Process

The following diagram illustrates the process used to complete this FMP. The FMP is sometimes referred to as a ‘road map’ to the future and used as a guiding document for current and future department leaders and decision makers.

As described in the ‘implementation’ phase, it is highly recommended that this plan be reviewed and evaluated, at minimum, on an annual basis or when there are unusual changes in risk, response demands, population and residential or industrial development activity. When reasonably practicable, we also recommend a third-party update of the FMP at the five-year mark to apply an unbiased review into the operation and provide further credibility to the Fire Master Plan process.

Figure 1: Fire Master Plan Process





## 1.6 Consultative Process

### 1.6.1 Community and Fire Station Tour

The community and station tour focused on the overall footprint, topography, transportation infrastructure of the community and the various response zones. Touring the stations provided an opportunity to conduct a general condition and operational functionality assessment. This tour also provided the opportunity to meet with various BFES staff and discuss their respective interests regarding the FMP development.

### 1.6.2 Fire Master Plan Workshop

This interactive workshop engaged the labour union leaders and other representatives of the Belleville Fire & Emergency Services regarding the current state and future advancement. The workshop was a precursor to the development of the Fire Service Master Plan.

The core themes that emerged from the workshop included an optimistic, although guarded view, toward building a more cohesive team with a vision of working together. There was considerable positive feedback regarding the opportunity to obtain clarity on the fire master plan process.

The group discussion revealed that there is considerable alignment and consensus amongst the Belleville Fire and Emergency Services members regarding the need for change, however the respective collective bargaining agreements, separate response zones and current relationship between the volunteer and career members are barriers that may prevent increased interoperability and the opportunity to better serve the community through a fully integrated fire service.

### 1.6.3 Targeted Interviews

Targeted interviews are part of the data and information collection process. The participants listed in the following table were asked questions related to their areas of purview and expertise. An interview guide was used to conduct the interviews. The interview itself was used to promote an open discussion about the community, risks, general concerns related to the community and municipal operations.



Table 1: Targeted Interview List

No.	Name	Job Title
1	Neil Ellis	Mayor of Belleville
2	Rod Bovay	CAO
3	Dan Smith	Former Deputy Fire Chief (current Fire Chief)
4	Don Carter	Deputy Fire Chief
5	Kyle Christopher	Sr. Fire Prevention Officer
6	Steve Morgan	International Association of Fire Fighters, President
7	John Lake	Captain
8	Heather Candle	Director of Economic Development
9	Rob McGlashan and Tracey Newton	Facilities Manager, Marketing and Customer Relations
10	Brandon Ferguson	Director/Treasurer
11	Monique Belair	Director/Fire Chief (former)
12	Joe Reid	Transportation & Operations
13	Stephen Ashton	Engineering
14	Mark Shannon	Former Captain (current Deputy Fire Chief)
15	Glen Lochhead	CLAC Union Steward
16	Andy Noyes	Captain
17	Jeff Keays	Captain
18	Dave MacMullan	Fire Prevention Officer, CLAC Union Steward
19	Phil Cyr	Captain, CLAC Union Steward
20	Shane McGrath	Former Training Officer (urban) (Current Fire Prevention Officer – urban)
21	Jay Allen	Captain, CLAC Union Steward
22	Chris Fry	Rural Training Officer

#### 1.6.4 Online Firefighter Survey

To obtain balanced input, we also employed an online firefighter survey. Our survey methodology offers several unique benefits. First, it offers an opportunity to gather opinions from an entire group as opposed to a limited sample of opinions from a select few. The online survey also offers an extremely flexible approach to the collection of data as respondents can complete the survey questions when it is convenient for them. Additionally, the anonymity of participants is easy to control and therefore may yield more candid and valid responses. Finally, surveys are also extremely time and cost-efficient methods to engage large groups while capturing extensive data. Table 2 below identifies the survey participants from each station.





Table 2: Survey participation for each station

Answer Choices	Responses	
Station 1	46.88%	16
Station 2	34.38%	11
Station 3	9.38%	3
Station 4	9.38%	3
Station 5*	0.00%	0
Total		32

\*Note: Station #5 has not staff assigned, resulting in 0 responses.

**Observation #1:** The online survey was available from January 24th to May 2nd with several prompts made requesting staff participation from BFES management. Typical online survey responses for FMP range from 50% to 80%. Participation in the survey represented approximately 28% of the BFES staff.

**Recommendation #1: The Fire Chief enhances engagement and input to ensure all staff are aware or informed of change initiatives.**

*(Suggested completion: 6-12 months and ongoing)*

**Rationale:** The successful implementation of the fire master plan recommendations will require comprehensive communication with all staff. During change initiatives it is imperative that staff are aware of the change, understand and accept the need for change as part of their role within the organization. This approach will increase overall cohesiveness and reduce resistance.

### 1.6.5 Municipal Comparative Analysis

An industry peer comparative analysis<sup>4</sup> of BFES was conducted as a method of benchmarking the performance of departments to similar municipalities. These benchmarks include budgets, performance, effectiveness, and efficiencies. Although fire and emergency services have the same goal of protecting life and property, each community has its unique features in how to accomplish their goals. Our main criteria for the comparative analysis are indicators of effectiveness and efficiencies amongst the communities for risk and mitigation. The municipal fire services participating in this analysis include City of Welland, Central York Fire Services Addington Highlands Fire and, Kingston Fire & Rescue

<sup>4</sup> Please see Section 3.18 Municipal Comparative Analysis, Page 101



## 1.7 Study Considerations

The following factors that affected both the assessment and effective mitigation of risk were considered and assessed:

### Community-Specific Considerations

- Geographic and physical boundaries for response
- Population and future growth
- Community risk factors
- Community demographic information
- Development and area structure plans
- Multi-jurisdictional requirements and cooperation
- Current and future development impact on risks and response
- Financial resources and constraints
- Impacts of government legislation
- Bylaws affecting the emergency services.
- Economic factors
- Tourism
- Construction
- Industrial activity
- Utilities
- Retail businesses and other services
- Agriculture
- Buildings and structures concentrating on high-risk demands, including business, assembly occupancies, etc.
- Municipal emergency management plans

### Department-Specific Considerations

- Levels of service and service delivery models
- Budgets
- Fire station locations and other infrastructure
- Support services
- Department structure
- Apparatus and equipment inventory, and future needs
- Building space requirements
- Operation and administrative staffing and qualifications
- Bylaw, policies, and procedures
- Fire prevention & public education
- Emergency core service response
- Health and wellness
- Training and recruitment records and standards
- Succession planning
- Prevention programs such as inspections, education, and enforcement
- Records and data management
- Emergency services standard operating guidelines and procedures

## SECTION 2 COMMUNITY PROFILE AND RISK OVERVIEW

### 2.1 Introduction

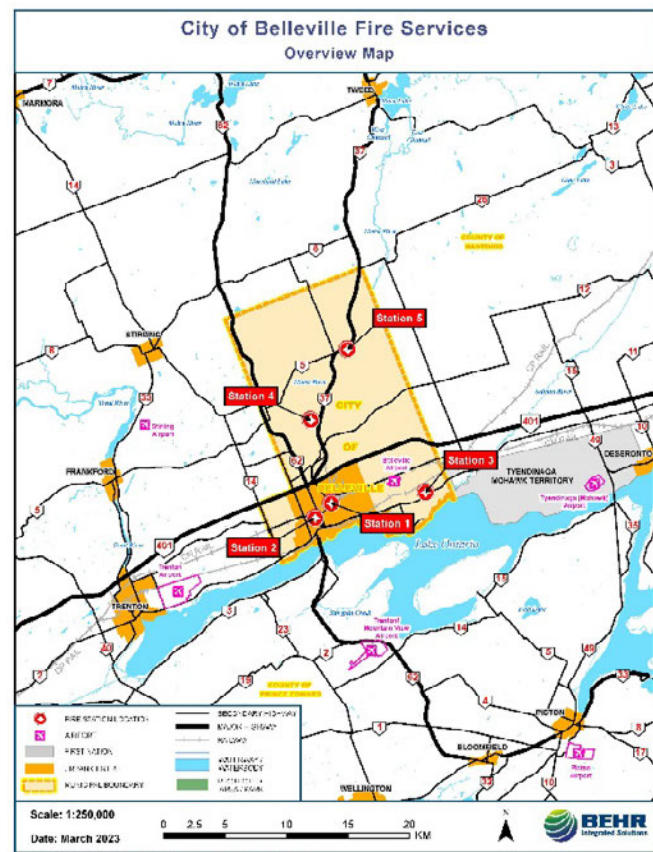
This section includes high level summaries of the Community Risk Assessment (CRA) and the City of Belleville Official Community Plan. This CRA has been developed for the City of Belleville to comply with Ontario Regulation 378/18: Community Risk Assessments (O. Reg. 378/18). O. Reg. 378/18 was made under the authority of the Fire Protection and Prevention Act, 1997 (FPPA) and came into effect on July 1, 2019.

It requires all municipalities in Ontario to develop a CRA prior to July 1st, 2024. This regulation also requires municipalities to “use its community risk assessment to inform decisions about the provisions of fire protection services<sup>5</sup>”. The CRA has been used to inform the Fire Master Plan and is developed as a companion document for the City of Belleville. This CRA is formatted to become a stand-alone document in the future to assist the city in sustaining compliance with O. Reg. 378/18 that includes conducting a review of the CRA when necessary, and annually.

### 2.2 Community Overview

The City of Belleville is located on the north shore of the Bay of Quinte (northern Lake Ontario). The closest urban centres are Kingston Ontario located 83 km to the east, and Toronto, Ontario located 189 km to the west. It is also conveniently located 126 km east of the US/Canada Thousand Islands Bridge border crossing<sup>6</sup>.

The city has a land-based area of 247.15 km<sup>2</sup>, with a population density of 222.8 per km<sup>2</sup>.<sup>7</sup> The land use area is a diverse mix of rural and urban use, classified as residential, with a substantial industrial area to the north of the city centre, as well as to the southeast along the lake. The industrial classifications are divided into seven main sectors: industrial, waterfront industrial, industrial mall, industrial/commercial, rural industrial, waste disposal and service



<sup>5</sup> Community Risk Assessment: Office of the Fire Marshal OFM-TG-02-2019, 2019.

<sup>6</sup> As retrieved from Google Maps

<sup>7</sup> Statistics Canada Population Census, 2021.

industrial. Outside of the core of the city to the north and east the area is designated as agricultural and rural residential<sup>8</sup>.

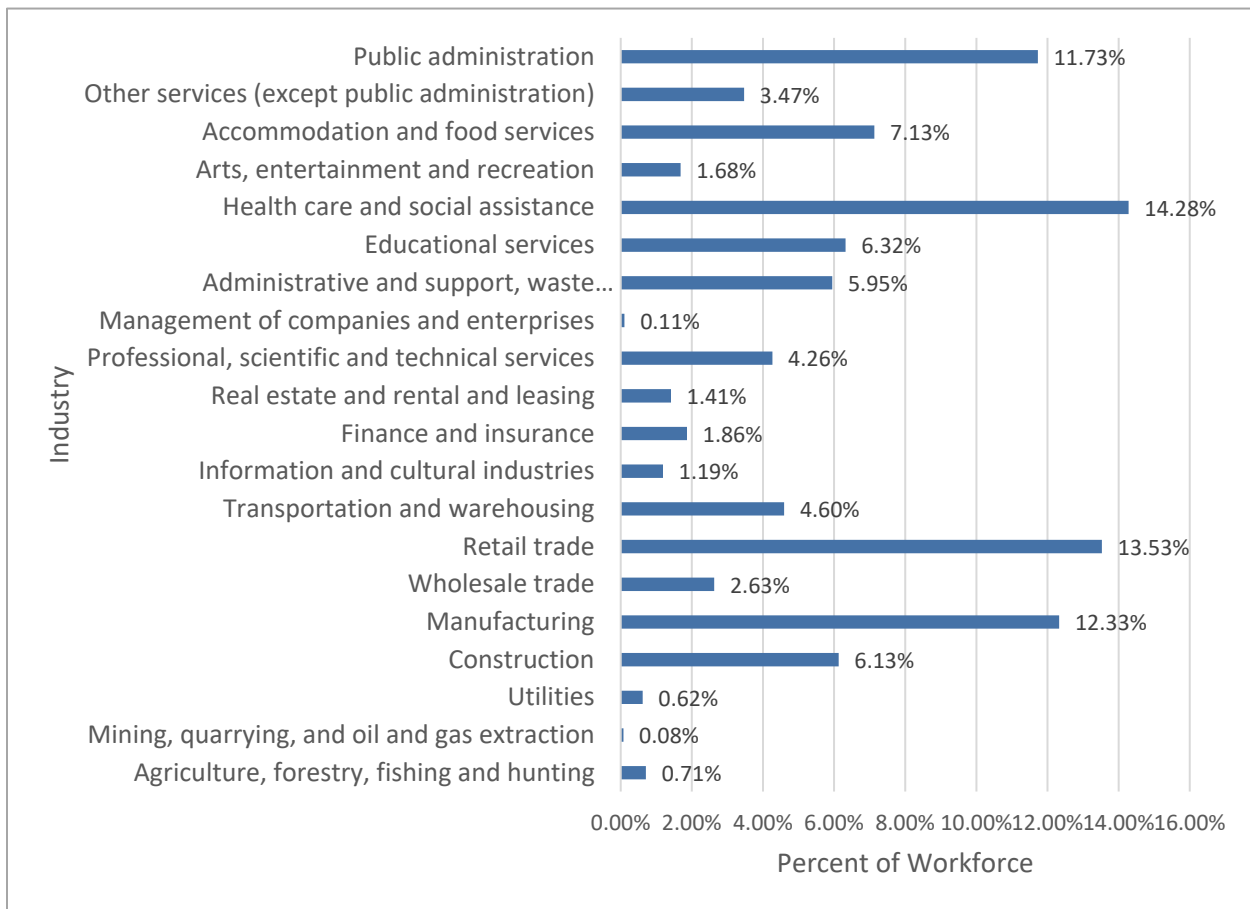
The Bay of Quinte and Moira River watersheds are areas of natural and scientific interest and provide an abundance of wetlands, woodlands, valley, and agricultural lands, as well as fish and wildlife habitat<sup>9</sup>.

### 2.3 Economic Indicators

Certain industries, employers and events contribute to the financial sustainability and economic vitality of a community. A fire or other emergency at key sectors and employment facilities within a community could have significant impacts on local economy and employment.

The top economic sectors in the city are summarized in Figure 2 below. As displayed, roughly 26% of the employed population works in health care and public administration, 13.4% in retail trade and an additional 12.33% in manufacturing.

Figure 2: Economic Sectors (2021)



<sup>8</sup> As retrieved from <https://opendata-bellevillegis.hub.arcgis.com/>

<sup>9</sup> City of Belleville Official Plan 2022.

Belleville has a strong and diverse sector, and the labour force tends to be skilled in the trades sectors<sup>10</sup>. There are several large and mid-sized manufacturing companies that hire a large relative percentage of the workforce. Although there is no single large employer responsible for the disruption to one or more of these manufacturing companies could put a significant amount of people out of work.

Table 3: Major Manufacturers Industries in Belleville

Company	Service Provided
Autosystems	Manufacturer of automotive lighting
Beclawat	Design, engineer and manufacturer of windows and doors for the marine, transit, train, and defense industry
Don-Mac Precision	Precision machine shop
Emmerson Packaging	An industry leader in flexographic printing
GH Manufacturing	poly bag converter and contract packaging solution provider
Hanon Systems	Manufacturer of automotive climate control systems and components
Hexo Corporation	Cannabis processing facility
Maxwell Merchant Solutions	Support, services, and paper products for point-of-sale terminals
Mill-Fab	Millwright, Fabrication and Trade Services
Ontario Truss and Wall	Custom truss manufacturer
ProMetic Life Sciences	Biotechnology
Sofina Foods	Leading Canadian manufacturer of protein products
Sprague Foods	Canned and jarred food producer
Stegg Limited	Precision Machine Shop
Triangle Fluid Controls	Gasket manufacturer
Truss Beverages Co	Producer of cannabis infused beverages

## 2.3 Growth Projections

Over a twenty-year period (2001-2021), the City of Belleville’s population has steadily increased. Simultaneously, the number of total private dwellings has increased from 2001 to 2021. Table 4 illustrates that the rate of increase for both the population and total private dwellings has increased most significantly over the past five years with an 8.6% increase in total population and an 8.1% increase between 2016 and 2021.

<sup>10</sup> <https://www.belleville.ca/en/do-business/industry-and-labour.aspx>

Table 4: Historic Growth in Population and Households – City of Belleville

Year	Population	% Change	Total Private Dwellings	% Change
2001	46,029	No Data	20,239	No Data
2006	48,821	6.10	21,239	4.90
2011	49,454	1.30	22,153	4.30
2016	50,716	2.60	22,744	2.60
2021	55,071	8.60	24,582	8.10

Source: 2021, 2016, 2011, 2006, 2001 Census, Statistics Canada

During the same twenty-year period (2001-2021), the larger Belleville-Quinte West Census metropolitan area population as well as the number of total private dwellings steadily increased. Table 5 illustrates that the rate of increase for both the population and total private dwellings has increased at a slightly slower rate than that of the City of Belleville, however, has also seen the rate jump most significantly over the past five years with an 7.5% increase in total population and an 7.2% increase between 2016 and 2021.

Table 5: Historic Growth in Population and Households - Belleville-Quinte West Census metropolitan area

Year	Population	% Change	Total Private Dwellings	% Change
2001	87,395	No Data	20,239	No Data
2006	91,518	4.70	38,851	91.90
2011	92,540	1.10	40,389	3.90
2016	103,401	11.70	45,023	11.40
2021	111,184	7.50	48,274	7.20

Source: 2021, 2016, 2011, 2006, 2001 Census, Statistics Canada

## 2.4 Community Demographics

A core component of assessing risk factors is analysis of the community demographic. This analysis would also identify specific measures to mitigate risks associated with a specific age group, such as seniors. The 2021 Census identifies a total population of 55,071 for the City of Belleville. The age distributions of the City’s population and Ontario’s population are and compared in Table 6.



Table 6: Population by Age Group – City of Belleville and Ontario

Age	Belleville Population	Belleville Percentage of Population	Ontario Population	Ontario Percentage of Population
0 to 4 years	2490	4.50	683,515	4.80
5 to 9 years	2790	5.10	764,430	5.40
10 to 14 years	2945	5.80	803,850	5.70
15 to 19 years	2810	5.10	801,455	5.60
20 to 24 years	3120	5.70	895,600	6.30
25 to 29 years	3550	6.40	975,400	6.90
30 to 34 years	3355	6.10	981,210	6.90
35 to 39 years	3155	5.70	948,030	6.70
40 to 44 years	3185	5.80	890,160	6.30
45 to 49 years	3,070	5.60	894,580	6.30
50 to 54 years	3,185	5.80	941,270	6.60
55 to 59 years	4,175	7.60	1,040,160	7.30
60 to 64 years	4,210	7.60	966,575	6.80
65 to 69 years	3,765	6.80	813,215	5.70
70 to 74 years	3,280	6.00	691,280	4.90
75 to 79 years	2,350	4.30	469,485	3.30
80 to 84 years	1,695	3.10	325,110	2.30
85 to 89 years	1,140	2.10	205,480	1.40
90 to 94 years	605	1.10	101,430	0.70
95 to 99 years	175	0.30	28,000	0.20
100 +	20	0.00	3,705	0.00
<b>Total</b>	<b>55,071</b>	<b>100.00</b>	<b>14,223,940</b>	<b>100.00</b>
Median Age of the Population	45.20		42	
Population aged 14 and under	8,225	14.90	2,251,795	15.83
Population aged 65 and over	13,030	23.70	2,637,710	18.54

Source: 2021 Census, Statistics Canada





The youngest demographic (those 14 years of age and under) represents 14.9% of the City's total population, which is slightly lower in comparison to the province (15.8%). While at a lower risk of fatality in residential occupancies overall when compared to seniors or adults, youth (aged 14 years and under) represent an important demographic for the purposes of public education. As a result, there is value in targeting public education and prevention programs to this demographic. Structured education programs consistently provided to children and youth can help to engrain fire and life safety awareness and knowledge into future generations.

The percentage of the population aged 65 years and older in Belleville represents 23.7% of the total population, which is 5.2% higher than the province (18.5%). This is significant. An additional 15.0% of the City's population falls between the age group of 55 and 64, who are aging towards the senior's demographic of 65 years of age and older. Based on historic residential fire fatality data, this population will become seniors who will be at greater risk. These demographic trends are important considerations for the development of informed targeted public education programs and risk reduction strategies within the community.

As previously indicated a community's population by age is an important factor in identifying specific measures to mitigate risks associated with a specific age group, such as seniors. Canada's aging population has been recognized as one of the most significant demographic trends. According to Statistics Canada, from 2016 to 2021 Canada experienced a large increase in the proportion of seniors since Confederation" due to the baby boomer generation reaching the age of 65. There are more Canadians over the age of 65 (19.0% of the population) than there are children aged 14 years and younger (16.3%).<sup>11</sup>

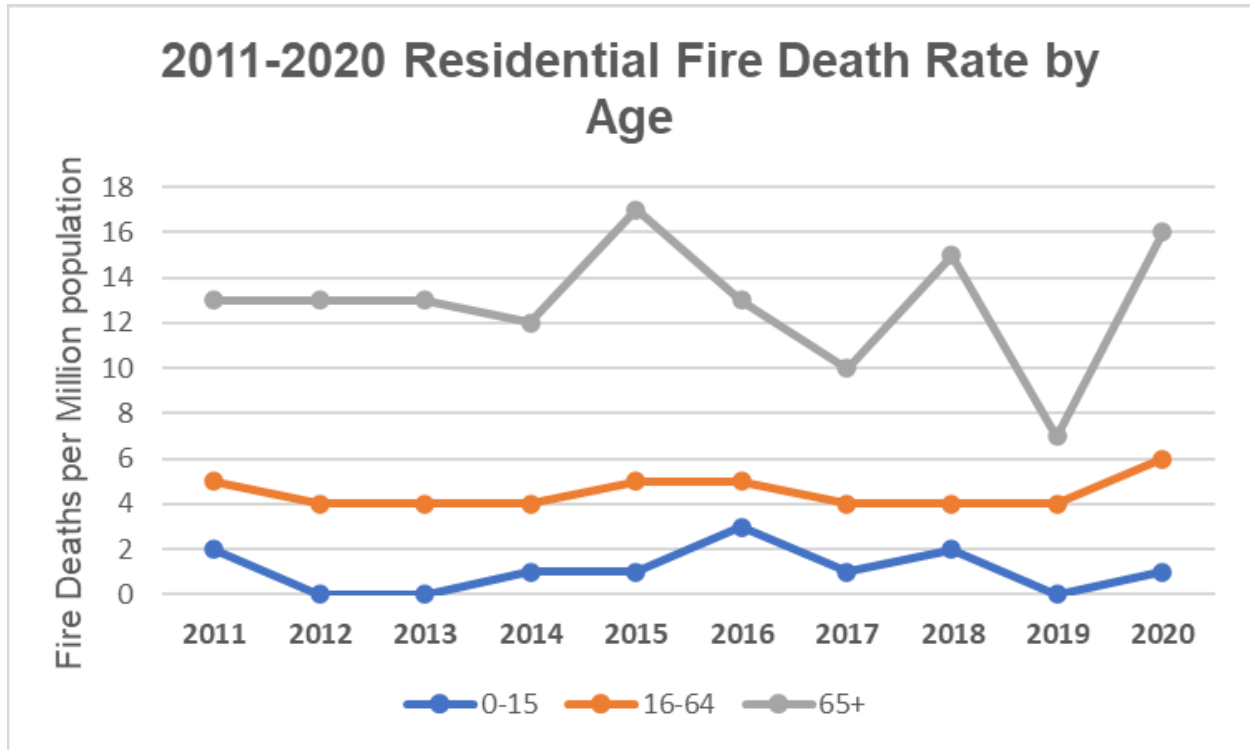
Seniors (those 65 years and over) are considered to represent one of the highest fire risk groups across the province based on residential fire death rate (fire deaths per million of population).

Figure 3 illustrates the number of fire deaths in Ontario through 2020. Seniors are identified at an increased risk of fatality in residential occupancies when compared to other age groups.

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<sup>11</sup> Statistics Canada. (2017, May). *The Daily: Age and sex, and type of dwelling data: key results from the 2016 Census*. Retrieved from <http://www.statcan.gc.ca/daily-quotidien/170503/dq170503a-eng.htm?HPA=1>

Figure 3: 2011-2020 Residential Fire Death Rate by Age of Victim



Source: Adapted based on Office of the Fire Marshal and Emergency Management reported residential fatal fires.<sup>12</sup>

## 2.5 Community Planning and Development

The City’s population is projected to increase by 6,400 people by 2041 to approximately 58,300 inhabitants, a growth rate of roughly 0.5% per year. Over the forecast period of 2016-2038, approximately 90-95% of City-wide housing growth should occur in the urban area and approximately 5-10% of City-wide housing growth should occur through rural growth. Growth will be accommodated through efficient use of existing serviced land, the logical extension or improvement of services, and appropriate infilling. The urban service area will be the focus of most of the future residential growth and non-residential development.

In the rural areas, the Hamlets of Foxboro, Plainfield, Latta, Roslin, Halloway, and Point Anne will continue to function as local service centres and the focus of growth in the rural area. The Municipality will provide a range of housing opportunities located primarily in the urban serviced area, but additional limited residential development will be permitted in hamlets and traditional rural areas.

<sup>12</sup> Office of the Fire Marshal and Emergency Management. (Revised 2018, November). Ontario Residential Fatal Fires. Retrieved from [Ministry of the Solicitor General Website](#)



The City of Belleville has developed a comprehensive Official Community Plan dated October 2021. The Official Community Plan includes a vision statement to provide the overarching guidance for development within the municipality.

### **Vision Statement**

*The City of Belleville is a diverse urban and rural community strategically located on the Moira River and Bay of Quinte, providing the benefits of a high quality of life, a broad range of economic development opportunities, valued natural and cultural heritage amenities and a full range of essential services. The Municipality shall strive to create a balance of economic, social, cultural, and natural environments for the development of a sustainable well-planned, financially sound community that values its natural and cultural heritage and offers opportunities for its residents to prosper.*

The Vision identifies and directs strategies and planning policies of this Plan to create a diversity of economic development opportunities in balance with the provision of services in a financially sound framework. It recognizes the importance of industry and commerce to the economic structure of the community and the importance that small business and entrepreneurship must play in the City's future. The Vision recognizes that the City's location on the Moira River and Bay of Quinte provides natural resources that sustain the community; these resources include productive agricultural lands, ground and surface waters, wildlife habitat, active and passive recreational opportunities, and areas of scenic beauty. The Vision encourages a balance in growth through both new development and redevelopment to ensure the most efficient use of the Municipality's investment in infrastructure. Responsible and sustainable growth by way of development and redevelopment in all sectors of the City's economy will be encouraged within the context of the Vision.

Specific elements beyond growth pressures and settlement patterns include:

**The future of the city:** The City will continue to build on its primary strength – diversity – that makes it a dynamic community. This diversity includes a mix of urban and rural lifestyles, small and large industrial and commercial business and employment opportunities, a wide array of housing types, and a full range of urban and rural services.

Much of this diversity has been made possible due to the broad range of excellent transportation resources available (highway, rail, air, water). Diversity will be enhanced by preserving important elements of the City's cultural heritage resources, and by accommodating new trends and technological changes. Through the mix of urban and rural settings and the medium sized scale of the urban area, the city will be attractive for persons seeking an alternative to large urban centres, and for persons relocating for retirement purposes.

The City of Belleville will continue to evolve as the social and cultural centre of a larger region and will strive to maintain historically shared values. These values include a strong sense of community, a sense of belonging, a tradition of self-reliance, social responsibility, and appreciation of natural and cultural heritage. The City of Belleville will be a healthy, progressive, diverse, and economically vibrant community that invests in its future in a financially sustainable and environmentally responsible manner.



**Environmental and Physical Resources:** The City's setting on the Moira River and Bay of Quinte is characterized by a diversity of natural features. As settlement pressures have increased, so has the awareness of environmental issues and the need to link economic growth with environmental sustainability and proper environmental and land-use planning can avoid damage in the future, and remediation of existing conditions can improve the state of the local environment.

The Bay of Quinte and Moira River watersheds, including both surface and groundwater, are essential sources of water for human use, and provide important recreational and economic development opportunities. Prime agricultural lands are in the traditionally rural areas of the city and are required to provide sources of food and of economic activity. The city supports green infrastructure meaning natural and human-made elements that provide ecological and hydrological functions and processes. These can include components such as natural heritage features and systems, parklands, storm water management systems, street trees, urban forests, natural channels, permeable surfaces, and green roofs.

**Economic Development** The economic success of the city is due largely to the community's geographic location within easy travel distance to the Cities of Toronto, Ottawa and Montreal, the U.S. border, and its vicinity to the Bay of Quinte.

Among the most important reasons for the City's prosperity have been and will continue to be the excellent quality of life afforded the City's residents, the excellent transportation linkages to major markets, and the highly diverse economic base. Employment opportunities will be provided through a balance of manufacturing, research and development, education, agriculture, tourism, and commercial and industrial uses in areas designated and determined to be best suited for each economic sector.

The Municipality encourages the establishment of retail small businesses and service commercial small businesses in the community and promotes the downtown core as a major focus of economic activity. A well-rounded, vibrant community with economic opportunities for people of all ages will be an objective of the Municipality. Due in part to the fact that the City of Belleville includes the largest urban area in the Quinte region, the city will continue to be the centre of economic activity and employment opportunities. In planning for the community, the Municipality will consider the downtown core and industrial areas being defined in whole or in part as enterprise zones.

The Municipality will foster a climate for innovative economic opportunities, with cooperation among members of the community and all levels of government. More non-residential taxable assessment will be promoted to lessen the dependency on existing and future residents.

The Municipality will give due consideration to the residential/non-residential assessment ratio and endeavour to maintain a favourable balance of assessment to ensure a sound economic future for the city, essential to the well-being of all businesses and the residents of the community. The Municipality will ensure that suitable serviced employment lands are available to meet the needs of all potential industrial and commercial investments and will encourage remediation and redevelopment of underutilized lands. The Municipality will recognize the economic importance of culture in the Region when establishing future economic priorities. This



includes tourism development opportunities, as well as expanding the City's base of creative cultural industries and occupations. The Municipality will also leverage its identified cultural resources to help enhance and revitalize the downtown area. This will include creating opportunities and spaces to accommodate a culturally vibrant downtown and waterfront revitalization.

**Agriculture:** Agriculture will continue to be an important generator of economic activity in the rural sector and is recognized as the foundation for the rural community. In future, there will continue to be a distinct and important rural component to the city. Businesses that support the agricultural sector by adding value to farm products will be encouraged.

An objective of this Plan will be to discourage or prevent unnecessary or inappropriate encroachment or development of incompatible land uses within the immediate vicinity of significant agricultural resources. Large scale agricultural operations will be required to develop comprehensive waste management plans to protect surface and ground waters.

**Tourism:** There will be a strong tourist demand in the future for the natural, historical, and cultural attractions of the city and region. The Municipality is committed to providing opportunities for sustainable tourism development. The protection and enhancement of the area's significant natural, historical, and cultural attractions will be the focus of the region's successful tourism strategy. The Bay of Quinte and Moira River will play important roles in this regard. Tourist support services will be expanded to complement and enhance the attractions of the city.

An increased number of recreational facilities and opportunities will be encouraged in many parts of the community to service the leisure needs of the tourists and residents of the city and region.

**Commerce and Industry:** The commercial service sector comprised of community, business and personal services will be encouraged to expand and diversify. The urban serviced area will be the focus of most of the future commercial and industrial activity. Expansion of the retail commercial sector will be promoted to expand the City's primary and secondary market area.

The City Centre will be strengthened as a focal point for the city by encouraging the development of a wide variety of compatible land uses with emphasis on retail and office commercial uses and residential projects, the improvement of its urban design, built form and functional characteristics, including the promotion of pedestrian friendly services and diversity through a wide variety of commercial, social, and cultural activities. Where appropriate, mixed-use development that incorporates commercial land uses will be encouraged, such as within the City Centre.

This Plan will endeavour to ensure the availability of sufficient industrial and commercial land with access to full municipal services and public and private transportation systems in the urban serviced area to meet a wide range of development needs. This Plan also encourages municipal acquisition of Employment Lands.

**Social Needs:** The well-being of the City's residents will depend upon the effective delivery of:

- professional health care services (i.e., a full range of professional medical service providers, public health programs, emergency care, full-service hospital).
- affordable and well-maintained housing for people of all ages, financial capacity, and levels of independence (one-unit dwellings, multi-unit dwellings, home sharing, nursing homes, long-term care homes, etc.).
- provide strategies to address homelessness and the services needed by such clients.
- health and community services including those that rely greatly on the efforts and donations of volunteers from within the community.
- education that provides skills for healthy living, professional development, self-fulfillment, and employment opportunities within the city.
- recreational programs and events that encourage physical activity and social interaction for all age groups.
- the incorporation of the principles of active transportation into municipal infrastructure projects, where possible and economical to do so.
- an accessible physical environment.
- cultural programs and activities that offer enrichment and education and that foster an appreciation of the City's cultural heritage.
- a healthy environment and biodiversity to be enjoyed by all.
- opportunities for investment to create employment for all ages and abilities, and services for the local population.
- Health care and social services will be community based and accessible; the urban serviced area will serve as a base for the administration of health services.

New community facilities and public uses should be directed to areas where they will contribute to the creation of a community hub, making better use of public space and improving the community's access to services. Services should also be located near long term care homes.

**Linkage (transportation and communication networks):** The transportation, servicing and communication networks will constitute the primary linkages within the city and between the city and the region that residents and visitors will utilize. It will be an ongoing goal of the Municipality to minimize the time, distance, economic and energy costs of movement for persons, goods and information within the city while maintaining public safety.

Electronic linkages (fibre optic cabling, digital switching, wireless communication systems, etc.) to assist or encourage businesses, telecommuters, home occupations and communication will become more important in the future, and this Plan supports the installation of infrastructure to ensure businesses residents of the city have access to leading-edge technology, including the promotion of connectivity in the rural areas.

The Bay of Quinte and Moira River corridor will be major elements in the recreation linkages of the city.





The protection of existing and former railway corridors will be encouraged for such potential uses such as communication and utility infrastructure, transportation corridors, and for recreational activities where appropriate.

Air and rail transportation facilities should be protected from incompatible development and enhanced where feasible.

Individual private modes of transportation will continue to be relied upon in the future. Public transportation will be provided to link more densely populated parts of the city with major commercial, industrial and education nodes.

The integrity of the existing provincial and city road networks shall be maintained and upgraded and integrated with cycling and walking routes as much as possible.

Within built-up areas, emphasis will be placed on designing facilities that encourage walking. Walking trails that connect shoreline areas, valleys, existing parks or other important physical or man-made features will be developed wherever possible while minimizing impact on sensitive lands.

**Sustainability:** Sustainable development is development that recognizes the interdependence of the economic, environmental, and cultural needs of the community. It promotes actions that expand economic opportunity, improve environmental quality, increase social well-being, and expands cultural engagement. A sustainable community is one that incorporates the elements of sustainable development and successfully balances social well-being, cultural identity and vitality, economic opportunities, and environmental responsibility meets the needs of other communities in the Quinte region.

**Housing:** The Municipality will accommodate a range of housing choices, including affordable housing options to meet the growing and changing needs of the city. This will include one-unit dwellings, townhouse dwellings, multi-unit dwellings and condominiums. The provision of these housing types will be varied, with some stock being provided on greenfield lands, and others in strategic infill locations.

The Municipality supports intensification as a means of achieving an efficient use of land and infrastructure, curbing urban sprawl, and creating more walkable neighbourhoods, while also meeting the projected needs of the city. The City Centre area is expected to accommodate a range of intensification types, including mid to high rise buildings, infill, adaptive reuse and redevelopment and live-work buildings.

Arterial roadways and corridors will accommodate intensification like the City Centre, decreasing in intensity further from the City Centre. Intensification will also be encouraged in underutilized areas throughout the city.

**Mixed Use:** The Municipality encourages mixed use developments that supports live/work opportunities and contributes to the creation of liveable, vibrant, and resilient communities. Mixed use development is encouraged in specific areas where it will strengthen the City's urban fabric, such as in areas identified for intensification.



## 2.6 Community Risk Assessment

Every municipality has unique characteristics and challenges contributing to risk. Risk can be managed through either accepting the risk, insuring against damages, or investing in risk prevention and mitigation strategies. Local governments typically employ a combination of these approaches. In general, the risks and management strategies of a community are relative to a municipality's financial capacity, geography, population demographics, fixed assets, and critical infrastructure, as well as overall service delivery.

A CRA provides a high-level community assessment of risk associated with fire and hazards, specifically focusing on the high-priority risks managed with a fire department response. High-priority risks are those associated with a high consequence or those that have moderate consequences and greater likelihood of occurring. The overall purpose of conducting a risk assessment is to establish an immediate, short-term, and long-range general strategy for the management these types of community risks.

### **Risk Evaluation**

- *Identify the existing risks and assign a value to specific risks based on quantitative and qualitative data.*
- *Identify fire department management strategies for high priority risks.*
- *Predict future risks.*

Conducting a CRA is the first step towards establishing a strategic plan to manage community risks based upon local fire department response capabilities. The results are used to assist the municipality in making informed decisions regarding the allocation of limited fire prevention and fire response resources.

This CRA as previously identified has been developed for the City of Belleville in accordance with the Ontario Regulation 378/18: Community Risk Assessments (O. Reg. 378/18), under the authority of the Fire Protection and Prevention Act, 1997 (FPPA).

### **2.6.1 Factors Contributing to Risk**

As mentioned, every municipality has unique challenges and characteristics contributing to the overall risk profile of the community. Some general examples of challenges that may impact community risks include:

- Fire and rescue service model and response capacity
- Population and demographics
- Population growth rate
- Industry types
- Economy
- Rate of development
- Transportation corridor types
- Topography
- Weather
- Historical response data

## 2.6.2 Risk Management

All communities require a process to identify and actively manage high-priority risks. As previously discussed, there are several approaches to managing risk. The focus of this report is to identify and discuss specific risks, and unique community characteristics that contribute to risk, typically managed through fire prevention or fire department response. Image 1 describes the risk management cycle. The first step in the risk management process includes the assessment of the probability and consequence of specific risks. The next step is the assessment to identify key risks which are then evaluated against the current prevention or response strategy to identify potential service gaps. The third step in this cycle includes adjusting fire prevention and response.

Image 1: Risk Management Cycle Process



service levels to manage the resources necessary to pre-emptively mitigate or respond as determined by approved service levels. The final step in cycle is to measure and report results to key policy makers. This cycle should be repeated periodically to address changes in the risk profile and make thoughtful and informed decisions regarding strategies to manage any changes.

In Canada, local governments are charged with delivering most of the fire and rescue response services for their citizens. Elected officials are the Authority Having Jurisdiction (AHJ) who ultimately determine the level of service required to manage fire and rescue risks to an acceptable level within their jurisdiction. The challenge for elected officials lies in determining the best balance between investing in adequate emergency services and accepting a certain level of risk.

## 2.7 Risk Evaluation vs. Service Levels

The evaluation of fire or rescue risks considers both the probability and consequence of emergency event types. The probability of an event is quantified by analyzing historical, current, and projected data. The consequence of the event type or risk is based on an informed assessment of the potential impact on a community should the event occur.

**Probability** – The probability of a risk, or event type, is the determined likelihood that an event will occur within a given time. The probability is quantified by considering the frequency of event type data. An event that occurs daily is highly probable and therefore higher risk. An event that occurs only once in a century is assessed as a lower risk as it may never occur.



**Consequence** – There are three types of consequences when considering possible fire/rescue response requirements:

- **Life safety impact:** Life safety risk for victims and responding emergency personnel are the highest order of consequence when considering the risk associated with specific event types. Events with a high likelihood of injury/death occurring and even a moderate probability of occurring require close examination to ensure adequate resources required to safely rescue or protect the lives of occupants from life-threatening are accessible to respond. Incidents that risk life safety include motor vehicle accidents, extreme weather, flooding, fire, release of hazardous materials, medical emergencies, and all types of rescue situations.
- **Economic impact:** Events with high negative impact on the local economy are devastating to a municipality. For example, recovering from the fire loss of a large employer’s property or key public infrastructure in smaller municipalities can be difficult. Therefore, providing adequate response capacity necessary to manage these types of events must be considered.
- **Environmental impact:** Negative environmental consequences resulting in irreversible or long-term damage to the environment must also be considered in the analysis. Events with risk of negatively impacting water, soil and air quality are also likely to impact life safety as well as the economy and therefore must be considered.

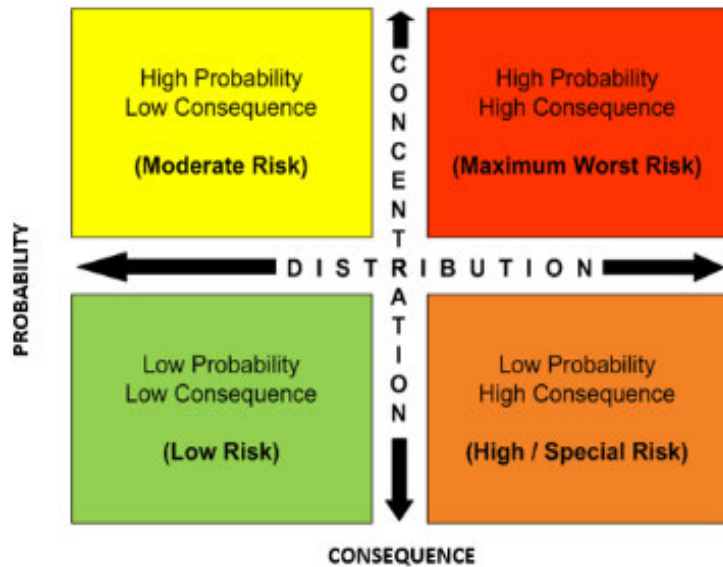
Social and cultural impacts as experienced with the loss of historic buildings, recreation facilities or non-critical community infrastructure, are considered but do not typically affect how fire department resources are deployed.

As discussed, the risk evaluation process is used to identify high-priority risks and the appropriate risk management strategy. Where a fire department response is determined to be the most appropriate management strategy, the appropriate services and service levels should be established to safely manage the risks. Elected officials are responsible for determining which services are delivered and setting service level goals. The service level goals determine the necessary concentration and distribution of either fire prevention or emergency response resources to safely manage the identified risks.

**Distribution** refers to the number of fixed resources, such as fire stations, and where they are placed throughout the community. Distribution varies depending on factors related to the number of incidents and types of calls for service in the defined area.

**Concentration** refers to the assembling of resources, such as a specialized work force and equipment, needed to effectively respond to an incident in each area within the community. It must also identify the availability of additional response resources including the reliability and time of arrival of a secondary responding unit.

Figure 4: Risk Evaluation Matrix



The risk evaluation matrix (see Figure 4.) can be divided into four levels of risk based on the probability and consequence, each with specific implications for the concentration and distribution of resources. It is provided as a reference and context for use of the matrix to quantify fire response risks in your municipality. Different quadrants of the risk matrix need different response requirements.

Table 7 offers examples of categories of types of structural fires and general hazards commonly found in communities. As described above, these risks are categorized by considering the probability and consequence of the fire or hazard. This qualitative analysis is based on experience and expertise, and should be completed with input from fire, building and emergency management officials. Every community will have a unique risk inventory contributing to its risk profile.

Table 7: Risk Inventory (Sample Only)

<p><b>Low Risk = Low Probability and Low Consequence</b></p> <p>This category is limited to areas or incidents having a low probability of fire risk and low consequence for the potential for loss of life or economic loss. Some low risks include:</p> <ul style="list-style-type: none"> <li>• Outdoor fire pits</li> <li>• Non-structure lightning strikes</li> <li>• Vacant land</li> <li>• Parks without structures</li> <li>• Isolated structures such as sheds</li> </ul>
<p><b>Moderate Risk = High Probability and Low Consequence</b></p> <p>Most responses fall under this category. Moderate risks include:</p> <ul style="list-style-type: none"> <li>• Motor vehicle collisions</li> <li>• Carbon monoxide detection (emergency medical co-response)</li> <li>• Monitoring/local alarms</li> <li>• Vehicle fires</li> <li>• Dangerous goods incidents with small quantities of a known product (20 litres or less), outdoor odours (natural gas or unknown)</li> <li>• Miscellaneous explosions</li> <li>• Emergency standbys</li> <li>• Smoke</li> <li>• Odours</li> <li>• Fires: <ul style="list-style-type: none"> <li>○ garbage</li> <li>○ detached garages</li> <li>○ single or multi-family residential fires</li> <li>○ small non-residential buildings less than 600 square metres</li> </ul> </li> </ul>
<p><b>High Risk = Low Probability and High Consequence</b></p> <p>There are very few properties/responses that are considered high probability, high consequence. These properties are categorized as large properties, over 600 square metres, without adequate built-in fire protection systems, or that has large concentrations of people or has a significant impact on the local economy. High risks include:</p> <ul style="list-style-type: none"> <li>• Commercial, industrial warehouse</li> <li>• Dangerous goods incidents with large quantities of known products (75 litres or more), unknown products or large exposure</li> <li>• Hospitals, care homes, institutions</li> <li>• Derailments &amp; transportation of dangerous goods</li> <li>• Aircraft crashes on or off the airport</li> <li>• Bulk fuel storage facility fire/explosion</li> </ul>
<p><b>Maximum Risk = High Probability and High Consequence</b></p> <p>This category of risk can be categorized as properties over 600 square metres that have high economic value in the form of employment or are not easily replaceable, or natural disasters occurring in highly populated areas, creating high life and property loss potential and strains on the department and other agency resources. Damage to properties in this category could result in temporary job loss or permanent closure of the business. Such properties are highly regulated or possess built-in fire protection systems. Some maximum risks include:</p> <ul style="list-style-type: none"> <li>• Wildland fires</li> <li>• Weather related events (floods, tornadoes, severe storms etc.)</li> <li>• Large vehicle accidents, pileups, derailments</li> <li>• Quantities of known flammable products (500-1000 litres)</li> <li>• Explosions or substation electrical fires</li> <li>• Confirmed natural gas leak</li> </ul>

### 2.7.1 CRA Assigning Risk Level

Once probability and consequence are determined the level of risk is calculated by multiplying the numerical values for probability and consequence. The relationship between probability and consequence as it pertains to risk levels can be illustrated in a risk matrix (below). In a risk matrix, probability and consequence are defined on separate scales with varying descriptors providing direction on how to assign the probability and consequence of an event. Figure 5 shows the risk matrix concept utilized for the CRA.

Figure 5: Risk Matrix Template

Almost Certain 10,000	Moderate Risk	Moderate Risk	High Risk	High Risk	High Risk
Likely 1,000	Moderate Risk	Moderate Risk	Moderate Risk	High Risk	High Risk
Possible 100	Low Risk	Moderate Risk	Moderate Risk	Moderate Risk	High Risk
Unlikely 10	Low Risk	Low Risk	Moderate Risk	Moderate Risk	Moderate Risk
Rare 1	Low Risk	Low Risk	Low Risk	Moderate Risk	Moderate Risk
	Insignificant 1	Minor 10	Moderate 100	Major 1,000	Catastrophic 10,000

The purpose of assigning a risk level is to assist in the prioritization of the range of risks that are identified in the CRA. Where possible, quantitative data was used to inform the risk assignment as described in the rationale in the table. It is important to recognize that with the availability of new or updated data, the probability levels could change or be refined. It should also be recognized that, as identified in the Office of the Fire Marshal Community Risk Assessment Guide (Office of the Fire Marshal and Emergency Management T.G.-02-2019,) “professional judgment based on experience should also be exercised in combination with historical information to estimate probability levels.

Similarly, Office of the Fire Marshal and Emergency Management T.G.-02-2019 acknowledges the role of professional judgment and reviews of past occurrences in determining consequence levels. The rationale provided for both probability and consequence consider information from the CRA’s nine profiles, as Office of the Fire Marshal and Emergency Management T.G.-02-2019 supports consideration of the profiles together to inform



decision-making about the provision of fire protection services in the specific municipality/community.

## 2.8 Structural Fire Risk Analysis

It is critical to use careful planning and consider alternative solutions when managing risk because the ability to increase the distribution of resources and add capacity is always limited. Spending large amounts of time and resources to manage a risk with low frequency/low consequences will have limited impact and make a minimal improvement to community safety. When planning for fire department response, the planning process includes a detailed review of the frequency of events and their potential consequence(s) to ensure prevention and response efforts maximize life safety and minimize negative consequences for high-priority events.

As previously stated, the Office of the Fire Marshal (OFM) has developed guideline to assist municipalities with conducting community risk assessments to inform decisions about the provision of fire protection services, in accordance with Ontario Regulation 378/18 and the FPPA.

As referenced in O. Reg. 378/18, the building stock profile assessment includes analysis of the types and uses of building stock of a municipality. Important considerations include the number of buildings of each type, the number of buildings of each use and any building related risks known to the fire department. There are potential fire risks associated with different types or uses of buildings given the presence or absence of fire safety systems and equipment at time of construction and maintenance thereafter. This section considers these building characteristics within the municipality.

## 2.9 Ontario Building Code Occupancy Classifications

OFM TG-02-2019 encourages fire departments to consider the potential fire-related risks associated with different building occupancy types and building uses. This includes consideration of each occupancy classification's prevalence within a community and the presence of fire and life safety systems and equipment. The Ontario Building Code (OBC) categorizes buildings by major occupancy classification. Utilizing the OBC major building occupancy classifications is consistent with the intent of TG-02-2019 to provide a recognized definition and baseline for developing a community risk assessment.

The OBC is divided into six major building occupancy classifications (groups). Within each group the occupancies are further defined by division. The OBC major classification groups and divisions are presented in Table 8.



Table 8: OBC Major Occupancy Classifications

Group	Division	Description of Major Occupancies
A	1	Assembly occupancies intended for the production and viewing of the performing arts
A	2	Assembly occupancies not elsewhere classified in Group A
A	3	Assembly occupancies of the arena type
A	4	Assembly occupancies in which occupants are gathered in the open air
B	1	Detention occupancies
B	2	Care and treatment occupancies
B	3	Care occupancies
C	All divisions	Residential occupancies
D	All divisions	Business and personal services occupancies
E	All divisions	Mercantile occupancies
F	1	High-hazard industrial occupancies
F	2	Medium-hazard industrial occupancies
F	3	Low-hazard industrial occupancies

Source: Ontario Building Code <sup>13</sup>

## 2.10 OFM Fire Risk Sub-Model Occupancy Classifications

The Fire Risk Sub-model developed by the OFM utilizes the major group classifications (i.e., Group A, B, C, D, E, F), but does not use the detailed division classifications as included in the OBC. This strategy provides the ability to assess buildings within a community comparatively by major occupancy groups, thus providing a consistent and recognized definition for each major occupancy type. This strategy also provides the opportunity for further analysis of a specific occupancy group. Subject to any site-specific hazards or concerns, occupancies within this group can be assessed individually and then included where required within the scope of the broader Community Risk Assessment. The OFM Fire Risk Sub-Model OBC classifications, definitions and associated fire related risks are presented in **Error! Reference source not found.** Table 9 along with potential proactive measures to reduce risk within these occupancy types.

## 2.11 Existing Major Building Classifications Summary

The majority of the City’s existing property stock is comprised of Group C - Residential Occupancies (93.7%) representing 18,628 residential units. The second largest occupancy type within the City is Group D&E– Commercial Occupancies accounting for 2.4% of the City’s property stock. There are 245 occupancies that are not classified within the OBC, including 237 farm buildings and 8 managed forest properties (as classified by Municipal Property Assessment Corporation).

<sup>13</sup> Ontario Regulation 332/12: Building Code, Part III Fire Protection, Occupant Safety and Accessibility, Section 3.1.2.1.

Table 9: City of Belleville Total Existing Property Stock

OBC Occupancy Classification	OFM Fire Risk Sub-Model Major Building Classifications	Number of Occupancies	Percentage of Occupancies
Group A	Assembly Occupancies	139	0.70
Group B	Care or Detention Occupancies	29	0.10
Group C	Residential Occupancies - Total	18,628	93.70
Group C	Single Family	15,334	77.20
Group C	Multi-unit Residential	1072	5.40
Group C	Hotel / Motel	13	0.10
Group C	Mobile Homes / Trailers	3	0.02
Groups D & E	Commercial	477	2.40
Group F (all Divisions combined)	Industrial Occupancies	355	1.80
Other	Not classified in Ontario Building Code - Farm	237	1.20
Other	Not classified in Ontario Building Code - Government	8	0.04
Other	Not classified in Ontario Building Code- Vacant Land	1,335	6.30
<b>Total Occupancy Classification</b>		<b>21,208</b>	

Consistent with most other municipalities in Canada, Group C - Residential Occupancies represent the most prominent type of building occupancy type within the City of Belleville. Within Ontario, information provided by the OFM indicates that the majority of structure fires loss over the five-year period from January 1, 2018, to December 31, 2022, occurred within Group C - Residential Occupancies (67%). The City has a higher percentage of single detached houses (59.40%) compared to the province at 53.59%. Belleville has a much lower percentage of apartments in buildings of five stories or higher however a much higher percentage of apartments in low rise buildings with fewer than five stories.

It is also important to note that 93% of the civilian fire related injuries, 100% of the civilian fire related fatalities and 74% of the dollar loss also occurred in residential occupancies.

Group F – Industrial Occupancies account for only 1.8% of the building stock however, it accounts for 10% of the fire loss.

## 2.12 Potential High-Fire Risk Occupancies

Potential high-fire risk occupancy is another factor for consideration within a city’s building stock. High fire risk can be linked to a combination of factors such as building density (exposures), building age, and construction. Fuel load typically refers to the amount and nature of combustible content and materials within a building. This can include combustible contents, interior finishes as well as structural materials. Combustible content tends to create the greatest potential fire loss risk. Higher fuel loads results in increased fire loss risk due to increased

opportunity for ignition and increased fire severity. In many communities, large amounts of fuel load can be contained within a single occupancy, such as a building supply business, within a large multi-unit residential building, or within a historic downtown core. This section of the CRA will focus primarily on fuel load for industrial occupancies.

### 2.12.1 Fuel Load Concerns

Buildings with potential fuel load concerns are identified in Table 10. These include buildings housing materials such as oxidizers and flammable and combustible liquids and chemicals.

Table 10: Potential High-Fire Risk Occupancies

Address	Facility Name/Organization	Risk Description
60 Dundas St E	Meyers Creek Brewing Company	Distillery/Brewery
86/87 River Rd	Signal Brewery	Distillery/Brewery
231 Dundas St E	Bioniche Life Sciences Inc	Chemical Plant
355 University Ave	Proctor & Gamble	Heavy Manufacturing (non-automotive)
219 Jamieson Bone Rd	Sigma Stretch Film of Canada	Heavy Manufacturing (non-automotive)
501 College St E	Kellogg's Belleville	Food Processing Plant
648 College St E	Minimax Express	Truck Terminal
634 College St E	FedEx	Truck Terminal
43 Tank Farm Rd	Purolator	Truck Terminal
659 College St E	Vision Transportation Systems Inc	Logistics Distribution Centre
121 Tank Farm Rd	Imperial Oil Tank Farm	Bulk Oil/Fuel Distribution Terminal
315 University Ave	Redpath Sugar	Food Processing Plant
105 Pinnacle St	Hawkins WT Ltd.	Food Processing Plant
200 Jamieson Bone Rd	Magna Lighting	Autosystems Manufacturing
345 Bell Blvd	Magna Lighting	Autosystems Manufacturing
345 University Ave	Magna Lighting	Autosystems Manufacturing

Source: Municipal Property Assessment Corporation, Municipal Connect

In addition to ensuring compliance to the requirements of the OBC and the Ontario Fire Code, there are operational strategies that a fire service can implement to address fuel load concerns. These include regular fire inspection cycles and pre-planning of buildings of this nature to provide an operational advantage in the event of fire.

## 2.13 Occupancies with Potential High Fire Life-Safety Risk

Fire risk does not affect all people equally. Those who are at an increased risk of fire injury or fatality are known as vulnerable individuals. In the event of a fire, these individuals may be unable to self-evacuate and/or require assistance in their evacuation efforts. Identifying the location and number of vulnerable individuals or occupancies within the community provides insight into the magnitude of this demographic within a community.

### 2.13.1 Registered Vulnerable Occupancies

From an occupancy perspective, vulnerable occupancies contain vulnerable individuals who may require assistance to evacuate in the event of an emergency due to cognitive or physical limitations, representing a potential high-life safety risk. As part of its registry of vulnerable occupancies, the OFM defines vulnerable occupancy as any care occupancy, care and treatment occupancy, or retirement home regulated under the Retirement Homes Act.

These occupancies house individuals such as seniors or people requiring specialized care. It is important to note, however, that not all vulnerable individuals live in vulnerable occupancies; for example, some seniors who are vulnerable due to physical limitation can live on their own or in subsidized housing, making them a key demographic to reach.

Ontario Regulation 150/13: Fire Code, which amends Ontario Regulation 213/07: Fire Code, identifies vulnerable occupancies as care, care and treatment and retirement homes. This includes hospitals, certain group homes and seniors' residences and long-term care facilities. The regulation requires fire departments to perform annual inspections, approve and witness fire drill scenarios and file certain information regarding the occupancy with the Fire Marshal's office. A list of vulnerable occupancies is presented in Table 11.

Table 11: Vulnerable Occupancies

Property Name	Occupancy Type	Location
Youth Habilitation Quinte	Group Home	45 Victoria Ave
Cheshire Homes	Group Home	246 John St
Community Living Belleville	Group Home	191 Haig Rd
Allan House	Group Home	4866 Old Highway 2
Leuty House	Group Home	5103 Old Highway 2
Undisclosed	Group Home	695 Mitchell Rd
Community Living Belleville	Group Home	661 Mitchell Rd
Children's Mental Health Services	Group Home	1212 Highway 37
Velleman House	Group Home	8542 Highway 62
Community Living Belleville	Group Home	9223 Highway 62
Undisclosed	Group Home	393 Beatty Rd
Undisclosed	Group Home	212 Foxton Rd
Community Living Belleville	Group Home	575 Scuttlehole Rd



Property Name	Occupancy Type	Location
Undisclosed	Institutional Residence	40 Victoria Ave
Grace Inn Shelter	Institutional Residence	315 Church St
Undisclosed	Institutional Residence	58 Highland Ave
Belleville General Hospital	Hospital	245-265 Dundas St E
Westgate Lodge Nursing Home	Long Term Care Home	37 Wilkie St
Bellmont Long Term Care Facility	Long Term Care Home	250 Bridge St W
E.J McQuigge Lodge	Long Term Care Home	38 Black Diamond Rd
The Bridge St Retirement Residence	Old Age/Retirement Home	79-85 Bridge St E
Currently Vacant – Zoning application for special Care residential Building	Old Age/Retirement Home	228 Dundas St E
Eden Place Retirement Home	Old Age/Retirement Home	38 Everett St
Arabella Retirement Living	Old Age/Retirement Home	24 Dundas St W
Chartwell Bayview Retirement Residence	Old Age/Retirement Home	435 Dundas St W
Quinte Gardens Retirement Residence	Old Age/Retirement Home	30 College St W
The Richmond Retirement Residence	Old Age/Retirement Home	175 North Front St
Maple Manor Residence	Old Age/Retirement Home	132 Avonlough Rd

There are 29 vulnerable occupancies in the City of Belleville. These include care occupancies, care and treatment occupancies and retirement homes.

The City of Belleville, as with many other urban centres, are experiencing an increase in homelessness. According to an article posted by Global News in November of 2021, there are 180 homeless people living in Belleville. The municipality is discovering numerous homeless encampments annually. Encampments are a growing trend as homelessness increases in Ontario. Encampments can generate many different types of calls for emergency services including medical calls, carbon monoxide calls and fire-related calls. According to Statistics Canada.

**Observation #2:** It can be valuable for a fire department to identify additional potential high fire life-safety risk considerations. This includes day care facilities and schools. Children, due to age and potential cognitive or physical limitations may prevent or delay self-evacuation in the event of an emergency. High life-safety risk occupancy considerations include schools and licensed day care facilities. The CRA identified that there are 29 schools, 3 daycare facilities and 5 additional institutional facilities dedicated to special education/training.

**Recommendation #2: Develop a proactive fire code inspection schedule, targeted public education programs and rigorous pre-emergency planning, for high life-safety risk occupancies.**

*(Suggested completion: 36-60 months)*

**Rationale:** *Pre-planning activities increase fire department personnel familiarity with buildings of special interest. A fire department can help reduce the risk faced by vulnerable individuals, vulnerable occupancies or high risk occupancies, by performing regularly scheduled fire safety inspections; approving and witnessing fire drill scenarios; providing public education on fire safety issues; conducting pre-planning exercises to increase fire department personnel's familiarity with the facility; reviewing fire safety plans for accuracy and encouraging facility owners to update facilities as needed; providing staff training; and encouraging fire drills.*

## 2.14 Hazard Identification and Risk Assessment (HIRA)

The City's Hazard Identification and Risk Assessment was reviewed and updated as recently as February of 2023 indicating that Belleville has complied with its legislative requirements. As a component of the risk assessment and risk analysis process, the top risks in Belleville were identified. The HIRA assigned likelihood and consequence levels to a list of hazards based on the potential for impacts to people, property, and the environment. As a result of this analysis, the top hazards in the city include the following:

- Flooding
- Windstorm/Tornado
- Ice Storm
- Snowstorm
- Pandemic

## 2.15 Impacts of Hazards on Fire Protection Services

To better understand the risks of hazards as they pertain to fire protection services, the top five hazards have been assessed to identify impacts on fire protection services. Many of the potential impacts are not unique to a jurisdiction. The results of this review as they pertain to the top five hazards in the city are presented in Table 12.

Table 12: Impacts of Hazards on Fire Protection Services

Hazard	Possible Impact
Flooding	<p>The City’s HIRA indicates that there were major flooding occurrences in 2008, 2014 &amp; 2019.</p> <p><b>Overall Impact (from HIRA)</b> Families with homes on flood plains or flood prone areas could be impacted. Roadways could be impacted as well as environmentally debris and unintended items could be washed into lake or rivers. Often during heavy rain events the City’s stormwater systems cannot handle the surge resulting in flash flooding.</p> <p><b>Fire Services</b> Depending on the severity of the flooding, access to various sections of the road network could be limited to fire department response delaying emergency response times and BFES deployment model could be impacted as the number of simultaneous calls could put a strain on service capabilities.</p>
Wind/Storm/Tornado	<p>The City’s HIRA indicates that there was major wind event in the summer of 2022.</p> <p><b>Overall Impact (from HIRA)</b> Above ground power lines, toppled trees could impact buildings or roads and winds could take down communication towers.</p> <p><b>Fire Services</b> Depending on the severity of the debris on roads and downed power lines, access to various sections of the road network could be limited to fire department response delaying emergency response times. Interruptions to communication towers could impact fire department communications.</p>
Winter Weather	<p>The City’s HIRA indicates that there was a large ice storm in Ontario in 1998, several days with freezing rain in 2023</p> <p><b>Overall Impact (from HIRA)</b> Above ground power lines could be impacted along with road treatments, debris clearing; salt gravel or other road treatment supplies.</p> <p><b>Fire Services</b> Depending on the severity of the debris on roads and downed power lines, access to various sections of the road network could be limited to fire department response delaying emergency response times. Interruptions to communication towers could impact fire department communications.</p>





Hazard	Possible Impact
Snowstorm	<p>The City’s HIRA indicates that there was a significant snowstorm affecting province in December 2022</p> <p><b>Overall Impact (from HIRA)</b> Visibility can cause traffic accidents on roadways or prevent movement of goods and services. Accidents on roadways may lead to leaking/spill of hazardous materials.</p> <p><b>Fire Services</b> The number and severity of motor vehicle collisions will increase. This could include hazardous material response. Access to various sections of the road network could be limited to fire department response delaying emergency response times.</p>
Human Health Emergency (Pandemic)	<p>The 2020 COVID 19 Pandemic implications are still having a negative impact on communities.</p> <p><b>Overall Impact (from HIRA)</b> Medically vulnerable persons are at risk. Increased use of non-recyclable PPE for staff. Critical infrastructure must be maintained with planning for staffing and acquisition of critical supplies</p> <p><b>Fire Services</b> Epidemic or pandemic breakout can present significant challenges to first responders causing potential fire department workplace absenteeism, and an increased demand for medical response and supplies as was illustrated during COVID 19. PPE was severely limited and supply chain issues for all equipment impacted operations. In many cases planned programming related to inspections and public education had to be delayed or modified.</p>

## 2.16 Water Infrastructure

Water supply is a critical infrastructure that is essential for firefighting. Having access to the city’s water delivery systems is critical to service delivery. The system consists of 1 treatment facility and 261.5 linear kilometers of pipe. The system overall is rated particularly good or good, with a small percentage as extremely poor. The reliability of the system – which quantifies the number of connection-days per year due to water main breaks compared to the total number of properties connected to the municipal system is 6.67<sup>14</sup>.

Fire flow, which is the available water supply for fire protection purposes, is available to 99% of properties, and 76% of properties are connected to the main system.

Alternate water supply sources can include fire services access to ponds, streams and alternative water supplies, and the use of fire suppression apparatus that have portable tanks that can

<sup>14</sup> City of Belleville Asset Management Plan 2022



support a tanker shuttle and a continuous supply of water to support fire suppression activities. According to the Fire Underwriter’s Survey, an Accredited Superior Tanker Shuttle Service is a recognized equivalent to a municipal fire hydrant protection system if it meets all the requirements for accreditation. It is noted that BFES Rural Station # 5 has been accredited as a superior tanker shuttle service. The operational responsiveness of this service has been evaluated in Section 4 of this FMP. Notwithstanding the station 5 tanker shuttle service the city has good fire flow coverage as well as a reliable delivery system for firefighting.



## SECTION 3 DEPARTMENT PROFILE

### 3.1 Department Overview

The Belleville Fire and Emergency Services (BFES) origin dates to May 18, 1840, where through resolution a volunteer fire service was established to support the community. At that time the department consisted of two companies (engine and hook and ladder). January of 1916 saw the Belleville Fire Department become a career department consisting of 10 firefighters working 84-hour work week on 24 hour rotating shifts.

In 1998 the City of Belleville amalgamated with the surrounding Township of Thurlow as part of the Ontario-wide municipal restructuring. This resulted in the amalgamation of the Thurlow Volunteer Fire Department with the Belleville Fire Department.

On April 11, 2011, the City of Belleville through Bylaw 2011-59 formalized the establishment and regulation of the City of Belleville Fire and Emergency Services, and the head of the department shall be known as the Fire Chief and Director Fire and Emergency Services. The present day BFES is a combination (career and volunteer staff) fire department operating out of five fire stations. The two urban area stations are staffed with career firefighters and the three rural area stations being staffed with volunteer firefighters. Except for management and administrative functions, the career and volunteer components of BFES operate independently. This issue is considered as an interoperable service delivery shortfall and is discussed further in this FMP.

The two central fire stations and are responsible for fire and emergency services to the identified urban areas of the City of Belleville. The three rural volunteer fire stations respond on an as-available basis for fire and emergency services for the identified rural areas within the City of Belleville.

BFES had an established Communications Branch that provides emergency dispatch and support services to all 17 municipal fire services in Hastings County. This will transition in February 2024 to a contracted service with the City of Peterborough.

**Observation #3:** The BFES core services are identified in the Bylaw to Establish and Regulate a Fire Department and Emergency Services dated 2011 is outdated. Further. This bylaw does not reference response time expectations, response performance targets or minimum response capacity. BFES response capacity within each response area should be assessed to inform service level decisions. The outcome of this process results in a standard of cover policy including service level recommendations to be considered for approval by the City of Belleville Council. The standard of cover or service policy must be included in the updating of the establishing and regulation bylaw. The community risk assessment conducted as part of this plan will provide the information to ensure that all core services align with the risk factors and define what the level of service is required. Levels of service do not have to be standardized across a community. However, core services that are aligned to identified community risks will assist with ensuring that staffing, training, SOG's and equipment are focused on those service level needs.

**Recommendation #3: Undertake a complete review of the ‘Bylaw to Establish and Regulate a Fire Department and Emergency Services’ dated 2011 and include response capacities and performance targets for the core services.**

**Alternatively, Council approves as separate service delivery policy for Belleville Fire and Emergency Services that is not part of the Bylaw as outlined in recommendation #21**

*(Suggested completion: 24-36 months)*

**Rationale:** *The Centre for Public Safety Excellence and International Association of Fire Chiefs developed a standard of cover framework to support the process of establishing fire department service types and service levels. It is a comprehensive process to identifying community risks, assessing fire department capability, and establishing appropriate emergency response service levels to mitigate community risks.*

*NFPA 1201: Standard for Providing Emergency Services to the Public discusses the importance of formally establishing service types and service levels. Section 4.5.3.1 states:*

*“The fire and emergency services administration (FESA) leader shall develop and adopt a formal policy statement that includes the specific types and levels of services to be provided by the organization, the service area, and the delegation of authority to subordinates.”*

*As the population and geographic footprint of a community increase, a fire department will experience an increase in concurrent requests for service, longer travel distances and a higher frequency of complex and concurrent incidents. Developing formalized service levels and reporting performance informs council on current performance and the fire department’s capacity to manage community risks.*

### **3.1.1 Mission, Values and Vision**

A mission statement is a short statement of why an organization exists, what its overall goal is, identifying the goal of its operations, what kind of product or service it provides, its primary customers or market, and its geographical region of operation.

**BFES Mission Statement:** *“The Belleville Fire Department is committed to serving the community through excellence in emergency response, prevention, education, protection and public safety”*

A vision statement describes the organizational long-term goals and objectives. These elements should be forward looking and motivational consistent with the mission and core values.

**BFES Vision Statement:** *“Belleville Fire Department be unified in our core values regarding operation, service, professionalism, accountability and integrity, while maintaining the highest standards at all levels in the department and with others in the community.”*

Core values are deeply ingrained principals that guide the organization’s actions. Core values drive behaviour and form beliefs, and an organization’s vision defines what it strives to be. Effective core values assist the organization’s personnel in their decision-making process and establish how BFES staff will interact within the city’s organization and the external community.

**BFES Core Values:**

*Professionalism – The fire Department demands the highest standards of excellence, integrity, commitment, and dedication from all its employees. As professionals, we must treat all others with respect and dignity. The public and taxpayers deserve nothing else.*

*Accountability – In carrying out our mission, all employees must hold themselves accountable to the public, taxpayers and personally for their actions.*

*Integrity – The fire department is entrusted with protecting the public and enforcing fire and other related codes, each member has a personal responsibility to demonstrate the highest ethical standards to inspire confidence and trust in each other and in the public we serve.*

### 3.2 Human Resources

Whether full-time (career) or volunteer; a fire department’s employees are its most valued asset. Emergency services are often delivered under difficult and stressful circumstances, with little room for error. Fire departments must be adequately resourced with staff, equipment, and training to be effective in delivering the highly technical services to achieve service excellence. As a result, a considerable effort is warranted to ensure that only highly committed, team-oriented, and physically able employees are recruited, trained, and retained.

An effective organizational structure must promote and support strong, effective leadership, sound business management and continuity, and effective communication with opportunities for staff development.

The City of Belleville maintains two separate Collective Agreements for BFES. The career firefighters are represented by the Belleville Professional Firefighters, International Association of Fire Fighters Local 497 and the volunteer firefighters are represented by the Ontario Volunteer Firefighters Association, Christian Labour Association of Canada (CLAC) Local 920.

The BFES works closely with the City of Belleville Human Resources (HR) department to assist with achieving their human resources goals and objectives. The BFES administration are tasked with adhering to all contractual obligations for both collective agreements including hiring, promotions, working conditions, wages, and benefits. Most employer-employee issues are handled through internal policies and subject to established grievance procedures. HR service support include:

- Recruitment and selection
- Compensation and benefits
- Employee relations
- Performance management



- Employee wellness
- Policy implementation and interpretation

### **3.2.1 Staffing Complement**

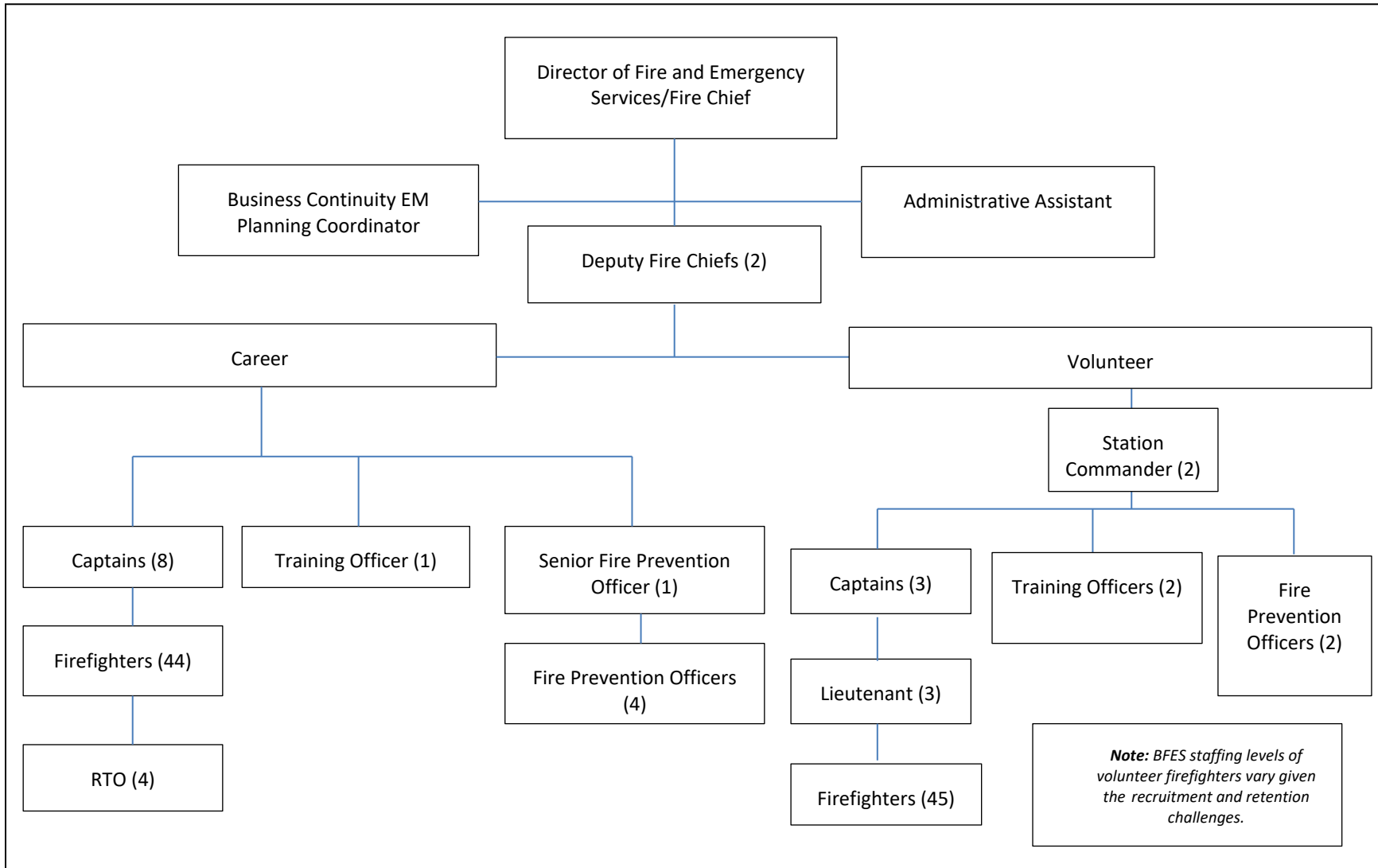
An effective organizational structure must promote and support strong and effective leadership, sound business management, continuity, and effective communication with opportunities for staff development. BFES currently consists of the following full-time and volunteer staff to deliver emergency services to the urban and rural areas within the City of Belleville boundaries:

- 1 fire chief (full-time)
- 2 deputy fire chiefs (full-time)
- 1 administrative support (full-time)
- 52 full-time career firefighters (including officer positions)
- 47 volunteer firefighters (including officer positions)
- 3 training officers (1 full-time and 2 volunteer)
- 4 full-time firefighters assigned to communications division.
- 7 fire prevention and investigations staff (5 full-time and 2 volunteer)

The career fire operations staff work out of 2 fire stations, on a 4-platoon system consisting of 24 hour on-duty shifts followed by varied days off balancing to 42 hours per week (averaged over a 4-week schedule). Administration staff are located at BFES fire station 1 and work a five-day work week (Monday to Friday). Career prevention/ investigation staff operate out of fire station 1 and work a 4 day off-set work week of Monday-Thursday or Tuesday to Friday. Career training staff are located at fire station 1 and may work either a five- or four-day work week with adjusted hours per day as operationally required. The four most junior full-time firefighters are assigned to the communications division on one of four shifts and located at fire station #1.



Figure 6: BFES Organizational Chart







### 3.2.2 Department Management and Leadership

Belleville Fire and Emergency Services administrative responsibilities, management and leadership are provided by the fire chief and two deputy fire chiefs through to the station officers as supervisors. A clear understanding and acceptance of each position's role in leadership along with effective management is key to a safe and effective fire service. Leadership, done in a consistent and professional manner transcends throughout the entire organization. This creates a cohesive, resilient, value-based organization that embraces change as part of day-to-day work.

This plan identifies several organizational opportunities that must be addressed in order to enhance cost efficiencies and operational effectiveness. Critical deficiencies include the need to significantly improve the interoperability between the urban and rural response services, integration of the suppression, training, fire prevention and public education functions. Belleville Fire and Emergency Services needs to position itself as a fully integrated fire service that provides the best possible service to the City of Belleville and the public.

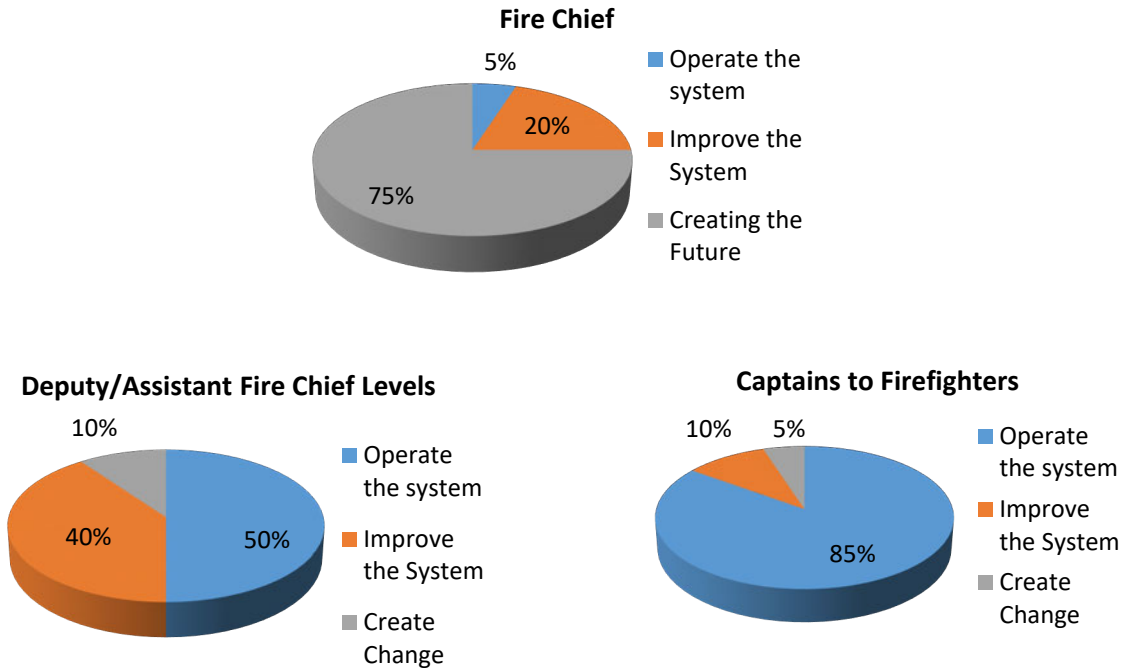
Effective management and leadership start at the top to guide an organization towards success. Community officials are always looking for ways to effectively manage and avoid costs while still increasing value in the delivery of services for their community. This environment has resulted in adopting more business-like approaches for delivering community safety services. Modern emergency services now require the development of business-like approaches such as:

- Conducting regular market (external) comparison and analysis
- Developing performance measures and objectives for core services including emergency response, fire prevention, public education and health and safety
- Regularly monitoring and reviewing performance against those measures to determine effectiveness.
- Reviewing capacity and sustainability of operations
- Ensuring value for service

In some cases, this may require a shift from the historical approach of maintaining current systems to a focus on creating a future for the department that is responsive to change, and which is sustainable and efficient. Fire service leaders need to be proactive and examine all aspects of their service delivery by looking for innovative and sustainable solutions to make them more efficient and effective. Some aspects include technology, response modeling, ongoing community risk assessments, staffing, fire prevention, public education, industry leading practices and advancements, training and education, and public safety enhancements.

The following figure offer a theoretical allocation of leadership time to effectively operate a fire department, scan for improvement opportunities and implement system improvements:

Figure 7: Fire Service Time Management



**Observation #4:** During the consultation process and our review of the Belleville Fire and Emergency Services leadership group, recurring themes emerged regarding the chief officers being predisposed to complete operational, routine administrative and day to day tasks. As an example, the deputy chiefs are required to move response vehicles between stations for maintenance and operational requirements.

Basic platoon management for aspects such as minimum staffing, payroll, scheduled absences, and overtime are being managed by the deputy chiefs. Given the above, the chief officers do not have the workload capacity to effectively lead Belleville Fire and Emergency Services and create a future for the department that is responsive to change and is sustainable and efficient.

The on-duty captains must remain within their respective response zones and cannot be tasked for duties that affect the response capacity. The number of administrative responsibilities assigned to the on-duty captains negatively impacts training and recurring skills maintenance for the platoons. The urban training officer is challenged to effectively manage the training program by being tasked with consumable inventories management, and other support functions.



It must be noted that the community risk assessment and structural risk assessment in this plan identifies an increase in high-rise buildings, multi-unit residential and high-density developments. Structure fires in these types of occupancies are extremely complex, labour intensive and high risk for the firefighters. The current on-duty response staffing with one captain and four firefighters at each station has an extremely limited fire suppression critical task capability. This staffing would be overwhelmed by a single-family residential fire that has extended to an adjacent structure or if interior operations are required to extricate occupants. Furthermore, the command-and-control function and ability to sector operations is absent for major events such as high-rise buildings, multi-unit residential and high-density developments.

Additionally, as a strategic initiative this plan has identified the need to significantly improve the interoperability between the urban and rural services, integration of the suppression, training, fire prevention and public education functions. The limitations of the volunteer service in the rural response zone and the need to normalize fully integrated service delivery throughout the city is deemed a critical priority for Belleville Fire and Emergency Services.

The culmination of these factors is deemed to be an administrative, management and operational shortfall for Belleville Fire and Emergency Services.

***Recommendation #4: Establish a Platoon Chief position on each of the four platoons, requiring an addition of four career positions.***

*(Suggested completion: 12-18 months)*

***Rationale:*** *Platoon Chiefs' responsibilities would include functions such as emergency response command and control, platoon supervision and management and day-to-day administrative requirements to address the current Belleville Fire and Emergency Services administrative, management and operational shortfall.*

### 3.2.3 Belleville Fire and Emergency Services Administration Positions

It is extremely important that any administration works closely as a team, and this philosophy is promoted throughout the organization. A high-functioning team is one that understands the various roles and responsibilities and brings their skills and talent together to enable the organization to advance their vision, mission, and goals.

High-functioning teams are:

- Trusting
- Collaborative
- Supportive
- Clear in roles and mission
- Adaptive
- Reflective



These team expectations must be understood throughout the organization. As goals and vision are defined, they should be openly shared with the members of the organization, and mechanisms for providing feedback and clarity should be encouraged.

Ensuring that accurate and updated job descriptions are regularly reviewed, made available and clearly understood for each position within the organization will assist with laying the foundation of a high-performance team. Current and accurate job descriptions are valuable tools that identify skills and abilities that are necessary for each position. They are developed to ensure each position meets the need of the organization. Incumbents and potential incumbents will have a clear understanding of job responsibilities and expectations. Compensation levels are typically developed as part of specific job description requirements. The City of Belleville human resource department maintains job descriptions for all positions currently in the organization.

**Observation #5:** Upon review of the job descriptions there were several missing while others are out of date or of inconsistent format.

**Recommendation #5: Undertake a complete review and update as required of all job descriptions.**

*(Suggested completion: 6-18 months)*

**Rationale:** Updated job descriptions should accurately describe each positions respective job functions, responsibilities, necessary skills, knowledge, abilities along other recommended qualifications. Current job descriptions serve as a foundation for hiring, training, promotions, compensation, and performance management. Each job description should be consistent in format and made readily available to incumbents and other persons considering one of these positions.

### 3.3 Recruitment, Selection, Retention,

BFES has established policies or processes in place to support recruitment, retention, advancement, promotion activities and remuneration which are consistent with applicable clauses in each of the two Collective Agreements. These processes are managed by the BFES administration, receiving assistance from City of Belleville HR.

#### 3.3.1 Recruitment and Selection

The recruitment of personnel is a key function of all emergency service agencies. The community places a tremendous amount of faith in their fire and EMS personnel, trusting them to provide the highest level of service when the public is most vulnerable. As such, the process used to select personnel should be comprehensive.

Career firefighter positions are valued opportunities. These positions are often filled by candidates that will spend their entire working career with a single fire department. Most career fire services do not have large turnover of staff other than attrition. This emphasizes



the need to establish solid recruitment standards for entry-level positions. Therefore, minimum qualifications should be high, and expectations should well defined. It is also helpful to have a recruiting package with all the relevant process information and requirements outlined.

Volunteer firefighters have a long and trusted history of valued service to their communities. The recruitment of volunteer firefighters has proven to be challenging for many communities that continue to rely wholly or partly on a sufficient complement of individuals capable of meeting the training and response expectations.

Experience within the emergency services industry has shown that relaxing the requirements for entry-level positions is not the answer for recruiting any employee. Instead, most departments have had the greatest success when qualified applicants are encouraged to apply. This process often involves targeted advertising and promotional campaigns aimed at demonstrating the benefits, as well as the personal satisfaction of becoming part of the fire service. The expected requirements for response area residency, required training, and attendance must be clearly explained early in the process.

BFES, like other fire services in North America, must attempt to train, maintain, and equip their firefighters to the recognised NFPA standards for the services being delivered. As this is typically provided at no cost for the recruit firefighters, cities provide substantial investment in both financial and resource commitments and as such recruit selection should be carefully managed.

Our review of the recruitment process along with interviews and survey results indicate that the recruiting processes for both career and volunteer firefighters has generally been successful in identifying excellent candidates.

Postings for the career and volunteer firefighter are placed on the City of Belleville website as required. Recruitment processes are separate and distinct for both the career and volunteer firefighter needs. The processes for each are as follows.

**Career Firefighters:** Vacancies are uncommon in the BFES. Opportunities typically occur as firefighters are promoted into the officer ranks because of attrition. Available positions are posted on the City of Belleville website with a defined opening and closing application submission period. The fact that limited opportunities occur for this position allows the city to select very high-quality recruits.

The minimum qualifications for all BFES firefighters include:

- 18 years of age or older and legally entitled to work in Canada.
- Possess an Ontario high school graduation diploma or equivalent.
- Have, or willing to obtain an Ontario Class “D” driver’s license with “Z” endorsement.
- Have, or willing to complete the NFPA 1001 Level I and II and NFPA 1002 program within 1 year or as available (costs paid by the municipality)



- Willing to complete Firefighter Services of Ontario clinical and medical assessments including physical aptitude, acrophobia, and claustrophobia assessments (costs paid by the municipality)
- Provide a clear driver's abstract and criminal record and vulnerable sector check.

BFES has a comprehensive selection process. After submitting their application and meeting the minimum qualifications, firefighter candidates are required to move through a multi-stage process. Applications are only accepted when there is an open competition and candidates meet all the initial requirements begin the following process:

- Completed applications must contain all the minimum qualifications.
- Once the complete application package is received by HR and reviewed by HR, the fire chief and deputy fire chiefs, the candidate may be selected to begin the process.
- Performance will be reviewed after each stage and a decision will be made regarding suitability to move on to a recruit firefighter.

All recruit firefighters serve a one-year probationary period. During this probationary period, the recruit is assigned to the Communications centre, however, will be made available for training and performance assessment. An evaluation of each recruit firefighter will be made by the fire chief prior to the completion of the 12-month probationary period.

**Volunteer Firefighters:** Recruitment processes are based on the service requirements of each volunteer fire station.

All required qualifications must be met, and documentation properly submitted including:

- Grade 12 diploma or equivalent work experience, post-secondary, or fire related training
- Canadian police Information Centre including vulnerable sector clearance.
- Successfully meet minimum medical criteria determined by the city of Belleville physician (Volunteer firefighter medical certificate)
- Minimum of a valid Class G driver's license
- Current drivers abstract.
- Social insurance number

Conditional offers of employment are made when all the above have been met. An orientation process is to be completed at the assigned fire station based on a schedule determined by the station commander. Formal training will be initiated upon positive recommendation from the station commander.



### 3.4 Advancement, Promotion

The promotional policies for administrative, full-time, and volunteer firefighter officer positions are filled through competitive processes and appointments.

**Career Firefighters:** All promotional processes within the career component of BFES form part of the Collective Agreement between the City of Belleville and the Belleville Professional Fire Fighters' Association.

The clauses in the current collective agreement stipulate:

- Eligibility
- Responsibilities of employee
- Examination processes
- Promotional board composition
- Promotional assessment criteria
- Resulting promotional lists

All promotions above the rank of first-class firefighter are subject to a six-month probationary period.

**Volunteer Firefighters:** All promotional processes within the volunteer component of BFES form part of the Collective Agreement (Schedule "C") between the City of Belleville and the Ontario Volunteer Firefighters Association.

The clauses in the current collective agreement stipulate:

- Eligibility
- Responsibilities of employee
- Examination processes
- Promotional board composition
- Promotional assessment criteria
- Resulting promotional lists

A promotional board is required to be established for the purposes of establishing qualified promotional candidates for all officer positions. Only volunteer firefighters that have met minimum requirements are eligible to apply for promotion.

#### 3.4.1 Retention and Remuneration

Firefighter retention can have a significant impact on a fire service, whether career or volunteer. The desire to retain fully trained, experienced firefighters is a goal of any fire chief. Retention is not a typical challenge for career fire departments, it is a significant challenge for composite or fully volunteer fire departments.

Results from the BFES interviews and surveys indicate that for career firefighters' retention is not a significant issue. Full-time positions in the BFES are highly sought after and valued.





The city offers a competitive salary and benefit package. Occasionally, career employees may leave to pursue other opportunities, but this is a relatively infrequent occurrence. In accordance with the Ontario Fire Protection and Protection Act, full-time firefighters are required to retire no later than age 60.

Volunteer firefighters often seek a career in the fire service, and while working in the volunteer capacity, will be applying for full-time opportunities as a career firefighter. A constant turnover of trained firefighters' results in staffing shortages and increased costs of recruitment and training.

The reason for resignation from a volunteer firefighter position is typically because of:

- A physical move of residence or workplace out of the municipality
- Career/primary work demands.
- Family commitments
- Childcare
- Obtain a career firefighter position (often rural volunteers accept career positions in BFES)
- Increased training demands of the position up to NFPA 1001 and other requirements
- Increased demands on department time obligations
- The need to meet mandated occupational and safety requirements

A constant turnover of volunteer firefighters creates increased administrative workload, staffing shortages, service delivery challenges and increased costs of recruitment and training. It is estimated that to recruit, train and equip one volunteer firefighter is approximately \$18K to \$20K. Since January 2020 BFES has recruited 26 firefighters and are short of the informal staffing level of 52 by 5 positions.

### **3.4.2 Remuneration**

The City of Belleville is committed to hiring and retaining the best candidate possible. The administrative or out-of-scope positions wages and benefits within BFES are determined by a review of their respective job requirements and qualifications along with comparisons of similar City of Belleville out-of-scope positions and industry comparators.

Competitive salaries and benefits are negotiated between the city and the Belleville Professional Fire Fighters' as well as the CLAC Ontario Volunteer Firefighters Association and form part of each of the collective agreements.

Volunteer fire departments can be structured to be a totally volunteer fire service, or more typically are referred to as a 'paid-on call' or 'paid-per-call' fire service where some stipend or hourly remuneration is given for emergency response and/or training. This is the case, with the BFES volunteers. The remuneration rates are included in the respective collective agreements for BFES staff and are negotiated on a recurring end of contract basis.



The compensation provided to both career and volunteer firefighters, while not usually the main attracting component for new potential hires, is an important component that must be considered, and becomes more of a factor for retention of existing volunteer firefighters, including officers.

## 3.5 Interoperability and Core Services

### 3.5.1 Service Interoperability and Efficiency

As previously identified, the current Belleville Fire and Emergency Service delivery system has critical deficiencies. This includes the need to significantly improve the interoperability between the urban and rural services. The online firefighter survey, workshop, staff, and city leadership interviews have all identified interoperability as a major obstacle that impedes opportunities for improved service delivery. In many respects the Belleville Fire and Emergency Service operates as two separate fire services. This unusual arrangement, while not totally unheard of, results in duplication and fragmentation of services where the public may not be well served.

This situation is residual from the 1998 amalgamated of Belleville with the Township of Thurlow. Over the past 25 years there has been several attempts by the Belleville Fire and Emergency Service leadership to resolve this situation. While the current Belleville Fire and Emergency Service staff acknowledge the need for change, the respective collective bargaining agreements, separate response zones and current relationship between the volunteer and career members are barriers that continue to prevent increased interoperability and the opportunity to better serve the community through a fully integrated fire service.

The analysis in this plan provides further substantiates that significant change must be a priority. This includes the following factors:

- Fragmented and inconsistent training, fire prevention and public education programs
- Segregated response zones that restrict career and volunteer firefighters from combined/integrated responses regardless of location within the city
- Increases in population and projected growth trends.
- Projected economic and industrial development.
- Structural risk assessment that includes an increase in high-rise building, multi-unit residential and high-density development
- Limitations of the volunteer service in the rural response zone that includes staff turnover, lack of qualified apparatus operators, extended mobilization time and the inability to consistently achieve of an effective response force.
- Inconsistent urban and rural fire protection taxation rates that need to align with the appropriate municipal designation (*not include in the scope of this FMP*)
- Optimization of fire response area to ensure best possible geographic or risk-based coverage.

**Observation #6:** There are several long-standing critical deficiencies that need to be addressed in order improve the interoperability between the urban and rural response services. For the Belleville Fire and Emergency Service to establish itself as a fully integrated fire service it is understood that there are several complexities to achieve this.

The amendment of fire protection taxation rates for urban and rural service will be a challenging public issue that will require extensive public consultation and communications.

The ‘no contract out’ provision in both the International Association of Fire Fighters and CLAC collective agreements will be a labour relations issue requiring a negotiated resolve.

Under the Fire Protection and Prevention Act, council essentially has the overall responsibility to establish the level of service for the municipality. The operation under the current structure of a rural and urban area has become more cumbersome to provide an effective and efficiency service. The updating of the various response areas to achieve the desire performance and service levels is critical as the city continues to grow.

Integration of the suppression, training, fire prevention and public education programs will be met with resistance and will challenge the chief officers’ leadership and resiliency.

***Recommendation #6: Mayor and Council must mandate that the Belleville Fire and Emergency Services be established as a fully integrated service delivery system.***

*(Suggested completion: 6-12 months)*

***Rationale:*** *The outcome would be reduced duplication, service level inconsistencies and fragmentation. The transformation of the Belleville Fire and Emergency Services organization culture to a cohesive team that fully supports working together to improve service delivery, public safety, and fire fighter safety.*

### 3.5.2 Core Services

Belleville Fire and Emergency Services core services are approved by *Establishing Bylaw 2011-59: A Bylaw to Establish and Regulate a Fire Department and Emergency Services*. As previously identified, this bylaw is out of date and does not include response performance targets or service levels for the various services identified.

The following core services are identified in the bylaw:

- Basic firefighting
- Structural firefighting including rescue and related duties.
- Vehicle firefighting
- Render first aid and other emergency pre-hospital core duties
- Hazardous materials at awareness level
- Vehicle accidents, vehicle extrication
- Water and ice rescue



- Confined space rescue – in accordance with skill level and provided training.
- Mutual aid participation
- Conduct fire prevention inspections of premises.
- Enforce fire prevention bylaws.
- Examine building plans of new construction for fire related issues in coordination with the Building Services
- Fire Prevention lectures and public education related to fire safety.
- Communications services (fire dispatch) to City of Belleville and 17 municipal fire services in Hastings County (Contracted out to Peterborough beginning February 2024).

Most citizens will not have the need to access fire department services. However, when emergencies occur, service expectations are high. Recurring monitoring and planning processes are necessary to ensure citizens get the services they expect, and the community gets good value for their investment.

Most of the Belleville Fire and Emergency Services core services have recommended standards within the various NFPA standards. These standards, along with the OFM Firefighter Certification regulation, Ontario Occupational Health and Safety Act including the Ontario Firefighter Guidance Notes, are all important references for developing safe and effective directives, policies, or guidelines for the delivery of each core service. Given the unique training and resource requirements, it is important that sufficient and proper equipment, personnel, and PPE are utilized while following established policies and procedures.

It is important to review and update the Belleville Fire and Emergency Services core services on a recurring basis and as part of the cyclical evaluation of community risks and fire department response capability. Services provided should align with the identified community risks and the needs of the citizens. Cyclical evaluation of community risks and fire department response capability is necessary to support ongoing emergency planning.

The current career on-duty staffing of two station companies of five firefighters including two captains has not increased in since 1966. During this period the city population has increased from 32,785 to 55,071 in 2022 which is a 68% increase. Population increase is only one factor in determining community risks, however the call volume analysis in in this plan indicates that the total number of incidents increased by 20% between 2021 and 2022 alone.



As previously identified the authority having jurisdiction for the establishment of emergency response performance targets and service levels is mayor and council. Section 4 of this plan identifies leading industry practices which can be considered as a foundational basis towards the establishment of performance targets and service levels. For example, the urban career service:

- NFPA 1710 performance standards summarizes the response standards based on a typical single-family dwelling of 2000 ft<sup>2</sup> without a basement and with no additional fire exposures to adjacent properties requires and effective response force of 16 firefighters, (17 if an aerial apparatus is deployed). A full alarms assignment of 10minutes 35 seconds in 90% of all calls for service is recommended.

For the rural service, NFPA 1720 standard for the volunteer rural areas is based upon the population density that is less than 500 people/2.6 km<sup>2</sup> (mile<sup>2</sup>) and therefore response areas 3, 4 and 5 are rural area demand zones:

- Six (6) firefighters arriving on scene within 14 minutes in 80% of all calls for service.

As detailed in section 4, the level of service, particularly the response time, is considerably different between career and volunteer stations in Belleville. The initial response time for urban fire apparatus was approximately 9 minutes or less to 90% of emergencies in 2022 however the effective response force is less than the recommended 16 firefighters and requires call back of off duty career or mobilization of the volunteers. It is estimated that it would require 30-40 minutes to achieve the recommended effective response force.

The rural fire apparatus arrived at approximately 19 minutes to 80% of emergencies in 2022. This is 5 minutes longer than the NFPA 1720 recommended standard. The number of volunteers responding has not been tracked and therefore the achievement of a consistent 6 firefighter effective response force has not been determined. In our experience and based upon the limitations for the volunteer service it is unlikely that the effective response force is achieved on a consistent basis.

**Observation #7:** The projected residential and economic development will increase the risk potential and demand for various emergency services and therefore Belleville Fire and Emergency Services' call volume trends will continue to increase. The structural risk assessment in this plan identifies an increase in high-rise buildings, multi-unit residential and high-density developments. As previously identified, structure fires in these types of occupancies are extremely complex, labour intense and high risk for the firefighters. The current on-duty response staffing has an extremely limited fire suppression critical task capability. This staffing would be overwhelmed by a single-family residential fire that has extended to an adjacent structure or if interior operations are required to extricate occupants.



Other emergency responses such as motor vehicle incidents with more than two vehicles and several casualties, dangerous goods spills over 100 litres, and confined space and technical rescues depending upon the scope of the situation will challenge the current response capacity and the completion of the various critical tasks. There is a disproportionate reliance on the call back of off-duty career staff and in extreme situations mobilization of the rural volunteer service for emergencies greater than minor events. Furthermore, response that requires both urban station companies to deploy, reduces the response capacity for coincidental and sequential emergencies.

The Belleville Fire and Emergency Services response capacity deficiencies that can be asserted from the factors above and the section 4 analysis are as follows:

Reduced effective response force in the urban area has a direct impact on firefighter and public safety and increases the risk potential for loss of life, extensive property loss and environmental damage.

- Prolonged rural area response time and assumed inconsistent achievement of the recommended effective response force has a direct impact on firefighter and public safety and increases the risk potential for loss of life, extensive property loss and environmental damage.

**Recommendation #7: Establish a third engine company by increasing the career staffing by 16 firefighter positions.**

*(Suggested completion: 12-36 months)*

**Rationale:** *The addition of a third engine company will provide additional response capacity to enhance the urban area effective response force, reduce the reliance on the recall of off-duty career and/or mobilization of the volunteer firefighters, increase the ability to manage coincidental and sequential emergencies and to bolster the rural areas response time and effective response force challenges.*

*There is also a potential for an offset of four (4) firefighters with the decision to contract the communications and dispatch service to an external agency is implemented.*

Table 13 below identifies the most frequent response types requested of the BFES over the last five years (2018-2022). Medical responses are consistently the leading request for service, averaging 34% of total responses. Public service requests are the second leading response type at 23%. Alarm response requests are third most frequent at 19%. This data demonstrates that BFES responded to a total of 10,173 calls broken into separate call types over the 2018–2021 period. The wide range of service requests indicate the dynamic nature of the fire service. It must be mentioned that some incident types require more personnel and equipment and time to handle safely and effectively. While it is impossible to be adequately equipped and resourced for all emergencies, careful analysis of the provided data



will assist with preparing for recurring events. This is further discussed in Section 4 of this report.

Table 13: BFES Response Types from 2018 – 2022

Incident Type	2018	2019	2020	2021	2022	Total
Medical	671	680	663	641	805	3460
Public Service	404	463	449	493	534	2343
Alarms	418	380	332	334	448	1912
Fire	249	205	286	318	356	1414
MVC	133	156	106	117	152	664
Dangerous Goods	48	32	48	34	39	201
Rescue	21	29	34	40	43	167
Other	5	0	1	2	4	12
<b>Total</b>	<b>1949</b>	<b>1945</b>	<b>1919</b>	<b>1979</b>	<b>2381</b>	<b>10,173</b>

### 3.5.3 Structural Fire Suppression

Structural fires pose a great risk to life safety of building occupants and firefighters. Fire services must have sufficient resources and proper SOGs to manage these types of emergencies safely and effectively.

Structural fire suppression encompasses a wide range of tactics for the control and extinguishment. Interviews and survey results indicated that the BFES is sufficiently equipped and properly trained to respond to fires where suppression tactics for the control and extinguishment of fires is conducted. However, concerns were expressed regarding the ability to safely and effectively conduct interior fire suppression and rescue given the limited effective response force (ERF).

SOPs regarding the fire suppression activities should align with the provisions of:

- NFPA 1710 (Standard for the Organization and Deployment of Fire Suppression Operations and Special Operations to the Public by Career Fire Departments) and/or
- NFPA 1720 (Standard for the Organization and Deployment of Fire Suppression Operations and Special Operations to the Public by volunteer Fire Departments)

Current staffing levels indicate that interior structure firefighting and interior rescue should not be conducted by the initial ERF until sufficient firefighters are on scene. Examples of ERF requirements and critical task assignments are provided in Section 4.





Managing structure fires of any type requires highly trained personnel with sufficient resources. The complexity of these fires depends on the fire load, extent of the fire spread, size and building envelope, as well as other external influences. Most structure fires require multiple fire crews completing specific tasks concurrently or sequentially to manage this type of emergency safely and effectively. Typical tasks being completed by separate or multiple fire crews include:

- Incident command and safety
- Fire suppression
- Rescue
- Ventilation
- Water supply
- Rehab and medical
- Salvage

BFES responded to 478 structure fire incidents during the period of 2018-2022 (5-year period). Of those 374 were residential, 89 were commercial/industrial, 10 were hospital/institution, and 2 were coded as a retirement home and a church. It is important to track these incidents for response planning and fire prevention purposes.

**Observation #8:** The ability to assess the effectiveness of the current volunteer response model effective response force was not possible. The response data provided did not include the number of firefighters that arrive on scene. Further, station 5 is currently a satellite facility that does not have an operational assignment for emergency response. The disposition of this station must be considered as part of the recommendation to establish a service delivery policy and the optimal effective response force.

**Recommendation #8: Commence an analysis of both the rural area responses and urban area responses to accurately determine the overall operational effectiveness and determine the achievement of the overall optimal effective response force for the municipality.**

*(Suggested completion: 12 - 18 months)*

**Rationale:** *The consistent achievement of the recommended effective response force has a direct impact on firefighter and public safety and increases the risk potential for loss of life, extensive property loss and environmental damage. The utilization of full-time staff units into rural areas would allow for additional support to the rural area and provide a more effective response improving both fire fighter and public safety.*



### **3.5.4 Service Calls**

Service call requests are typically non-emergency call types. Fire departments play an important but often unrecognized role in the social safety net of communities. When citizens perceive an emergency or an urgent request for assistance, the agency most frequent called to help is the fire department. For the reviewed period (2018 – 2022) there were 1235 responses for service (23% of total call volume). This is a value-added service of significant importance to those making the request.

### **3.5.5 Motor Vehicle Collisions**

Motor vehicle collisions (MVCs), with or without trapped persons can pose unique hazards to both the victims and responders. MVC responses are the most frequent non-medical first responder/emergency service provided by the BFES responding to 147 MVC incidents over the 2018-2022 period. Multiple transportation corridors and MVCs are risk factors identified in Section 2, Community Risk Profile.

Many modern vehicles pose added risks to firefighters, such as airbag deployment and hybrid vehicles containing fuel cells or large battery banks. Vehicle incidents involving transport vehicles often pose the additional challenges of dangerous goods or requiring heavy equipment to effectively manage the event.

Vehicle extrication requires specialized training, equipment, and close coordination with other emergency services for the safety of both victims and responders. Weather conditions also contribute significantly to both the severity of the incident and the effectiveness of the response.

The BFES firefighters have the training, equipment, and apparatus to safely to provide MVC response and victim extrication. The relevant SOPs are expected to provide guidance on what resources will respond to MVCs and any response boundary restrictions. BFES conducts training for MVCs utilizing industry leading practices including training on different vehicle types that are made available for that purpose.

### **3.5.6 Medical First Response**

Emergency medical assistance is a service that is delivered by both career and volunteer firefighters to the recognized Emergency Medical Responder (EMR) level. Interviewees have indicated that emergency medical assistance is a highly valued service to the public that does not overwhelm the response capacity and is provided at a relatively low cost.

As previously identified the response data provided showed that BFES provided 3460 EMS responses for the 2018–2022-time frame, which is the largest single response activity (34% of 5-year total call volume).



### **3.5.7 Wildland, Field, and Brush Fires**

Wildland, field, and brush fires are a common hazard in the rural areas of Belleville. These types of fires can quickly escalate and pose risks to nearby structures. Significant safety risk can occur to highway and roadway traffic as a result smoke restricting visibility. As well, smoke particles can result in respiratory issues. The BFES firefighters have the training and equipment to respond to these types of fires in the community.

### **3.5.8 Dangerous Goods Response**

Response capabilities should align with service levels defined in the NFPA 472: Standard for Competence of Responders to Hazardous Materials Weapons of Mass Destruction Incidents service level matrix which is soon to be consolidated as NFPA 470. This standard directs fire departments without advanced hazardous materials training to take only a limited role in dangerous goods incident response. For those departments who do undertake the defined training there are three hazmat response service levels.

The first level of service is the awareness level. This level, recommended universally in North America as a minimum for all fire departments, is the most basic and is for responders who could be the first on the scene of an emergency involving hazardous materials including fire and police personnel. At the awareness level responders are:

- expected to recognize the presence of uncontrolled/unconfined dangerous goods, utilize the CANUTEC (Canadian Transport Emergency Centre) Chief Administrator Officer
- Dangerous Goods Response Manual and other resources to identify the product(s) involved,
- determine initial actions,
- establish initial exclusion zones, and
- provide protection for themselves and others while calling for trained personnel.

Awareness level responders will also establish the exclusion perimeter, secure the area, and restrict entry by others to their best of their abilities. It does not involve donning protective suits to enter the contamination zone to stop the release of DG or conducting decontamination.

The second level of response is the operations level. Responders are trained to be part of the initial response and control the impact of the release in a defensive fashion. Responders are expected to take a more hands-on approach than considered at the awareness level. They will use absorption, damming and diking to stop or redirect the flow of the dangerous goods. Firefighters are trained to don protective suits, enter the hot zone to conduct rescue and evacuation activities and control the product release.

The third level of response is the technician level. Technician-level responders must be certified hazmat technicians, trained in the use of specialized chemical protective clothing and control equipment. Responders at this level take offensive action in responding to



releases or potential releases of dangerous goods. Given the required training, cost of equipment and limited community need, this level of dangerous goods service is only provided by larger communities in Ontario. In addition, many private sector dangerous goods response companies also operate within Ontario for carriers/shippers with existing response contracts and recognized transportation emergency action plans.

BFES had 201 incidents over the 2018-2022 period that are identified as dangerous goods incidents. It was not determined whether mutual aid for advanced dangerous goods was requested on any of these incidents.

BFES provides an awareness level of service. This service level is limiting in both the level of training and resources available to handle any dangerous goods incident. BFES would look to the Office of the Fire Marshal through the regional coordinator for support at the operations or technician level should more advanced levels of training and resources be necessary.

### **3.5.9 Technical Rescue**

Rescue operations are often unique situations requiring specialized equipment and training to ensure the responders maintain the competencies required to safely execute the rescue. The challenge in maintaining these skills is the low frequency of the events combined with the limited opportunity to maintain training proficiencies. Aspects such as limited training budgets, higher priorities, and time constraints impact the opportunity to remain proficient. As a result, fire departments offering technical rescue services must provide adequate training to maintain competencies while ensuring operational readiness of equipment.

Typical technical rescue services, include:

- Motor vehicle collision (MVC) requiring extrication.
- Low-angle rescue
- Swift and static water rescue
- Ice rescue
- Confined space rescue

BFES does not train to or maintain technical rescue services other than MVC and water/ice rescue and would request equipment and support from mutual aid partners if required.

Review of the 2018-2022 incident data indicate 695 incidents were categorized as technical rescue in nature.

- Vehicle extrication – 528
- Ice/water – 76
- Entrapment – 11
- High angle – 3
- Confined space – 2
- Elevator 75 (emergency and non-emergency)



It is important to note that MVCs may be deemed as technical rescues, medical, fire, or dangerous goods depending upon the specifics of the incident and the operations required but may require all skill sets and resources.

Further to the observations regarding the completion of SOPs, technical rescue service-related SOPs are required for all firefighters involved in the use of the specialized equipment and tactics. They must be trained in the respective rescue specialty and is documented. The competency of first responders should be monitored and regularly refreshed, as most certifications are a one-time process which does not ensure the skills, knowledge and abilities are maintained. The lower frequency of these specific rescue events emphasizes the need for recurring training. This further emphasizes the need for a BFES service delivery policy that identifies core services, standards, and performance targets.

### 3.6 Fire Inspection, Investigation and Public Education Programs

The fire service in general, has increased emphasis on fire prevention activities, communities are seeing a significant reduction in fire-related losses. Initiatives such as the smoke alarm campaign has resulted in a reduction of fire related deaths. In Canada, from 2011 to 2020, there were approximately 220 fire-related deaths in Canada each year. Most of these fire-related deaths were classified as unintentional (accidents). While a large portion of this reduction appears to result from an increased focus on safety in the design, construction and use of equipment and buildings, as well as the widespread installation of smoke alarms in residential occupancies, fire inspections and public fire education have also played a critical role. Data collection and analysis will determine the effectiveness of these programs and their impact on the overall reduction of losses.

**Observation:** The BFES fire Prevention Division consists of five urban fire prevention officers and two rural fire prevention officers designated, along with the fire chief, as assistants to the Fire Marshal to carry out all directives required within the Fire Protection and Prevention Act, 1997 to the City of Belleville. There have been multiple turnovers in the rural fire prevention program. The rural fire prevention officers require the same level of certification and qualifications as the urban fire prevention officers. This has provided a challenge to BFES to maintain qualified rural fire prevention officers.

**Recommendation #9: The urban and rural fire prevention, inspections, investigation, and public educations should be integrated into a centralized service.**

*(Suggested completion: 18-24 months)*

**Rationale:** The centralized approach will allow for effectiveness, consistency, and cost efficiencies in the delivery of fire prevention services across the entire city. This will allow for appropriate training and mandatory provincial certification is achieved and maintained by all required staff.



### **3.6.1 Fire Code Inspection Services**

Modern building codes including life safety design and operating requirements are key component of risk management. Cyclical fire inspection programs for high-risk buildings ensure these systems continue to function throughout the life of the building. This is especially important for high occupancy and special purpose buildings such as apartment buildings, hospitals, seniors housing and schools.

While the benefits of an effective fire prevention program are sometimes difficult to fully quantify, the reduction of fire deaths and injuries in Canada following the implementation and enforcement of modern building and fire codes illustrates the value. These services are fundamental elements of a broader community fire reduction and life safety strategy. Fire inspections are critical services in identifying fire hazards and maintaining life safety systems. Recurring fire inspections are a core component of public safety and should be an established practice in any community.

The City of Belleville is mandated to respond to complaints and requested inspections related to fire safety concerns by the Fire Protection and Prevention Act. As well, vulnerable occupancies are required to initiate and complete routine annual inspections.

BFES will provide a file search for any outstanding Ontario Fire Code violations against a property providing authorization is granted from the current owner.

### **3.6.2 New Developments Plan Reviews**

Requirements of both the fire and building departments must be met prior to obtaining development approval or occupancy certification. The fire prevention officers together with the planning and development staff review building and site plans to ensure the construction process complies with Ontario Building Code and Fire Code requirements. This is a key public safety function as the fire risk during the framing phase of wood-framed development is relatively high.

### **3.6.3 Pre-Emergency Plans**

Pre-emergency or incident plans are intended to provide emergency responders with advanced knowledge and processes for a safe and effective response. These pre-plans include information regarding the construction type, occupancy, building status, emergency contacts, utility shutoffs, fire suppression and detection systems installations and locations exposure information, water supply availability, access problems and any other hazards.

Pre-planning programs are not necessarily tied directly to the fire inspection program, but rather include operationally relevant information that was gained on a site visit. Pre-planning should also include potential responses to areas of concern that are not captured in the formal fire inspection program.

**Observation #10:** BFES established a formalized pre-incident planning process in 2023 in the urban response area with plans to expand this program to the rural response area. These plans evaluate firefighting and other emergency considerations such as construction type, occupancy, building status, emergency contacts, utility shutoff locations, fire suppression and detection systems, exposure information, water supply availability, access issues, staging locations, and other hazards.

**Recommendation #10: Continue the expansion of the formal pre-incident planning process of all department response areas.**

*(Suggested completion: 1-24 months)*

**Rationale:** *The information contained in a pre-incident plan is critical to emergency responders when there is no property representative on-site who knows the intimate details of the building or complex. The use of common light weight construction materials can be identified and informing response crews of potential risks and assist in developing operational plans. The fire pre-plans are useful for any emergency, not just in the event of a structure fire.*

### 3.6.4 Fire Cause and Origin Investigations

All fires causing injury, death and property loss are to be investigated in Ontario. The Ontario's Office of the Fire Marshal and Emergency Management maintains a fire incident database and provides trend analysis that can be utilized by BFES to identify specific fire and injury prevention campaigns based upon leading fire and other incident causes. Examples include cooking safety, wood burning appliance safety, smoke alarm testing and maintenance, carbon monoxide alarm installation, home escape planning and fire prevention week. BFES fire prevention officers along with the fire chief and two deputy chiefs are trained and certified by the Ontario Fire Marshal Office to conduct fire investigations for the City of Belleville.

### 3.6.5 Fire Prevention Public Education

Public education programs and active involvement in the community are important efforts that inform and engage citizens to think about fire safety and risk reduction. BFES supports several fire prevention and education activities including:

- Station tours
- Attending school and community events
- Truck visits

Interview and survey participants identified that most citizens do not access emergency response services and are limited in their understanding of the BFES services and operations. Public education programs and events provide firefighting crews the opportunity to interact with the community under non-emergency circumstances. BFES should continue to provide





these value-added services in the community providing these events do not detract from core response services.

Many smaller fire departments, of all types, struggle to find capacity for firefighters to engage in formalized public education programs. Some fire departments have approached this challenge by enlisting the help of volunteer fire educators, often utilizing retired members. A volunteer fire department in BC developed an innovative approach by recruiting the spouses of their current volunteer members into the department to teach fire safety. The new team of fire prevention public educators were trained to the NFPA 1035 Fire and Life Safety Educator standard.

This example is provided to demonstrate that there may be additional unexplored resources within the community which could be considered. Volunteer public educators may be found in groups of retired teachers, retired firefighters or high school students wanting work education experience. Discussions with local school authorities will identify what criteria exist for such resources to provide these programs in schools.

Local school divisions are typically great supporters of fire safety education. Several public education resources are available for pre-school and elementary school age children. Teachers have free access to several free fire safety programs and materials<sup>15</sup>. Further, several community fire departments attempt to target specific elementary grades to provide several programs, including but not limited to:

- Fire escape planning
- Fire evacuation drills
- Kitchen safety
- Holiday safety

Numerous examples of these programs may be found in online resources. As an example, the NFPA provides a host of fire prevention resources.<sup>16</sup> As previously stated BFES should continue to provide value added fire prevention and education including innovative programs as detailed above.

### 3.7 Mutual Aid and Other Service Agreements

Large emergency events quickly overwhelm the response capacity of most municipal fire departments. This is especially true for smaller fire departments with limited resources. As a result, mutual aid and automatic aid agreements are a necessary component in adding response capacity for these low frequencies but potentially high or extreme consequence events.

Mutual aid agreements between fire departments allow them to assist each other across jurisdictional boundaries. Typically, this happens when local emergencies exceed primary response resources. They may include fire response, and/or specialty response services including

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<sup>15</sup> <https://teachers-ab.libguides.com/firesafety>

<sup>16</sup> <https://www.nfpa.org/Public-Education/Staying-safe/Preparedness/Fire-Prevention-Week/Educate>.



rescue, dangerous goods. It is important to note that mutual aid requests are not guaranteed as the responding agency may not be able to support the request.

Automatic aid agreements unlike mutual aid agreements do not need to be requested as the dispatch protocols include the initial or supplemental response to fires, rescues, and emergencies by a neighbouring municipality that can provide an enhanced response than the principal municipality.

The Province of Ontario through the Office of the Fire Marshal has developed a provincial wide mutual aid plan to formalize and maintain mutual aid and automatic aid agreements for identified areas coordinated through an Ontario Fire Marshal appointed fire coordinator. Each area will develop and maintain their respective mutual aid plan consistent with the Ontario plan.

The principle of operation of mutual aid plans is to promote and ensure adequate and coordinated efforts to minimize loss of human life and property, as well as damage to the environment through the efficient utilization of fire department and provincial resources in the event of a mutual aid activation during times of natural or human-made emergencies.

The City of Belleville is included in the Hastings and Prince Edward mutual aid plan. There are no boundaries when considering mutual aid assistance that may require responses into neighbouring counties.

### **3.8 Emergency Management Program and Emergency Operations Centre**

The Ontario's Emergency Management and Civil Protection Act lays out obligations and standards for emergency management programs required of all levels of government on Ontario. Each municipality must develop and implement an emergency management program to protect the lives and property of its citizens.

The City of Belleville Emergency Management Operations Centre (EMOC) is established and follows the requirements under the Act as well as Ontario Regulation 380/04. The primary EMOC is in the Belleville police station. The back-up centre is in fire station number one. The municipal emergency response plan has been developed under the authority of the Corporation of the Municipality's By-Law 2004-185 and maintained under the direction of the emergency control group (ECG). This plan enables a centralized controlled and coordinated response to emergencies in the municipality. The municipal emergency response plan is dated 2019 and is up to date.

#### **3.8.1 Emergency Management**

Historically, the emergency management portfolio was assigned to the fire chief as the individual with the most experience dealing with emergencies in the community. Today, emergency management has evolved to a highly specialized discipline. The fire chief or deputy fire chief may not be qualified or have the capacity to manage or act in emergency management roles. In smaller communities with less emergency response capacity, the fire chief may well be required to manage the emergency response in the field and not be available to participate actively in the emergency coordination centre operations. As a result,



many communities are moving toward assigning emergency management to full-time specialized emergency management staff.

The City of Belleville Council have recognized the importance of emergency management oversight and coordination by assigning this critical function to a dedicated person reporting to the Director of Fire and Emergency Services/Fire Chief. The Community Emergency Management Coordinator (CEMC) is the Director of Fire and Emergency Services/Fire Chief. One of the deputy chiefs is designated as the alternate CEMC with responsibility for community risk.

### 3.9 Emergency Services Communications

The BFES communications service (fire dispatch) has been in the business of providing a professional level of fire communications services since the 1960's. Fire communications services was identified as a core service with BFES.

Utilizing initial data and finding conducted in the early review of the Communications division including staffing concerns, expensive Next Generation-911 upgrade requirements and findings identifying call process time concern, assisted leading BFES to enter into a 5-year contract with Peterborough Fire Department to provide emergency services communications to BFES. This will come into effect in February 2024.

### 3.10 Health and Wellness

The active pursuit of employee/member health and wellness is extremely important to an organization. The benefits include:

- Decreased absenteeism
- Decrease in injuries during normal duties.
- Decreased workers compensation premiums
- Employee career longevity
- Improved work/home balance
- Career longevity

In our interviews with the fire chief, deputy chiefs and members of BFES has demonstrated a commitment to health and safety. BFES promotes health and wellness through committees, programs and processes including.

- Separate joint occupational health and safety committees for both career and volunteers
- Post-fire decontamination processes
- Promoting general fitness
- Fitness equipment in fire stations
- PPE decontamination processes
- Mental health wellness and support programs and committees:
  - Post-incident de-briefing



- Critical Incident Stress Management training
- Access to clinical psychologist

### 3.11 Training

Training and competency development are essential and ongoing activities for all contemporary fire departments. A prepared and competent workforce reduces risk and safely optimizes service delivery. An effective workforce-training program aligns the growth and development of personnel to the organization's mission and goals.

The recent closing of the Ontario Fire College and the change to regional training centres resulted in a partnership agreement with the Hastings and Prince Edward Mutual Aid Society to include a regional training facility under the purview of the Office of the Fire Marshal.

The Ontario Firefighter Certification regulation filed April 14, 2022, and enacted on July 1, 2022, introduces mandatory minimum certification standards for firefighters that align with fire protection services being provided. This regulation will help ensure that firefighters have consistent training according to the level of service set by a municipality supporting firefighter and public safety. This certification program requires training confirmation by each municipality's firefighter by September 2023 and full certification of all requirements by July 2028. Indications are that this may have a major impact on volunteer services and further challenges with retention/recruitment. The previously identified turnover rates of the rural volunteer firefighters could be contributed to the OFM certifications. The OFM certification requirements are attached as Appendix G

Training and education program activities are identified by assessing the Knowledge, Skills, and Abilities (KSAs) needed for the firefighters to perform their duties as outlined in the department's SOGs and procedures. When firefighters are competently trained and possess the KSAs for the services they are expected to provide, they reduce risk and increase their own safety and the safety of the public they serve.

The training program of a fire service is a very important and demanding portfolio. The scheduling of instructors, facilities and participants is a complex task to ensure safe and consistent training, while not negatively impacting the operational capacity.

Ongoing training and competency development/maintenance are critical activities for all fire services. A prepared and competent workforce reduces risk and safely optimizes service delivery. An effective workforce-training program aligns the growth and development of personnel; ensuring firefighters and officers have the necessary competencies to achieve an organization's mission and goals. The recommended or required training for each position within BFES should reflect each positions respective job description. Some of these training requirements are pre-requisites to apply or expected to be completed as made available. Other training requirements are core competency maintenance and team building exercises.

Training and education program activities are identified by assessing the knowledge, skills, and abilities (KSAs) needed for the firefighters and officers to perform their duties as outlined in the department's standard operating guidelines (SOGs) and procedures. When well-equipped with



the KSAs for the services they are expected to provide, they increase their own safety and the safety of the public they serve.

BFES has three fire training officers (one career and two volunteer) to oversee, coordinate and deliver the training needs of the firefighters. Both the career and volunteer components of BFES provide their own independent training curriculum and training scenarios. Through interviews and survey results it was observed that there are several gaps in training objectives that impact operational effectiveness and safety. There is little to no training being jointly conducted with career and volunteer firefighters together.

As previously identified the urban and rural fire training programs including recurring skill proficiency maintenance should be integrated into a centralized coordinated program to increase operational effectiveness, and firefighter safety.

### **3.11.1 Industry Recommended Qualifications**

Industry recognized standards of training and competencies developed by NFPA provide general guideline for training standards aligned with most fire department positions and as previously indicated the OFM certification regulation is to ensure mandatory minimum certification standards for firefighters that align with fire protection services being performed. The tables found in Appendix G describes the NFPA recognized training and competencies for each position as well as the OFM minimum certification standards for the various Ontario fire protection services and the compliance timeline.

It is extremely important that training requirements and priorities are aligned with the approved standard of cover or level of service policy approved by the City of Belleville. BFES may choose to provide variations of service delivery by full-time and volunteer fire fighters. For example, the Full-time staff are trained to an operation level in Water/ Ice and the volunteers trained to awareness level, requiring the full-time units to respond to all water/ ice rescue calls across the entire city. This type of delegation of tasks removes or prevents the over burdening of the volunteer fire fighter, allowing them to focus on training of core suppression and auto extrication skills.



**Observation #11:** BFES current operates a full-service operation as defined in Ontario Regulation 343/22, which includes interior attack, auto-extrication and hazardous materials response and provide additional technical rescues. BFES crews are supervised and lead by Company Officers, provide fire inspections, conduct fire investigations, and deliver public education programming. All of these require initial training and mandatory certification within timeframes outlined in the regulation. Further BFES should ensure that competency/ refresher training is maintained in all the skill sets to ensure fire fighter and public safety. This includes regular and ongoing training and annual drills such as live fire training sessions, technical rescue practical scenarios and currency of skills and techniques in all areas. The training and certifications are required regardless of if personnel are urban or rural assigned. The increased in training and certification requirements may put added expectations on rural volunteers.

**Recommendation #11: Ensure all firefighters and fire service staff are certified to the appropriate levels defined under O Reg 343/22 for duties they are required to perform as key responsibilities within the defined services levels approved by Council.**

*(Suggested completion: 12-24 months)*

**Rationale:** Once Council has established the service levels to be provided by the fire service the municipality and fire service must ensure compliance with Ontario Regulation 343/22 mandating all fire fighters are certified at a minimum to the corresponding certification standard set out in the regulation. This includes all technical rescues provided by the fire service.

### 3.12 Facilities and Assets

#### 3.12.1 Fire Station Overview and Assessment

Fire stations are typically used to accommodate fire apparatus, equipment, personal protective equipment (PPE), and support fire service functions and firefighters. A community may have one or more of these stations based on the size and complexity of the response zones. Administration staff are typically located in the central fire station.

BFES provides fire and emergency response out of five fire stations that are located throughout the municipality. Two of the fire stations are utilized by the career staff and are the primary urban response stations. Three volunteer fire stations are in the rural response area of Belleville. Two of these rural stations are operational, while one is primarily an apparatus storage and secondary response station.

Fire station/s are typically located to provide optimum geographic and/or risk-based coverage within a response area. As the community grows, these facilities may not be functioning efficiently. Should the existing station remain a viable location based on response coverage a renovation may be required. Alternatively, a new location and build may be the best option. When new or replacement fire stations are being planned, careful consideration



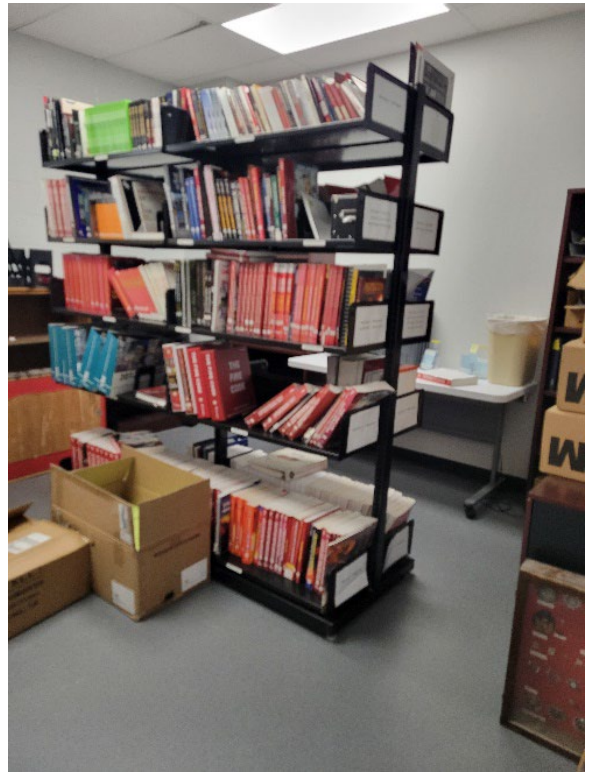
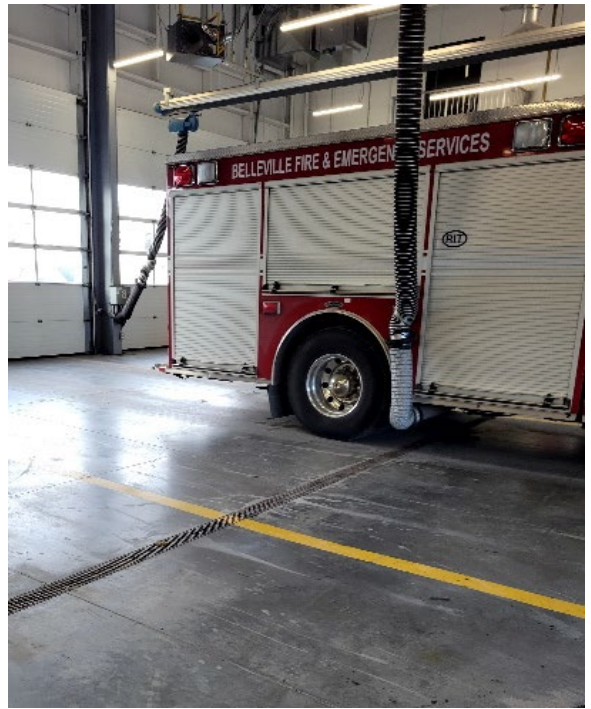
of the ideal location based on present and future needs of the municipality and the fire service should be the priority.

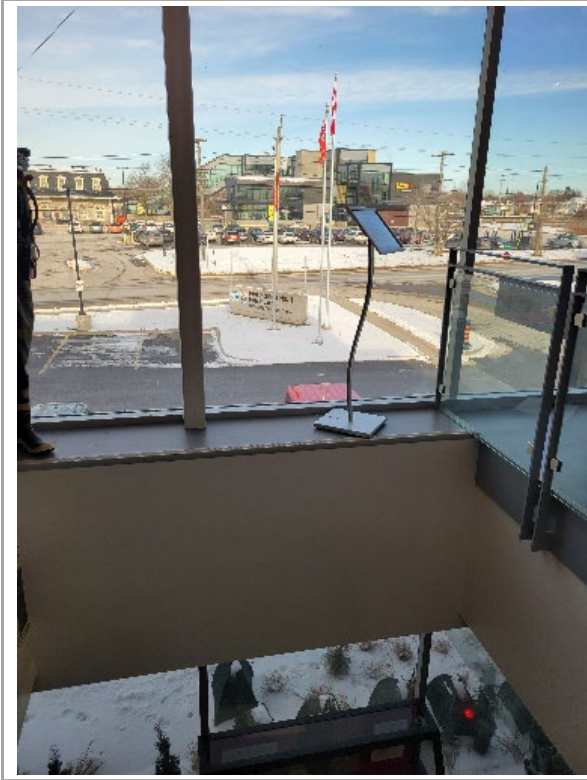
An overall assessment of each of the five BFES fire stations are captured below.

Fire Station # 1	60 Bettles Station		Opened 2015		
Use:	Career fire station for urban primary response and location of Headquarters. Location of emergency communications centre				
Bays:	5 (4 Drive through)	Unit Capacity:	5	Year in Service:	8
Comments:	This station is currently in good condition and should remain fully functional for the foreseeable future. There are challenges accommodating storage and PPE needs. Based on the recommendation on the future of the dispatch resources, additional space may become available. The railway near this station has created an emergency response obstruction that will need to be considered when a new station 2 location is being determined				
Unit Inventory:	1 Pumper	1 Rescue		1 Aerial Ladder	
	1 Marine rescue boat	C 1		C 2	
	C 3				







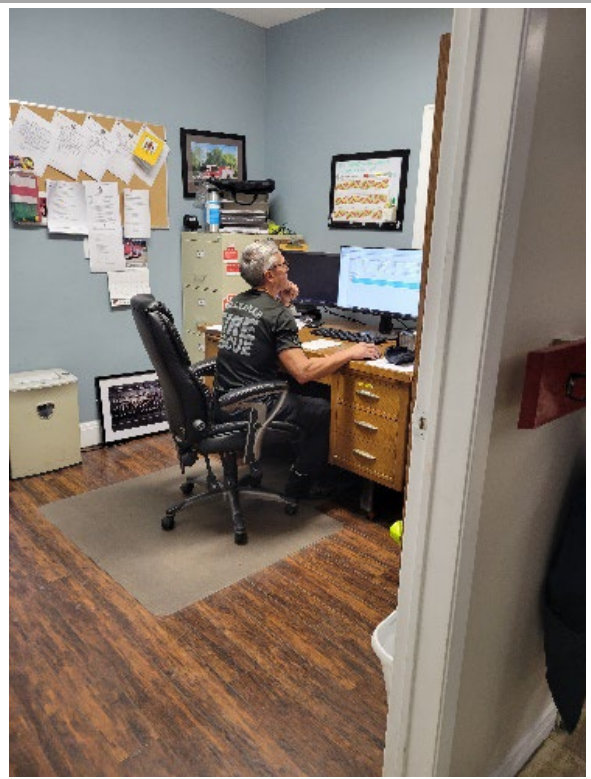
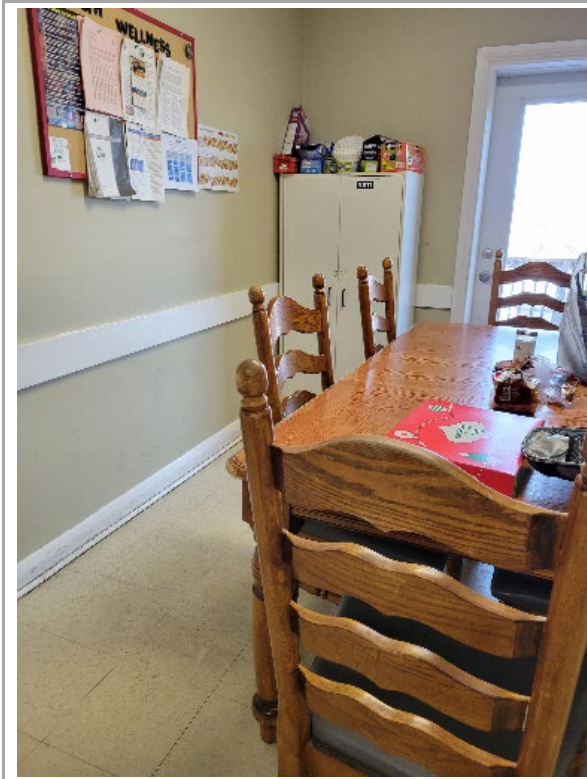
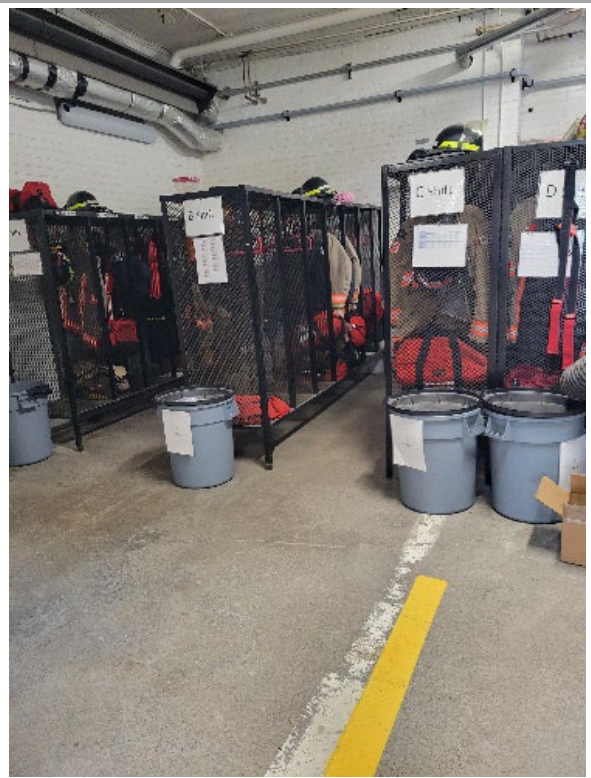
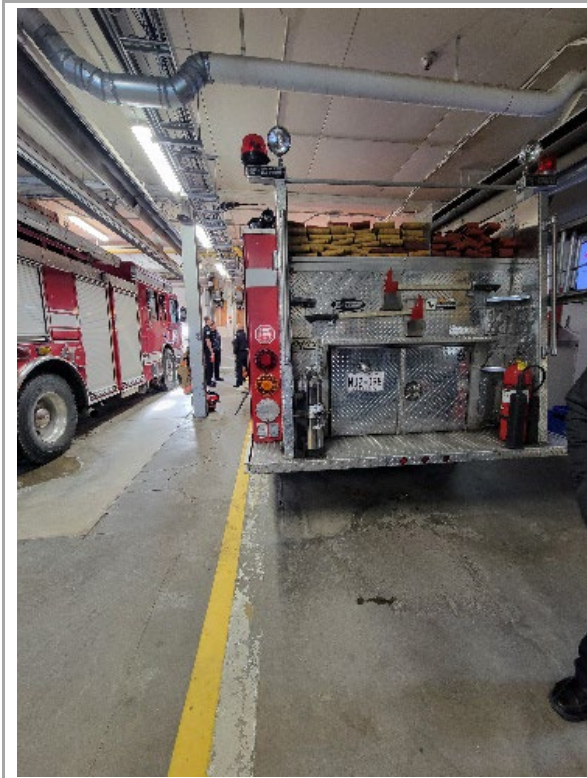


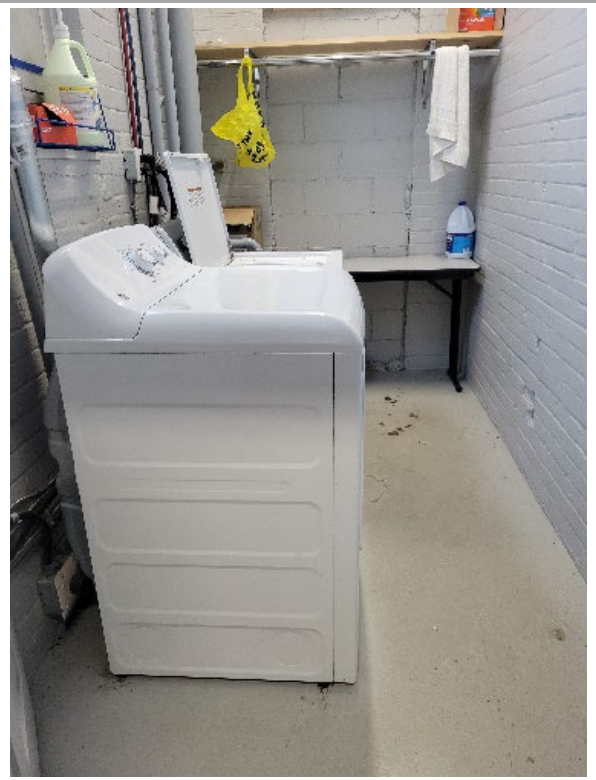


<b>Fire Station # 2</b>	<b>72 Moira Street</b>			<b>Opened 1949</b>	
Use:	Career fire station for urban primary response				
Bays:	4	Unit Capacity:	4	Year in Service:	1953
Comments:	This station is well past its functional life as a fire station and replacement is deemed to be a crucial priority. Section 4 of this FMP identifies location options for a new station that will optimize response are coverage.				
Unit Inventory:	1 Pumper	1 Aerial Ladder		1 Reserve Pumper	
	1 Utility Truck				







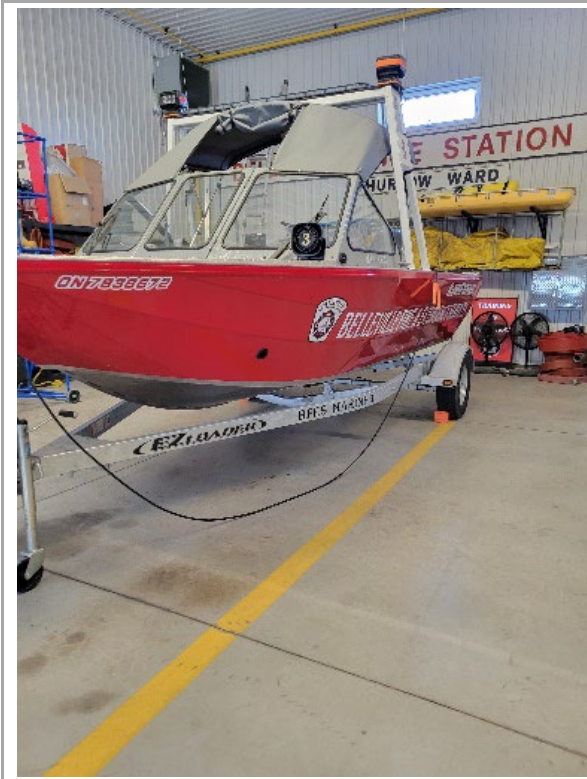
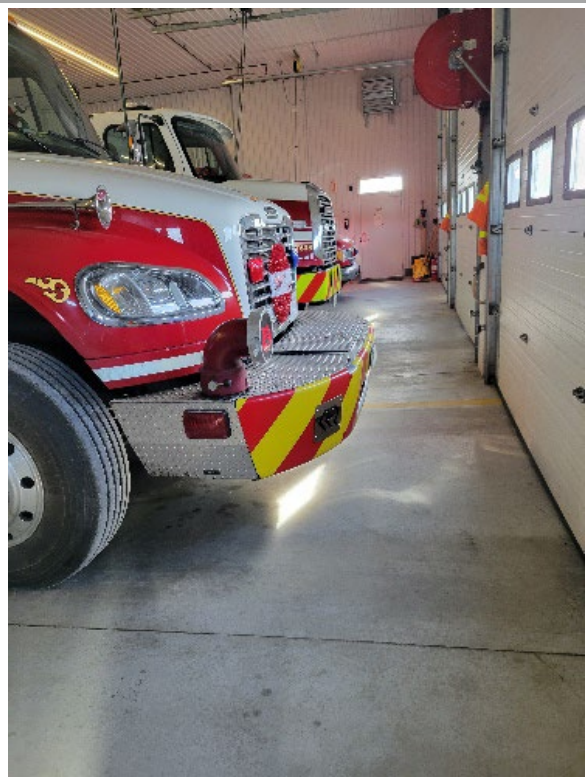




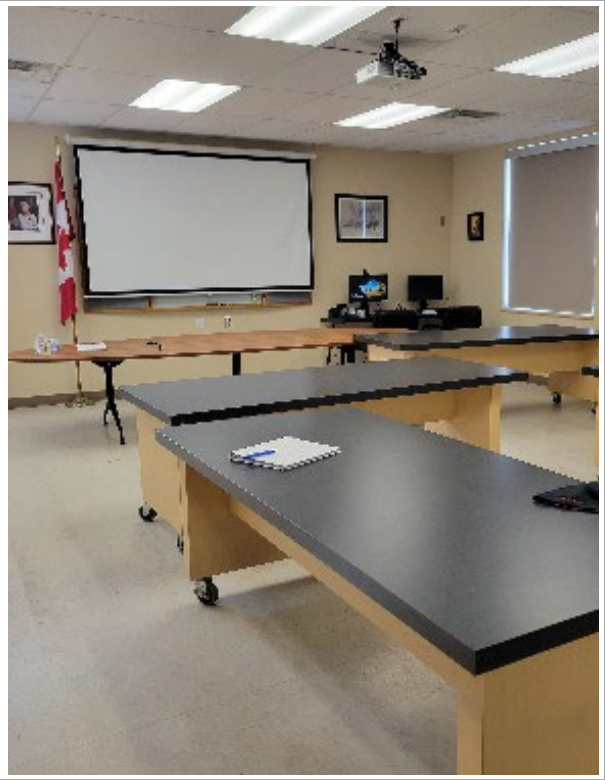
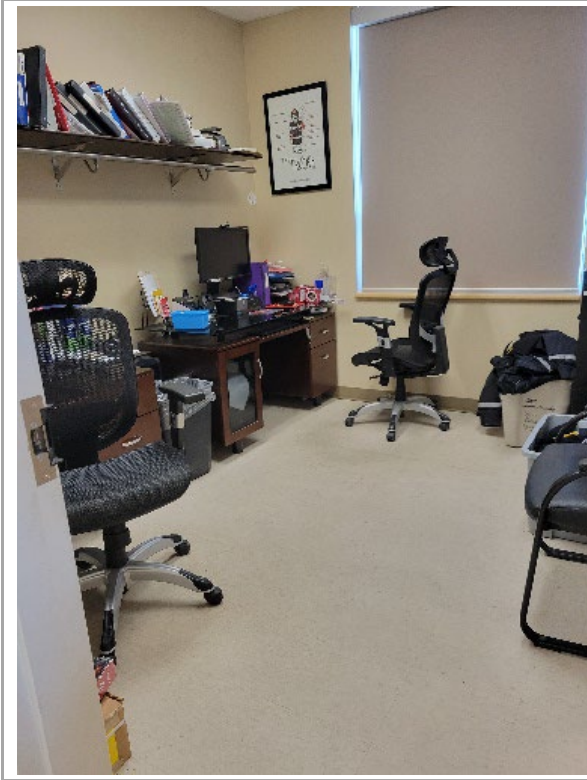


<b>Fire Station # 3</b>	<b>4867 Old Highway 2</b>	<b>Opened 2016</b>		
Use:	Volunteer fire station for rural primary response			
Bays:	4	Unit Capacity:	4	Year in Service: 7
Comments:	This station is currently in good condition and should remain fully functional for the foreseeable future. It is currently meeting the needs of the volunteer firefighters assigned to this station.			
Unit Inventory:	1 Pumper	1 Rescue	1 Tanker	







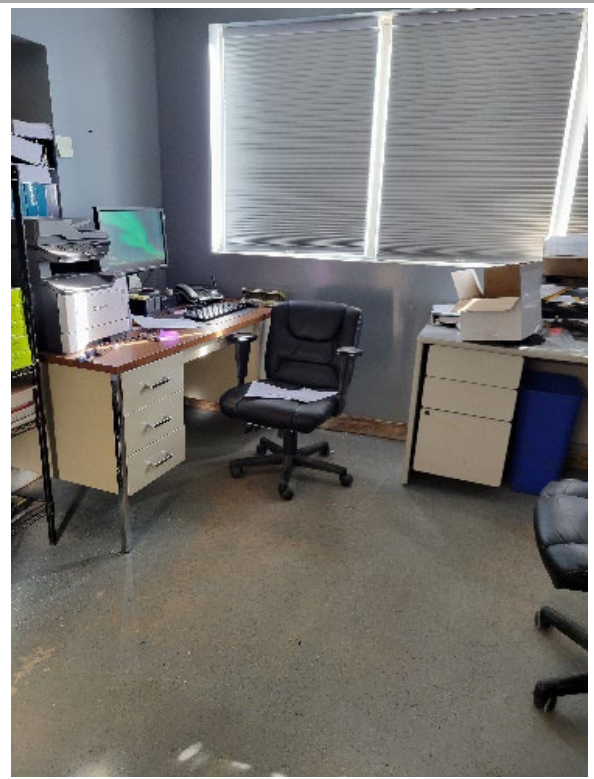
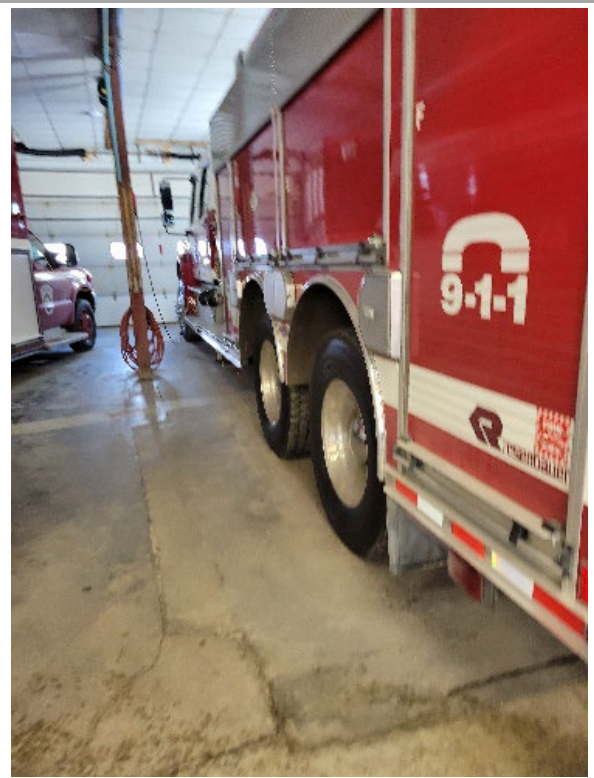


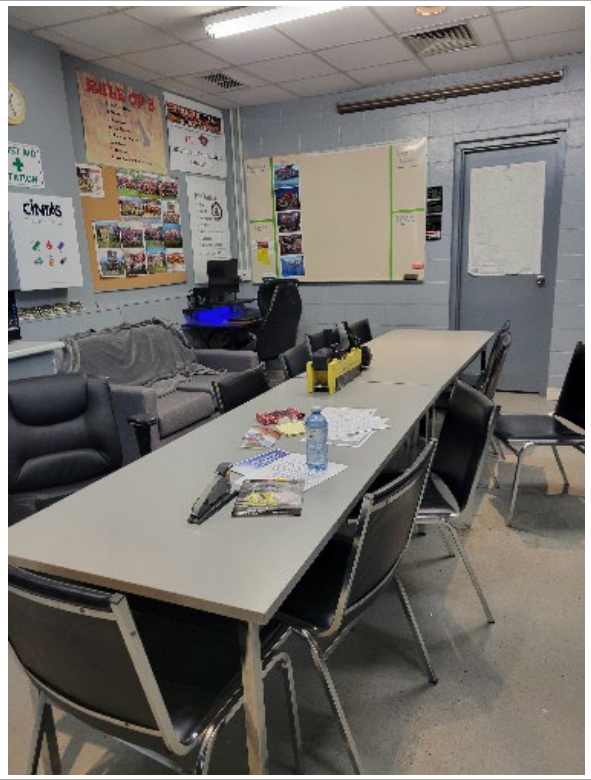
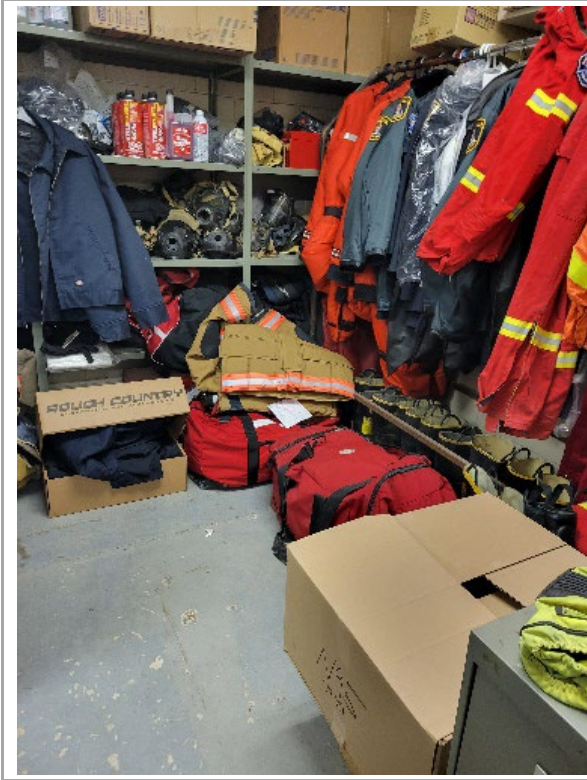


<b>Fire Station # 4</b>	<b>516 Harmony Road</b>	<b>Opened 1970</b>			
Use:	Volunteer fire station for rural primary response				
Bays:	2 Drive through	Unit Capacity:	2	Year in Service:	8
Comments:	This station is well past its functional use as a fire station. Building is in a poor state of repair. Building was never designed to be a fire station. Built in approximately 1950 it was originally a cheese factory. This building was converted into a volunteer-based station. An addition was added to the station in approximately 1994 and is attached to the community centre. Section 4 of this FMP has options for consideration for the response coverage in the rural response area.				
Unit Inventory:	1 Pumper	2 Tankers	1 Rescue		







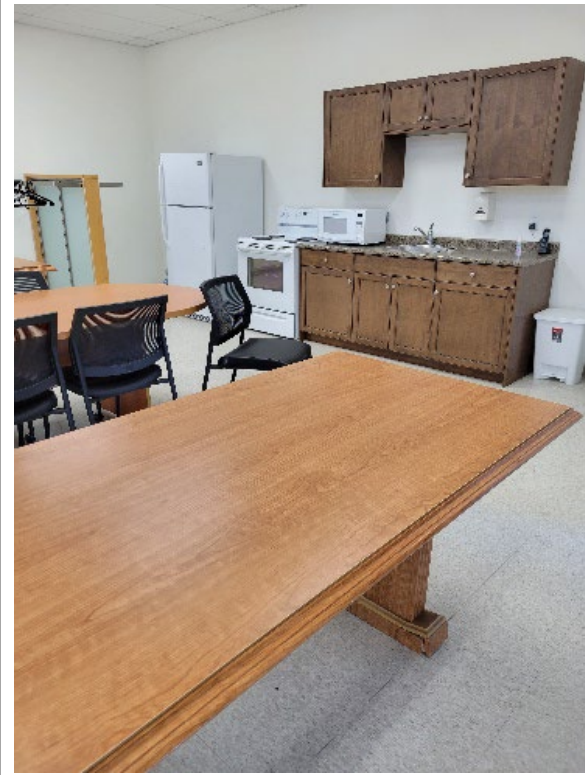






<b>Fire Station # 5</b>	<b>26 Hoskin Road</b>		<b>Opened 2017</b>		
Use:	Volunteer fire station for rural primary response				
Bays:	2	Unit Capacity:	4	Year in Service:	6
Comments:	This station is relatively new and in good condition. While this station is not primarily staffed by volunteers it does provide additional apparatus storage. Volunteer firefighters from Station 4 are the primary responders to this station. Volunteer firefighters may need to be assigned to this station based on future development of the area.				
Unit Inventory:	1 Pumper	1 Light Duty Truck			







As previously stated, Fire Station #2 and #4 have been identified for either upgrading, replacement or re-location.

To operate a fully functioning fire service effectively and efficiently, several key features are essential for a fire station. These features include, at a minimum:

Item	Description
1	Site security
2	Adequate parking for staff and visitors
3	Internet and intranet connectivity
4	Adequate space for training – training props, hydrant
5	Backup power supply
6	Chief Officer and/or Captain’s office
7	Deputy fire chief’s office (career station only)
8	Emergency management office (if required)
9	Administrative support office/space (if required)
10	Training room / meeting room
11	Office security
12	Dorm rooms (career station only)
13	Day use area
14	Kitchen
15	Fitness / wellness area (as required)
16	Unisex bathrooms and showers
17	Space to safely garage and do minor maintenance on vehicles
18	Hose drying area
19	Small equipment storage and maintenance room
20	Air filling station room complete with proper ventilation
21	Industrial washer and dryer room
22	Bunker gear storage room complete with proper ventilation
23	Consumables storage room (Fire)
24	Consumables storage room (EMS)



**Observation #12:** An assessment of all five fire stations utilized by BFES has shown that three of the fire stations are in good condition and meeting the needs of the BFES. Two of the fire stations are not meeting the needs of BFES and pose potential safety risks to the personnel working out of these buildings. Fire station #2 is utilized by the career firefighters, and fire station #4 is utilized by the volunteer firefighters.

It must be recognized that fire stations utilized by full-time fire services are heavily used 24-hours per day, seven days per week. The BFES fire station currently must be able to accommodate a minimum of six firefighters. Future staffing requirement should be anticipated and planned for. As well the volunteer fire stations, while not staffed as are in career stations, none the less are subject to significant usage along with wear and tear.

***Recommendation #12: Replacement of current fire station 2 to the proposed location contained in Section 4 of this FMP. Further with the replacement of a new station 2, that station 4 be evaluated for operational viability including the need to replace this deficient station.***

*(Suggested completion: 24-48 months)*

***Rationale:*** A properly designed and equipped and located fire station will ensure optimum response capabilities, safety of firefighters and staff, and equipment longevity. This would include confirming a proper location which is suitable for optimum response and building size. The new fire station 2 would include all the features of a fully functioning fire station that conforms to occupational health and safety standards, Canadian Standards Association standards, National Building and Safety Codes and NFPA standards. The process of constructing a new fire station could take up to two years.

*Station 4 is well past its functional use as a fire station. Building is in a poor state of repair. Building was never designed to be a fire station. Built in approximately 1950 it was originally a cheese factory. This building was converted into a volunteer-based station. An addition was added to the station in approximately 1994 and is attached to the community centre.*

### 3.12.2 Training Facilities

Training of new recruits and current firefighters is crucial to their safety and the community they serve. The Ontario Firefighter Certification regulation for firefighting stipulate employers is required to provide adequate training for the tasks required of firefighters. Secondly and just as important, NFPA indicates specific training requirements for specialty disciplines that are required for a fire department such as BFES.

Most fire service's train by utilizing a combination of online training, internal classroom and practical training sites, other fire services' facilities, or third-party vendors. They also often utilize areas within their community that provide opportunity to train specific scenarios.

Typical fire training areas have:

- Classroom(s) with access to reliable internet
- Adequate parking
- Apparatus staging
- Decontamination and personal care facilities
- Vehicle extrication pad
- Training building or tower
- Area designated for props.
- Water supply/ hydrant
- Water collection system/drainage
- Proper security

**Observation #13:** BFES has sufficient facilities within their fire stations for classroom needs, however, have limited training areas to conduct hands-on training. Their training typically occurs in their apparatus bay, outside in areas around the station, or elsewhere in the community. Vehicle extrication training is done by taking advantage of permission with local wrecking yards. The only practical live fire training facility near Belleville is the regional centre in Quinte West.

**Recommendation #13: Conduct an internal training needs assessment followed up by a training facility feasibility study.**

*(Suggested completion: 12-24 months)*

**Rationale:** A comprehensive study to determine if an in-house training facility is financially and operationally beneficial balanced against the other available options that are available to meet the needs of the department.

## 3.13 Equipment

### 3.13.1 Apparatus and Light-Duty Vehicles

Fire apparatus and light-duty vehicles are one of the largest asset expenditures for any fire department. Purchasing and managing these assets requires strong fiscal responsibility to endure public and council scrutiny. Currently, BFES has a considerable amount invested in vehicles and equipment. The lifespan of apparatus varies depending on its type and use.

#### 3.13.1.1 NFPA Fire Apparatus Standards

NFPA has developed standards to assist a fire service with the design, maintenance, inspection, testing, life cycling, and dispersal for their fire apparatus. Fire departments may choose to adopt these standards or utilize them as a reference in their own standards and practices.



### NFPA 1901: Standard for Automotive Fire Apparatus

The NFPA 1901 standard defines the requirements for new automotive fire apparatus and trailers designed to be used under emergency conditions to transport personnel and equipment and to support the suppression of fires and mitigation of hazardous conditions. This standard recommends that fire apparatus should respond to first alarms for the first 15 years of service, with the expectation that they perform as designed 95% of the time. For the next five years, it should be held in reserve for use at large fires or used as a temporary replacement for out-of-service first line apparatus.

### NFPA 1911: Standard for the Inspection, Maintenance, Testing, and Retirement of In-Service Emergency Vehicles

The NFPA 1911 standard defines the minimum requirements for establishing an inspection, maintenance, and testing program. Also included are guidelines for emergency vehicle refurbishment and retirement.

Underwriters Laboratories of Canada (ULC): Utilizes many of the provisions within these standards as part of the Underwriters survey for determining fire insurance ratings for a community.

For example, it follows the life cycle program with the exception that it may award full credit for a fire apparatus older than 15 years, but not more than 20 years, in remote locations only if the piece of equipment is deemed in excellent condition and all necessary upgrades are done. The value of the additional credit in this case, which is only a portion of the total grading for a final Fire Underwriters Survey (FUS) rating may well be overshadowed by the cost of maintaining an older unit.

In addition, the National Fire Protection Association Standard (NFPA) 1901: Standard for Automotive Fire Apparatus recommends the following:

#### **D.1 General**

*To maximize fire fighter capabilities and minimize risk of injuries, it is important that fire apparatus be equipped with the latest safety features and operating capabilities.*

*In the last 10 to 15 years, much progress has been made in upgrading functional capabilities and improving the safety features of fire apparatus. Apparatuses more than 15 years old might include only a few of the safety upgrades required by the recent editions of the NFPA fire department apparatus standards or the equivalent ULC standards. Because the changes, upgrades, and fine-tuning to NFPA 1901 have been truly significant, especially in safety, fire departments should seriously consider the value (or risk) to fire fighters of keeping fire apparatus more than 15 years old in first line service. It is recommended that apparatus more than 15 years old that have been properly maintained and that are still in serviceable condition be placed in reserve status; be upgraded in accordance with NFPA 1912; and incorporate as many features as possible of the current fire apparatus standard (See Section D3 of Standard). This will ensure that, while the apparatus might not totally comply with the current editions of the automotive*



fire apparatus standards, many of the improvements and upgrades required by the current editions of the standards are available to the fire fighters who use the apparatus. Apparatuses that were not manufactured to the applicable NFPA fire apparatus standards or that are over 25 years old should be replaced.

Underwriters Laboratories of Canada

Current Underwriters Laboratories of Canada (ULC<sup>17</sup>) and NFPA 1901: Standard for Automobile Firefighting Apparatus Standards recommend using apparatus on the frontline for up to 15 years, then as a backup for another 4-5 years. Of course, this timeline is dependent on the frequency of use, scheduled maintenance, and budgets. Some emergency vehicles life cycles can be extended due to low usage or serviceable condition. A leading practice is to have a complete condition survey conducted to determine if there is usable life cycle remaining. This condition survey must consider the NFPA and FUS standards along with the maintenance and cost records of the respective vehicle.

Table 14: Fire Apparatus Service Schedule (Fire Insurance Grading)

Apparatus Age (Yrs.)	Major Cities <sup>3</sup>	Medium Sized Cities <sup>4</sup>	Small Communities and Rural Centres
0 – 15	First Line Duty	First Line Duty	First Line Duty
16-20	Reserve	2 <sup>nd</sup> Line Duty	First Line Duty
20-25 <sup>1</sup>	No Credit in Grading	No Credit in Grading or Reserve <sup>2</sup>	No Credit in Grading or 2 <sup>nd</sup> Line Duty <sup>2</sup>
26-29 <sup>1</sup>	No Credit in Grading	No Credit in Grading or Reserve <sup>2</sup>	No Credit in Grading or Reserve <sup>2</sup>
30+	No Credit in Grading	No Credit in Grading	No Credit in Grading
<sup>1</sup> All listed fire apparatus 20 years of age and older are required to be service tested by recognized testing agency on an annual basis to be eligible for grading recognition (NFPA 1071).			
<sup>2</sup> Exceptions to age status may be considered in a small to medium sized communities and rural centres conditionally, when apparatus condition is acceptable, and apparatus successfully passes required testing.			
<sup>3</sup> Major Cities are defined as an incorporated or unincorporated community that has: <ul style="list-style-type: none"> <li>• a populated area (or multiple areas) with a density of at least 400 people per square kilometer; AND</li> <li>• a total population of 100,000 or greater.</li> </ul>			
<sup>4</sup> Medium Communities are defined as an incorporated or unincorporated community that has: <ul style="list-style-type: none"> <li>• a populated area (or multiple areas) with a density of at least 200 people per square kilometer; and/or</li> <li>• a total population of 1,000 or greater.</li> </ul>			
<sup>5</sup> Small Communities are defined as an incorporated or unincorporated community that has: <ul style="list-style-type: none"> <li>• no populated areas with densities that exceed 200 people per square kilometer; AND</li> <li>• does not have a total population more than 1,000.</li> </ul>			

<sup>17</sup> Underwriters Laboratories of Canada (ULC) is an independent product safety testing, certification, and inspection organization. [www.canada.ul.com](http://www.canada.ul.com)



### 3.13.1.2 Apparatus and Light-Duty Vehicle Fleet Inventory

Table 15: BFES Fleet Service Life Table

Unit Number	Year	Manufacturer	Use	NFPA 1901 Recommended Replacement Timeline
711	2011	Spartan	Pumper	2026 (15 year) 2031 (20 year)
712	2003	Smeal	Pumper	2018 (15 year) 2023 (20 year)
715	2011	Spartan	Rescue	2026 (15 year) 2031 (20 year)
716	2011	Spartan	Ladder	2026 (15 year) 2031 (20 year)
719	2018	Dodge Ram	Light Duty Truck	N/A
721	2014	Pierce	Pumper	2029 (15 year) 2034 (20 year)
722	1991	E-One	Pumper	2006 (15 year) 2011 (20 year)
726	2018	E-One	Ladder	2033 (15 year) 2038 (20 year)
659	2022	Ford	Light Duty Truck	N/A
719	2018	Dodge	Light Duty Truck	N/A
761	2019	Ford	Light Duty Truck	N/A
762	2019	Ford	Light Duty Truck	N/A
763	2011	Chevrolet	Light Duty Truck	N/A
764	2011	Chevrolet	Light Duty Truck	N/A
765	2011	Chevrolet	Light Duty Truck	N/A
771	2013	Ford	Light Duty Truck	N/A
Pickup 1	2016	Chevrolet	Light Duty Truck	N/A
Pickup 2	2019	Ford	Light Duty Truck	N/A
Pickup 3	2016	Chevrolet	Light Duty Truck	N/A
631	2007	Rosenbauer	Pumper	2022 (15 YEAR) 2027 (20 YEAR)
633	2010	Rosenbauer	Tanker	2025 (15 YEAR) 2030 (20 YEAR)
635	1998	Almonte	Rescue	2013 (15 YEAR) 2018 (20 YEAR)
641	2007	Rosenbauer	Pumper	2022 (15 YEAR) 2027 (20 YEAR)
644	2017	Thibault	Tanker	2032 (15 YEAR) 2037 (20 YEAR)
645	2002	Thibault	Rescue	2017 (15 YEAR) 2022 (20 YEAR)
651	2013	Rosenbauer	Pumper/ Tanker	2028 (15 YEAR) 2022 (20 YEAR)
Marine 1	2010	Henley	Rescue Boat	N/A
Marine 3	2022	King Fisher	Rescue Boat	N/A
647	2010	Suzuki	ATV	N/A
N/A	2002	Wells Custom	Trailer	N/A
645	1996	Hub	Tanker	2011 (15 YEAR) 2016 (20 YEAR)



### 3.13.1.3 Fire Apparatus Design and Procurement

Fire apparatuses are designed and tendered based on the unique requirements of the fire service and the community needs that it serves. With the design, tender, and procurement processes typically taking 2-3 years or longer, and the expected apparatus life cycles being 15 years or more, it is important that the procurement decisions accurately reflect immediate and future needs.

**Observation #14:** The design of fire apparatus should take into consideration the immediate and forecasted needs of the community. Consultation with those who use, service, and maintain the apparatus provide valuable insight to critical components for consideration.

**Recommendation #14:** *Develop a life cycle replacement and design of fire apparatus process that includes input from frontline staff, procurement staff, and the fire chief.*

*(Suggested completion: 3-6 months)*

**Rationale:** *Careful consideration around the design and functionality of replacement fire apparatus will assist with ensuring the needs are met now and into the future.*

### 3.13.1.4 Fire Apparatus Maintenance and Repair

In Ontario, all fire apparatus with a gross weight, registered gross weight, or manufacturers gross vehicle weight rating exceeding 4500 kilograms must be inspected on an annual basis in accordance with regulations made under the Highway Traffic Act. These vehicles are required to display an inspection sticker as evidence of compliance with this requirement.

Daily driver inspections for commercial vehicles are a requirement under the Act. Fire vehicles are not included in this requirement, however most fire departments in Ontario mandate daily inspections either at the beginning of a shift, or post-trip at a minimum.

A sound and reliable preventative maintenance program is a vital component of the overall fleet management process ensuring each piece operates reliably in the way it was intended safely and effectively while assisting in making it to the anticipated life cycle. Poor maintenance scheduling or neglect on required checks and repairs can lead to accidents, breakdowns, and life safety issues. A fire apparatus pre-maintenance program should consist of the following components:

- Trip inspections (daily, pre-trip, post trip)
- Regular preventative maintenance scheduling
- Annual preventative maintenance comprehensive check



The maintenance and repair of all BFES heavy and light emergency vehicles is skillfully handled through the Municipalities Fleet Services. The “customers” (BFES) are very satisfied with the level of service that they receive.

Required speciality testing and certifications are successfully handled through the fleet services emergency vehicle technicians. (EVT).

Daily inspection sheets and post trip inspections are reviewed to ensure any necessary repairs are made as soon as possible. Recommended service schedules, testing and certifications are coordinated with BFES administration to ensure compliance with as little disruption to service as possible. Through interviews with BFES staff and review of records, it is obvious that the maintenance and upkeep of all fire vehicles are maintained to a very high standard.

### 3.14 Ancillary and Firefighting Equipment

Equipment needed for field response operations such as vehicle extrication tools, hand tools and fans are examples of equipment required to meet the needs of BFES. Ancillary equipment should be designed and maintained to meet the department’s current core service, goals, and objectives. Results of the interviews and surveys have indicated that the current inventory of ancillary equipment is sufficient and appropriate for the services currently being provided. This equipment is typically tools such as chain saws, hose wrenches, pry bars, axes, wedges, hand-held thermal imaging cameras and mounted and portable lighting. As the response needs change or grow, additional equipment to match the service must be considered.

#### 3.13.1.5 Fire Apparatus Replacement and Dispersal

Given the expense and timelines required for the eventual replacement of the various fire apparatus, industry leading practice is to establish an expected replacement date and anticipated funding necessary for each. This necessary funding would be allocated in a reserve fund with regular yearly contributions. Determining the appropriate dollar value required in a reserve fund to ensure sufficient monies are available at the time of replacement is based on life cycle, forecasted inflation and depreciation. Calculating the yearly contributions is based on the number of years of expected life in the fleet inventory.

As identified above, although both NFPA and the fire underwriters have criteria on re-classifying or retiring apparatus, modifications or upgrades may be required based on age or heavy usage. For example,

- Engines: 16-20 years frontline (NFPA and FUS), but can be reduced due to high usage
- Rescue Truck: 15 years frontline (NFPA) but can be reduced due to high usage.

BFES does not have established life cycle targets or an established apparatus replacement program including reserve funding for any of their fleet. Administration presents any





requests for these large capital expenses on an ad hoc basis through the annual budgeting process.

The current BFES apparatus retirement approach is not consistent with the front-line service recommendations in NFPA 1901 Standard for Automotive Fire Apparatus and CAN/ULC S515 Standard for Automobile Fire Fighting Apparatus, which is utilized by FUS in setting insurance rates within municipalities. This NFPA standard allows for continued front line service for a further 5 years in rural or smaller communities. The decision on whether to retain a piece of apparatus past 15 years should be a result of careful consideration including:

- Overall vehicle condition and reliability
- Maintenance records
- Potential re-sale or salvage value
- Cost and timeline of replacement
- Continued ability to meet expected demands/service levels.

Table 16 parts 1 and 2, and Figure 8 are examples of internal processes that can be used to evaluate the replacement timelines and funding requirements for individual apparatus and light vehicles. These examples show that the monies put into the replacement reserve fund are close to the projected replacement cost in year 15 and require additional contributions to extend the past 15 years.

- 5-year increase to replacement cost from 15-20 years = \$182,533
- 5-year decrease in depreciation value from 15-20 years = \$58,415
- Total increased costs to retain apparatus for additional 5 years (15-20) = \$240,948
- Additional contributions to Reserve Fund \$195,500
- Difference between 15 and 20 years is  $\$240,948 - \$195,500 = \$45,448$  or \$9,090 additional contributions per year
- Changing from a 15 - 20-year replacement cycle requires additional reserve contributions of \$1,818 per year.



A similar profile can be developed for the replacement and dispersal of BFES apparatus and light vehicles.

Table 16: Example of Apparatus Assessment (Part 1)

Vehicle Assessment Criteria			
90 to 100 points	Excellent	Date:	
80 to 89 points	Very Good	Unit number:	
60 to 79 Points	Good	VIN (vehicle identification number):	
50 to 69 Points	Poor	Station:	
Below 49 Points	Not Serviceable	Score:	
		Assessed condition:	



Table 16: Example of Apparatus Assessment (Part 2)

Total Points	Observation and Validation	Value	Score
10	Age in years from manufacture date	1 to 5	10
		6 to 10	8
		11 to 15	6
		15 to 20	4
		21 to 25	2
		Over 25	0
10	Usage Kilometre	1 to 50000	10
		50000 to 100000	8
		100000 to 150000	6
		150000 to 200000	4
		Over 200000	2
15	Commercial Vehicle Inspection Program - yearly inspection, trip inspections documented and labels on vehicle	Pass	15
		Not passed	0
15	Frame /Body	Frame/structure/safety systems meets manufacture specification and passes CVIP inspection	15
		Frame/structure/safety systems do not meet manufacture specification and fails CVIP inspection	0
15	ULC/NFPA	Certified	15
		Failed	0
15	Performance tested yearly to ULC/NFPA standards	Pass	15
		Marginal	10
		Fail	0
10	Body/Paint/lighting	No apparent damage, rust, or deterioration	10
		Minor rust/damage/deterioration	5
		Rusted/paint condition deteriorating/body damage	3
		Condition hinders operation	0
10	Interior condition of cab, safety systems and compartmentation.	Clean, tidy, safety equipment in working order, equipment properly secured	10
		Not tidy, house cleaning required, equipment functional and securely mounted	7
		Poor condition and need immediate attention	0

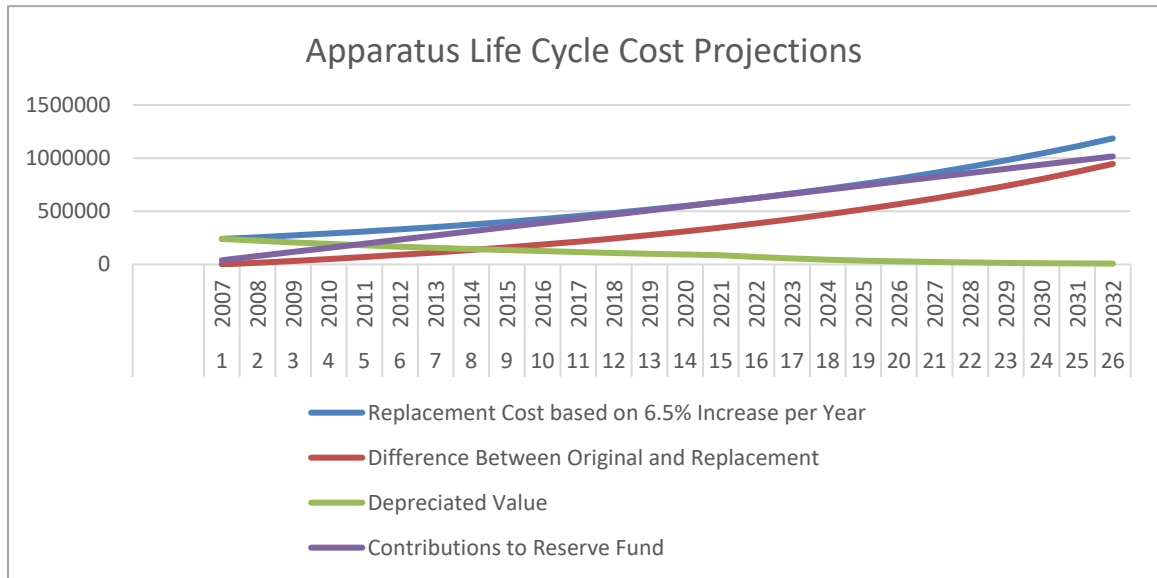


Table 17: Fire Apparatus Life Cycle Cost Projection (Example Only)

Vehicle age	Year	Replacement cost based on 6.6% increase per year	Difference between the purchase of original and replacement	Depreciated value based on 7% depreciation for years 2-15 and 20% depreciation years 16-25
1	2007	\$240,000.00	\$0.00	\$240,000.00
2	2008	\$255,840.00	\$15,840.00	\$223,200.00
3	2009	\$272,725.44	\$32,725.44	\$207,576.00
4	2010	\$290,725.32	\$50,725.32	\$193,045.68
5	2011	\$309,913.19	\$69,913.19	\$179,532.48
6	2012	\$330,367.46	\$90,367.46	\$166,965.21
7	2013	\$352,171.71	\$112,171.71	\$155,277.64
8	2014	\$375,415.05	\$135,415.05	\$144,408.21
9	2015	\$400,192.44	\$160,192.44	\$134,299.63
10	2016	\$426,605.14	\$186,605.14	\$124,898.66
11	2017	\$454,761.08	\$214,761.08	\$116,155.75
12	2018	\$484,775.31	\$244,775.31	\$108,024.85
13	2019	\$516,770.48	\$276,770.48	\$100,463.11
14	2020	\$550,877.33	\$310,877.33	\$93,430.69
15	2021	\$587,235.24	\$347,235.24	\$86,890.55
16	2022	\$625,992.76	\$385,992.76	\$69,512.44
17	2023	\$667,308.28	\$427,308.28	\$55,609.95
18	2024	\$711,350.63	\$471,350.63	\$44,487.96
19	2025	\$758,299.77	\$518,299.77	\$35,590.37
20	2026	\$808,347.56	\$568,347.56	\$28,472.29
21	2027	\$861,698.50	\$621,698.50	\$22,777.84
22	2028	\$918,570.60	\$678,570.60	\$18,222.27
23	2029	\$979,196.26	\$739,196.26	\$14,577.81
24	2030	\$1,043,823.21	\$803,823.21	\$11,662.25
25	2031	\$1,112,715.54	\$872,715.54	\$9,329.80
26	2032	\$1,186,154.77	\$946,154.77	\$7,463.84



Figure 8: Fire Apparatus Life Cycle Cost Projection (Example Only)



**Observation #15:** A leading practice is to designate a lifecycle to each piece of apparatus and contribute annually to a reserve fund to ensure enough funds are available when the replacement is needed. BFES has a reserve fund for the replacement of their apparatus and light vehicles and forms part of the City’s annual budget process. The process of determining an appropriate fire apparatus life cycle is significantly more challenging than for normal commercial vehicles. When emergency vehicles are deployed, they are subjected to very demanding usage and reliability cannot be compromised. The current annual contribution to the BFES may not be sufficient to sustain the fleet and life cycle replacements

**Reference:** Section 3.13.1.5 Fire Apparatus Replacement and Dispersal p. 92

**Recommendation #15: Review the capital budget reserve contributions to determine the appropriate investment to sustain the fleet of emergency vehicles.**

**(Suggested completion: 36-60 months)**

**Rationale:** An established capital reserve fund that has been properly assessed and funded will assist with budgeting and replacement strategies for BFES apparatus and light-duty vehicles.

**Observation #16:** Light vehicles are not subject to the same replacement schedule identified in NFPA 1901; however similar criteria should be established for the life cycle replacement of light vehicles.

**Recommendation #16: Develop criteria for the replacement of light vehicles.**

**(Suggested completion: 12-30 months)**



**Rationale:** *BFES light vehicles are subject to considerable wear and tear. Annual assessment of all vehicles will assist with maintaining a functional and reliable fleet.*

### 3.15 Personal Protective Equipment

BFES personnel are supplied with NFPA, National Institute for Occupational Safety and Health and Canadian Standards Association approved PPE including turnout (bunker gear), gloves, helmets, boots and any specialized gear for specific rescue and EMS operations.

All firefighters are expected to clean and do a gross decontamination of their PPE after a fire or other incident that gets exposure to carcinogens or other health hazards. NFPA 1971: Standard on Selection, Care, and Maintenance of Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting for the Health and Safety of their firefighters is the recognized reference for care and maintenance of these important pieces of protective gear.

The importance of properly cleaning and maintaining each firefighters PPE cannot be overstated. The hazards of off-gassing and absorption of contaminants is a significant health hazard for the firefighters. A thorough cleaning, inspection, and repair as necessary is to be completed at least twice annually. A third-party provider performs the annual testing, deep cleaning, and repair to all bunker gear. At any time should the integrity of any piece of PPE be in question it must be replaced and taken out of service.

Recent fire industry initiatives have included:

- Designing new and renovated fire stations with a specific room with proper storage and air handling for firefighter PPE, which decreases the potential exposure to contaminants in the apparatus bay and living quarters.
- Discouraging the past practice of transporting their PPE in their personal vehicles for the same reason
- Issuing a second set of bunker gear for use when the primary set is contaminated or in need of repair.
- Installing commercial washers/extractors and dryers for firefighters to clean their bunker gear and station wear, rather than taking it home.
- Utilizing appropriate software to track the initial issue date, cleaning and repairs and replacement/retirement of all PPE.
- Updated policies and procedures that include the necessary responsibilities for the proper care and maintenance of all PPE.

The protective equipment provided to BFES firefighters is appropriate and designed to meet the department's safety goals and objectives. Career firefighters are provided a second set of bunker gear. BFES utilizes a NFPA 1851 independent service provider for annual deep cleaning and necessary repair of all bunker gear. An internal tracking process is maintained to monitor initial issue date, repairs, cleanings, and replacements.





### **3.15.1 Self-Contained Breathing Apparatus**

Self-contained breathing apparatus (SCBA) are essential pieces of firefighting equipment that allows firefighters to safely work within environments that would otherwise be uninhabitable. An SCBA ensemble consists of a harness, regulator, face piece and “down person” alerting system, and inter-changeable breathing air cylinders that typically provide breathing air for 30 – 45 minutes.

It is essential that all components of the SCBA is tested and properly maintained. An accurate history of in-service dates, testing, maintenance, and repairs must be kept. Simple maintenance can be done by the firefighters, however more complex repairs and certifications need to be completed by a certified SCBA technician.

There appears to be enough SCBA units and breathing air cylinders to provide effective and safe response. Additionally, BFES has their own certified SCBA breathing air cylinder filling at station 1.

BFES has an established life cycle process for the SCBA units. Maintenance and testing of all SCBA is provided by a third party.



**Observation #17:** The self-contained breathing apparatus inventory is sufficient for normal operations. A plan to maintain a consistent make and model of self-contained breathing apparatus and breathing air cylinders would enhance effectiveness and operability.

**Recommendation #17: Develop a self-contained breathing apparatus management program that includes a consistent inventory of air packs and bottles.**

*(Suggested completion: 24-36 months)*

**Rationale:** Establishing and maintaining a consistent and sufficient inventory of SCBA and air bottles will allow every BFES firefighter the opportunity to utilize this critical component of firefighter safety when required.

### 3.16 Specialized Rescue Equipment

Effective and efficient response to an incident requires vehicles or in the case of water emergencies, watercraft that are suitably equipped and designed for a specific purpose. BFES responds with specialized equipment to incidents involving motor vehicles, hazmat/ dangerous goods incidents, technical rescue, ice rescue, and water rescue. Utilizing the pumpers and rescue for the initial response, specialized equipment is kept on the apparatus or in-station in anticipation of the known risks in each response zone.

A deputy fire chief is assigned the portfolio that includes the equipment needs of the service. Equipment needs and issues are discussed at captain meetings. Concerns and recommendations are then carried up through to the fire chief and discussed at the regular fire chief meetings.

While it is impossible for a fire service to anticipate every type of emergency response, having appropriate equipment and training to safely and effectively provide the level of service that is within their defined scope of duties should be considered the minimum.

BFES has a broad range of expectations to provide emergency responses. The equipment that is required to provide these services safely and effectively appears sufficient and appropriate. An ongoing review of necessary equipment for expected service levels will assist the fire chief to request any equipment needs through the appropriate budget process.

#### 3.16.1 Rescue Tools

Rescue tools consist of equipment as simple as crow bars or small hand tools up to and including heavy rescue cutters, spreaders, and lift bags. In many cases, at most motor vehicle accidents requiring extrication, having this equipment readily available and operating properly is truly a matter of life and death.

The BFES has a variety of hand tools carried on each pumper, while the heavy rescue tools are carried on the rescue truck.



### **3.16.2 Field and Brush**

Equipment specifically designed for wildland, grass and bush firefighting is typically lighter and more portable. Hose packs, water packs, and other light duty firefighting tools need to be transported by light vehicle or on foot, in some cases under extreme terrain and conditions.

BFES wildland gear appears to be suitable and sufficient for the department's immediate needs. Additional equipment and resources would need to be brought in through mutual aid should it be needed.

### **3.16.3 Water Rescue**

BFES has two rescue boats that are deployed for water rescue. The career staff utilize the main rescue boat out of fire station 1, and a second boat is available in station 3 and is utilized by the volunteer firefighters.

### **3.16.4 Ice Rescue**

Ice rescue incidents are extremely risky to responders. The thickness of ice may or may not support the body of a rescuer. Special training, techniques, and rescue tools such as inflatable rescue boats and lifelines are common equipment for a fire service that are posed with this type of risk in their community. BFES has training and equipment to respond to this type of incident. Additional equipment and resources would need to be brought in through mutual aid should it be needed.

### **3.16.5 Dangerous Goods Response**

BFES is trained and equipped to manage dangerous goods incidents at the awareness level with some capacity to provide the operational level for certain types of dangerous good incidents. The equipment that is typically required for these levels of dangerous goods response includes air monitoring equipment diking, patching and absorbent material, and propane flaring burner. BFES maintains enough equipment for minor dangerous good incidents. Larger incidents would require additional resources through mutual aid partners.

### **3.16.6 Low-Angle Rescue**

Low-angle rescue situations typically require specialized equipment designed for difficult retrievals. Typical tools are a rescue basket and appropriate rope with a type of haul system for both the patient and the rescuers. BFES has the necessary equipment and training to provide low-angle rescues safely and effectively.



### 3.17 Asset Management

A leading practice is municipalities that have a centralized asset management system where fire and emergency services' assets are managed with other municipal fleet and facilities.

BFES manages and maintains its assets using a manual checklist, which is not sufficient for the needs of the fire service. Interviews suggested that this method has been working but staff recognize that there are far better methods of managing and tracking assets. There are numerous municipal or fire and emergency services-based asset and records management system software's available.

Each manufacturer has its own menu of features and benefits. Some software can also combine multiple functions, such as inventory management, training, and general data. Software should be functional for the operations, scalable for growth, and come with a warranty and after-market services that does not render it obsolete for operations in the future.

**Observation #18:** The interview process determined that the current asset management program is not sufficient to meet the needs of the department. A thorough review should consider the unique needs and requirements of the department.

**Recommendation #18: Undertake a needs assessment for an appropriate asset management system and procure the desired system, alternatively a centralized corporate system may be the better option.**

*(Suggested completion: 12-18 months)*

**Rationale:** An effective asset management program will assist with efficient oversight of the department assets.

### 3.18 Municipal Comparative Analysis

Comparing the Belleville Fire and Emergency Services to that of similar municipalities is a good way to identify relative service levels, costs, and trends. It must be noted that all communities have different attributes such as risk factors, historical decisions, and community profiles. For this reason, the comparative community analysis should be used as a base reference, not a suggestion or intention of something to be replicated in Belleville. These benchmarks include budgets, service areas, service levels, and staffing levels.

For the purposes of this municipal comparator review, we used 2018-2022 information to obtain common information from each community. Although fire and emergency services have the same goal of protecting life and property, each community has its unique features in how to accomplish those goals. Therefore, there are no ideal or identical comparators for Belleville.



Our main criteria for collecting information were:

- Population
- Department size
- Type (full-time, part-time or combination)
- Department staffing

Additional information for evaluation was:

- Number of fire stations
- Call volume
- Call types

Table 18: Participating Community Comparatives

Community	Population	Land Area (km <sup>2</sup> )	Area of Response (km <sup>2</sup> )
City of Belleville	55,071	247.15	247.15
City of Welland	55,750	81	81
Central York Fire Services	153,538	88.45	88.45
*Addington Highlands Fire	3,123	1,535	1,535
Kingston Fire & Rescue	132,500	450	450

\* Addington Highlands “Area of Response” covers land and terrain within the Forest Protection Area where Ministry of Natural Resources and Forestry is responsible for all wildland fires.

### 3.18.1 Industry Standards

Table 19: Community Comparative Standard of Cover

Community	Standard of Cover	Standard of Cover approved by Council	Is the standard based on a leading practice such as NFPA 1710/ 1720?
City of Belleville	No	No	No
City of Welland	Yes	Yes	Yes
Central York	Yes	Yes	Yes
Addington Highlands	Yes	Yes	No information provided
Kingston	Yes	Yes	NFPA



### 3.18.2 Department Profile

Department profile, staffing models and levels of service are based on community risk, risk tolerance and the ability for a community to pay for and sustain desired service levels.

Table 20: Community Comparative Departments' Profile

Community	Department Type	No. of Stations	Total Staff	Fire Chief (FT)	Deputy (DC) Assistant Chief (AC)	Support Staff	Suppression Staff	Fire Prevention Staff	Training Staff	Dispatch	Mechanical	Other
City of Belleville	Volunteer/Full Time	5	117	1	2	1	52 FT 47 Vol	5 FT 2 Vol.	1 FT 1 Vol.	4 FT	0	0
City of Welland	Composite	3	118	1-FT	2(DC)-FT	3-FT	104	5	3-FT	0	0	0
Central York Fire	Full Time	5	163	1 FT	3(DC)-FT	5	144	7	3	0	0	0
Addington Highlands	Volunteer	3	50	1	Vol	7 hrs	47	0	1PT	Contract	1	0
Kingston	Composite	10	318	1	3	5	285 C 120 Vol	8	3	16	3	0

FT: Full-time    PT: Part-time    POC: Paid-On-Call





### 3.18.3 Response Data

For the purposes of this municipal comparator analysis, we used 2018–2022 information to get common information from each community. Breakdowns are divided into the two following categories:

Table 21: Examples of Incident Types for Statistical Analysis

Incidents by Type		
EMS Related Calls		
Call Types	Pre-Hospital Care: Alpha, Bravo Charlie Delta Echo	
	Lift Assist	
	False Alarms	
Fire-Related Calls		
Fire Emergency	Alarm Burning Complaint Structure Fire Minor Fire Smoke	Car Fire Re-check Wildfire – Grass, Brush, Outdoor Oven/Pot on Stove Explosion
MVI (Motor Vehicle Incident), aka MVC (Motor Vehicle Collision)	Extrication	No Extrication
Rescue	Stalled Elevator Lake/Marine Rescue High Angle	Swift Water Building Collapse Ice
Hazmat/Dangerous Good	Highway Incident Rail Incident	Industrial Incident Resident Incident
Non-Emergency	Carbon Monoxide Gas/Oil Smell/Spill Power/Telephone/Cable Line Down Natural Gas Leak	Aircraft Standby Incident Bomb Threat Hazardous Materials Propane Leak/Smell
Other	Inspection Burning Pile Inspection Assist Other Agency Public Service	Needle Pick-up Flood Assessment Water Problem (in structure)

**Note:** Description and category names may not be common terminology in all jurisdictions.



Table 22: Municipal Comparative Response Call Volume

Community		Belleville	Welland	Central York	Addington Highlands	Kingston
Total Call Volume	2018	1949	2914	5129	199	4192
	2019	1945	2708	4940	196	4128
	2020	1919	1579	4333	201	4146
	2021	1979	2258	4665	193	4693
	2022	2381	2330	5488	302	5177
Fire Related Calls	2018	N/A	917	2424	19	3118
	2019	249	912	2372	9	3055
	2020	205	902	2088	22	3083
	2021	286	1065	2240	32	3402
	2022	312	867	2415	32	3727
EMS Related Calls	2018	351	1997	2705	63	1074
	2019	N/A	1796	2568	73	1073
	2020	671	677	2245	66	1063
	2021	680	1193	2425	79	1291
	2022	663	1463	3073	108	1450

There is no standard for categorizing incidents so it must be understood that these statistics are broadly based and are only general reference when comparing fire departments. The community comparative analysis can only be interpreted from an indirect basic level due the disparity from each of the surveyed communities' organizational structure, core services and levels, emergency response categorization, and financial systems. Direct comparison is strongly discouraged.

## SECTION 4

# INCIDENT STATISTICS AND RESPONSE PERFORMANCE ANALYSIS

Section 4 provides an overview of fire service industry standards and relevant legislation with respect to emergency response capacity and capability. This section also includes a detailed analysis of the trends in incident types occurring in Belleville and BFES response performance.

### 4.1 Industry Standards and Provincial Legislation

The following section provides an overview of relevant industry standards and provincial legislation with respect to fire department response performance in Ontario.

#### 4.1.1 National Fire Protection Association (NFPA) Standards

The National Fire Protection Agency (NFPA) has developed numerous fire department standards. Established in 1986, “the NFPA is a self-funded non-profit organization devoted to eliminating death, injury, property and economic loss due to fire, electrical and related hazards (NFPA, 2021).” The NFPA has developed over 300 consensus-based codes and standards designed to improve fire department effectiveness and firefighter safety. NFPA research is applied in establishing industry benchmarks for fire department operations, training, and equipment. Many of these standards are referenced throughout the *Ontario Fire Protection and Prevention Act, 1997* and related firefighting regulations and guidelines the *Ontario Occupational Health and Safety Act, R.S.O. 1990*.

The NFPA has done considerable research in developing standards and ensuring they reflect the primary value of life-safety in emergency response for responders and victims. BFES is a composite department with both career and volunteer firefighters. The two NFPA standards addressing fire department operational performance and service levels include NFPA Standard 1710: Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments and NFPA 1720: Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Volunteer Fire Departments. Additionally, NFPA 1201: Standard for Providing Emergency Services to the Public outlines several best practices in establishing and managing an effective and efficient fire service. It provides standards regarding governance, organizational structure, planning and resource deployment.

#### 4.1.2 Ontario Regulatory Framework Regarding Community Fire Safety

Ontario municipalities are required to provide a public education and fire safety program but may or may not elect to do that by establishing a fire department. The Fire Protection and Prevention Act, 1997, S.O. 1997, c. 4 states the following:

*“Municipal responsibilities*

*2(1) Every municipality shall,*



- (a) establish a program in the municipality which must include public education with respect to fire safety and certain components of fire prevention; and
- (b) provide such other fire protection services as it determines may be necessary in accordance with its needs and circumstances.

*Methods of providing services*

- (2) In discharging its responsibilities under subsection (1), a municipality shall,
  - (a) appoint a community fire safety officer or a community fire safety team; or
  - (b) establish a fire department.”

In the event a fire department is established, municipalities are required to meet the numerous requirements regarding fire department equipment, training and certification standards identified in the regulations of this act and the Occupational Health and Safety Act, R.S.O. 1990. Many of these requirements are based on NFPA standards.

Establishing service types and associated service levels is the responsibility of the authority having jurisdiction (AHJ). For most municipalities the AHJ is the municipal council. Formalizing service types and service levels in policy is also considered a leading practice. Fire department service types and service levels are typically established to mitigate identified community risks. Most common community risks are identified in the CRA completed as a separate report to this FMP.

NFPA standards are a sound framework to consider as a starting point in developing formalized service level standards. However, municipalities are not required to provide specific services or meet the service level standards identified in NFPA 1710 or 1720. The response time goals and the number of required firefighters to respond identified in these standards are industry best practices but not legislated requirements. The AHJ and fire department should work together to identify achievable and affordable service levels.

Formalized service levels should address community risks but also reflect community values, ability to pay and council’s service expectations. If not formalized, it is difficult for a fire chief to determine whether his department is meeting those expectations. Furthermore, monitoring established services levels provides the opportunity to assess if community risk factors have changed, what mitigation measures can be taken or if services levels need to be adjusted. This is particularly important for communities that are experiencing growth such as Belleville.

## 4.2 Incident Types and Frequency Analysis

Fire and rescue services typically have access to large amounts of incident and response data. Incident data can be used for analyzing and reporting community risks. Incident type and frequency data is also used to analyze department activity levels and identify trends in service demands and community risks. Further, incident data illustrates the broad range of services provided by BFES to manage local risks.

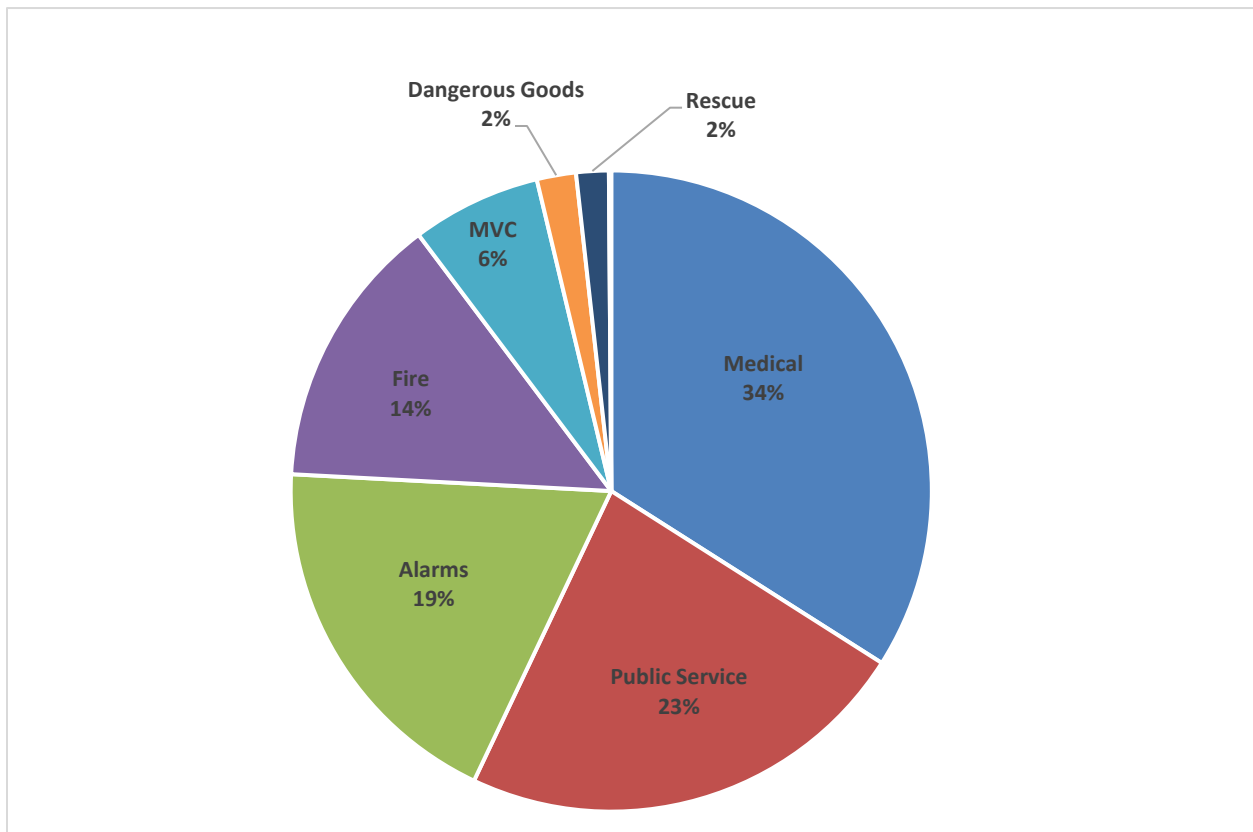


The breadth of services provided by the modern fire service is often surprising. Fire departments have evolved from primarily providing fire suppression services to responding to a broad range of public service and emergency incidents. As a result, fire departments are a critical component of a community’s social safety net.

All emergency and non-emergency BFES incident data from 2018 to 2022 are reviewed in this analysis. General trends in incident type, frequency, time of day and day of week are identified. Incident data can be aggregated into broad categories or more specific categories. This differentiation is made to provide appropriate levels of detail to different stakeholders. For example, a fire chief will want very specific details regarding the types of fires occurring in a community and their causes. Alternatively, community or council members may only require a general understanding of the incident types and services provided.

From 2018 to 2022, BFES responded to 10,173 incidents. Chart 1. Incident Types by Percentage provides an overview of the percentages of incident types that BFES volunteer and career firefighters responded to during the five years of the study period.

Chart 1: Incident Types by Percentage (2018-2022)

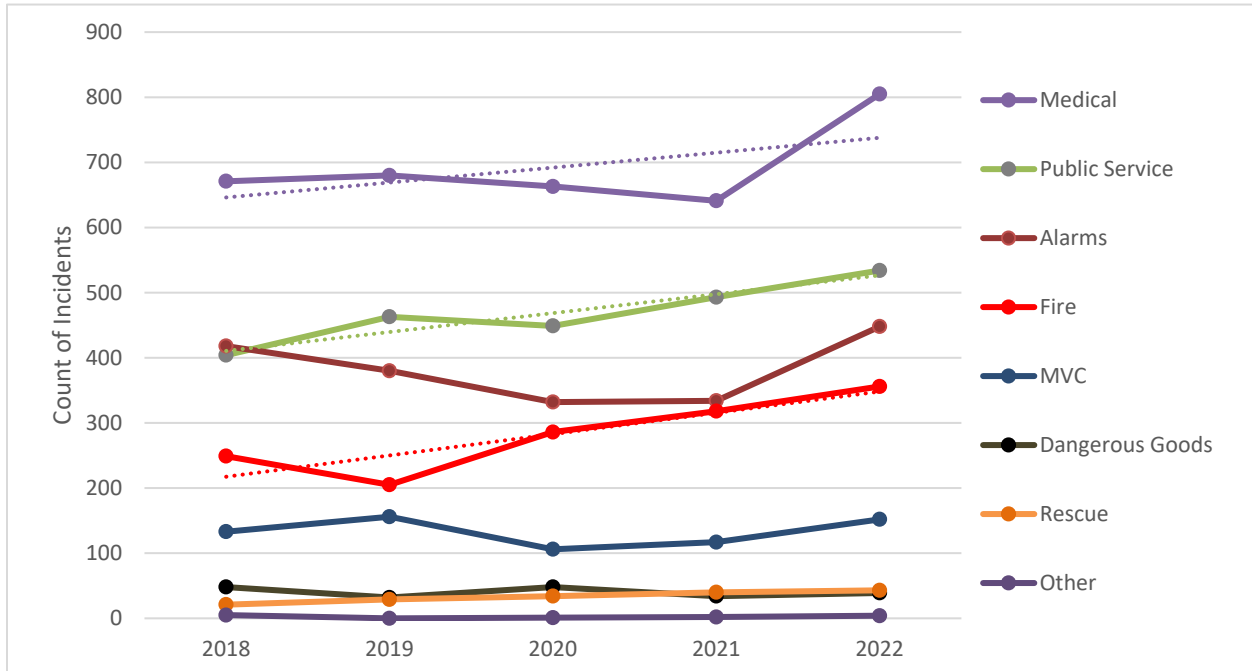


The following observations regarding incident types were noted:

- Medical emergencies were the most frequent incidents occurring in Belleville.
- In our experience, the percentages of incident types were generally consistent with what is experienced in similar mid-sized municipalities in Canada.

Table 23 is the OFM’s all incidents by sub-categories and identifies the broader incident category trends over the five-year study period.

Chart 2: General Incident Trends



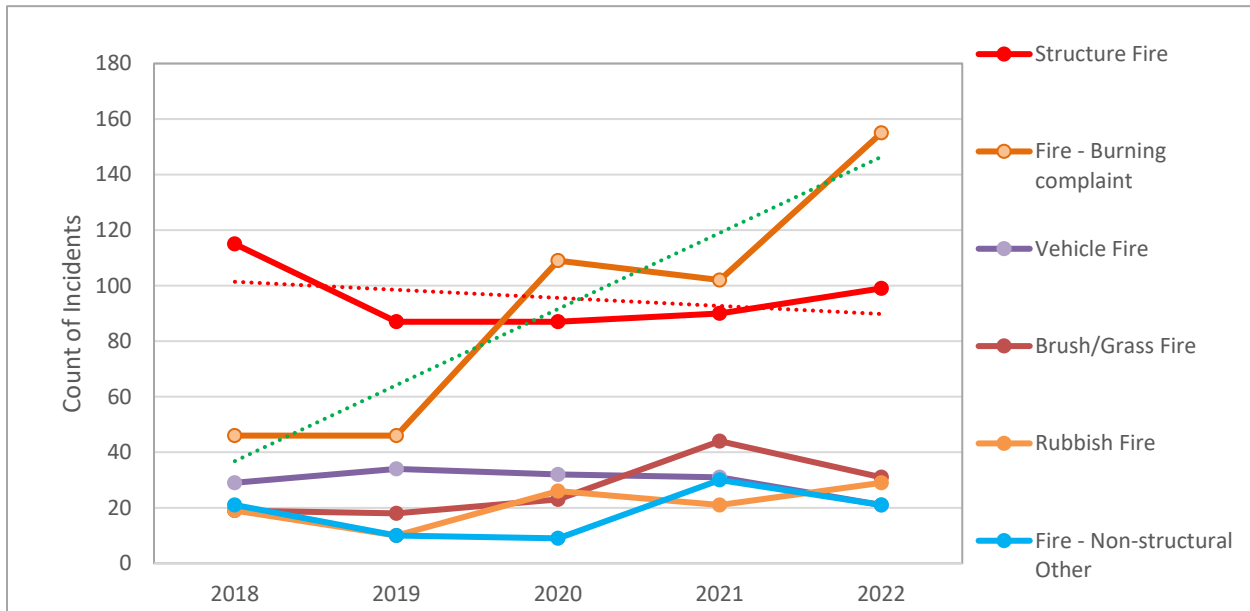
The following observations regarding incident types were noted:

- Medical, public service and fire-related incidents demonstrated an upward (increasing) trend through the study period.

All other incident types were relatively constant. Six categories of fire incidents are identified in BFES incident data. Chart 3: Fire Incident Trends identifies general trends noted in the fire-related categories.



Chart 3: Fire Incident Trends



The following observations regarding fire incident types were noted:

- Structure fires demonstrated a slight downward trend, ranging from 115 in 2019 to 99 in 2022.
- Open burning complaints increased considerably, ranging from 46 in 2018 to 155 in 2022.
- All other fire-related incident types were stable throughout the past five years.

Table 23 All Incidents by Sub-Categories reflects incident types in greater detail using the Ontario Fire Marshal (OFM) standard incident report codes from 2018 to 2022.

Table 23: All Incidents by Sub-Categories

Incident Type	2018	2019	2020	2021	2022	5 Year
Medical: Assistance	592	490	370	359	380	2191
Public Service: Call	265	339	244	216	171	1235
Medical: Emergency	79	185	246	206	354	1070
Alarm: Commercial/Industrial	188	171	154	163	196	872
Alarm: Residential	182	142	141	127	182	774
Vehicle Accident: Extrication	109	119	77	98	125	528
Fire/Smoke: Non-Structural: Burning Complaint	46	46	109	102	155	458
Fire/Smoke: Structural: Residential	94	65	67	67	81	374
Alarm: Hospital/Institution	48	67	37	44	70	266
Public Service: Carbon Monoxide Detector	101	97	34	0	0	232



Incident Type	2018	2019	2020	2021	2022	5 Year
Public Service: Carbon Monoxide Detector: No Symptoms	0	0	62	81	86	229
Public Service: Smoke Detector	0	0	29	67	73	169
Leak/Spill: Natural Gas/Propane	42	22	42	30	29	165
Public Service: Non-Emergency Lift Assist	0	0	18	51	91	160
Fire/Smoke: Non-Structural: Vehicle	29	34	32	31	21	147
Medical: Lift Assist	0	0	38	45	58	141
Vehicle Accident: Fuel Leak	24	37	29	19	27	136
Fire/Smoke: Non-Structural: Grass/Brush	19	18	23	44	31	135
Electrical: Wires Down	32	16	14	21	40	123
Public Service: Odour Investigation	0	0	24	28	54	106
Fire/Smoke: Non-Structural: Rubbish	19	10	26	21	29	105
Fire/Smoke: Structural: Commercial/Industrial	17	18	18	21	15	89
Rescue: Ice/Water	8	12	21	18	17	76
Rescue: Elevator	12	13	12	17	21	75
Fire/Smoke: Non-Structural: Other	15	10	8	24	16	73
Medical: Defib	0	5	9	31	13	58
Public Service: Carbon Monoxide Detector: Symptoms	0	0	13	10	9	32
Electrical: Transformer	3	6	6	11	5	31
Electrical: Wiring Overhead	3	5	5	7	5	25
Leak/Spill: Gasoline/Diesel/Oil	3	7	4	2	5	21
Fire/Smoke: Electrical: Utility Pole	5	0	0	4	2	11
Rescue: Entrapment	1	3	1	2	4	11
Default	3	0	1	2	4	10
Fire/Smoke: Structural: Hospital/Institution	2	3	1	1	3	10
Leak/Spill: Other	3	1	1	2	3	10
Fire/Smoke: Electrical: Transformer	1	0	1	1	3	6
Fire/Smoke: Structural: School	1	1	1	0	0	3
Rescue: High Angle	0	0	0	2	1	3
Explosion: Bomb Threat	0	1	0	0	1	2
Explosion: Structural: Residential	0	1	0	0	1	2



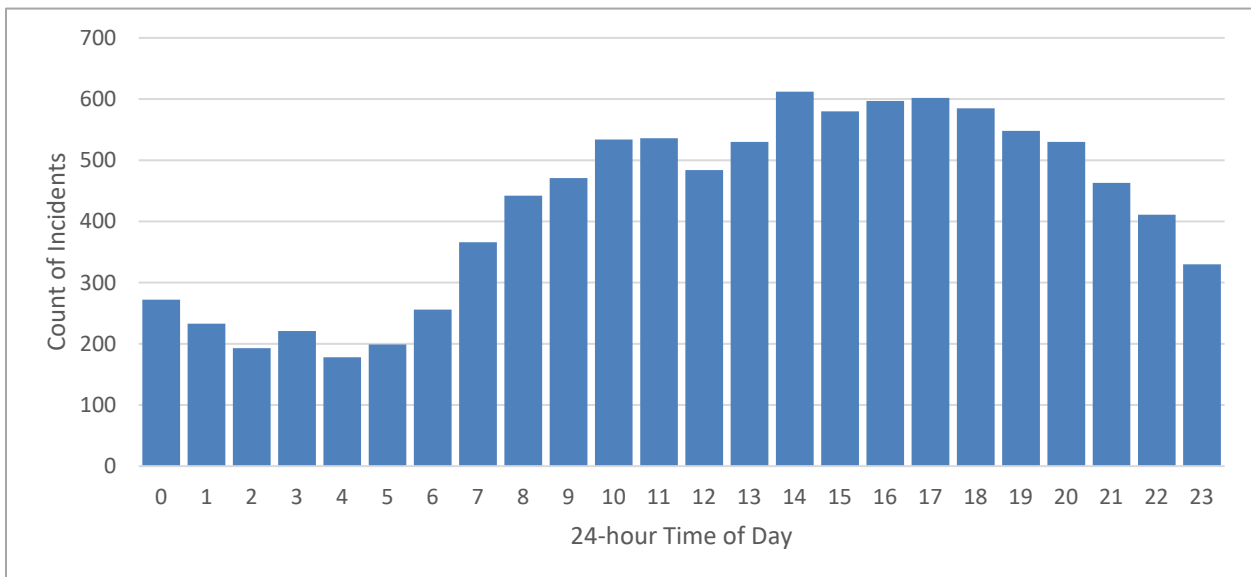
Incident Type	2018	2019	2020	2021	2022	5 Year
Mutual Aid	2	0	0	0	0	2
Rescue: Confined Space	0	1	0	1	0	2
Electrical: Substation	0	0	0	1	0	1
Fire/Smoke: Electrical: Substation	0	0	0	1	0	1
Fire/Smoke: Structural: Church	1	0	0	0	0	1
Fire/Smoke: Structural: Retirement Home	0	0	0	1	0	1
Leak/Spill: Hazmat: Major	0	0	1	0	0	1
<b>Total</b>	<b>1949</b>	<b>1945</b>	<b>1919</b>	<b>1979</b>	<b>2381</b>	<b>10173</b>

The following observations regarding the incident types were noted:

- Medical assistance incidents decreased while medical emergencies increased during this period.
- Odour detection, non-emergency lift assist, smoke detector and carbon monoxide detector incidents were the public service response categories that generally increased.
- The total number of incidents increased by 20% between 2021 and 2022.
  - Most of this increase was accounted for in medical emergencies and alarm-related incident types.

The time incidents occur is useful in identifying periods of peak and lower demand for services. Typically, demand for emergency services is lowest in the early hours of the morning. The horizontal axis in Chart 4: Incidents by Time of Day begins with 0 hours (12 p.m. – 1 a.m.) and ends at 23 hours (11 p.m. to 12 p.m.).

Chart 4: Incidents by Time of Day (2018-2022)



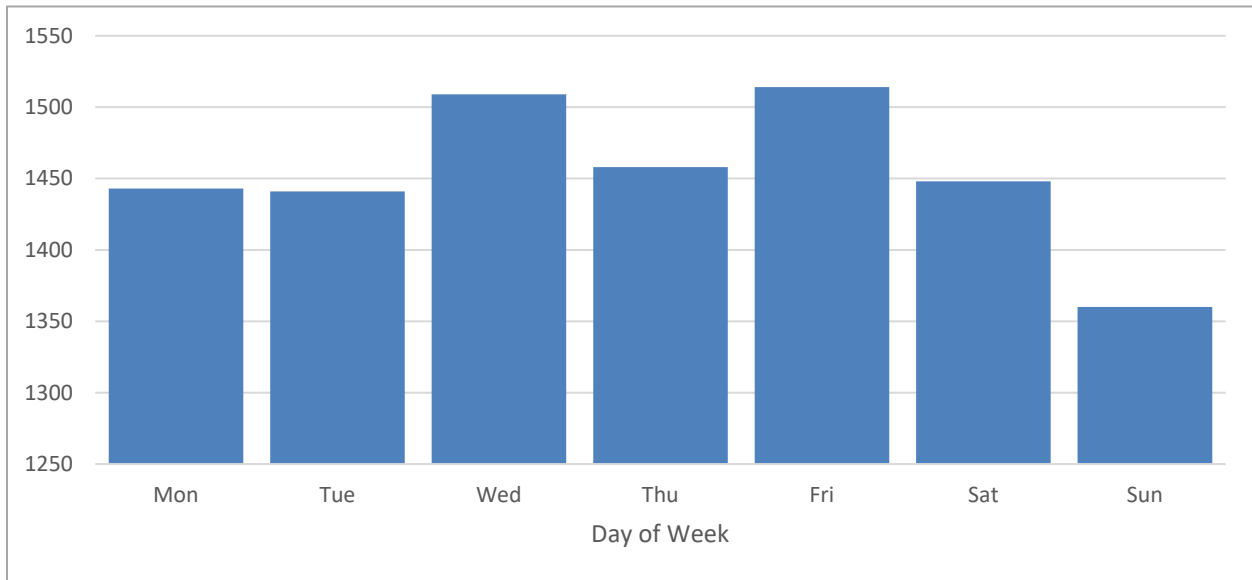


The following observations regarding the time incidents occurred were noted:

- Incidents began to increase at 5 am and peak late in the afternoon.
- After 5 pm, incidents decreased throughout the night until early morning.

Similarly, monitoring the days of the week in which BFES respond most and least frequently provide additional insight into potential pressures in service delivery throughout the week.

Chart 5: Incidents by Day of Week (2018-2022)



The following observations regarding the day of week incidents occurred were noted:

- In general, the frequency of emergency incidents was relatively constant.
- Wednesdays and Fridays experienced a slightly higher demand for services and Sunday slightly less.

Additional details and discussion regarding incident types and related community risks can be found in the CRA.

### 4.3 Emergency Response Performance

The following section provides an analysis of the response performance to emergency incidents. Emergency response performance is assessed based on two key variables – the length of time taken to respond and the adequacy of resources responding to safely manage emergency incidents.

#### 4.3.1 Total Intervention Time

Total intervention time is the elapsed time between the incident occurring and the time incident management begins. The discovery of the incident and initiation of the emergency response system is typically done by a victim or witness calling 911.

After the 911 call is made, the emergency response system is engaged to manage the incident and minimize its impact. Simplified, the system is composed of an emergency dispatching

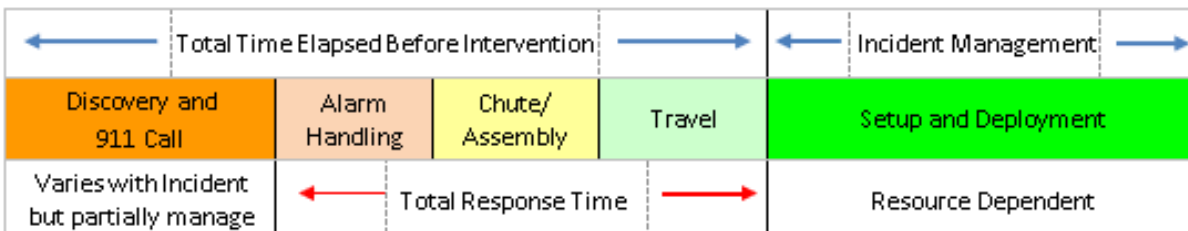


centre and the responding agency. Although many of the requests for service may not require an urgent intervention, when it does, the main purpose of this system is to respond and manage the incident as quickly and as safely possible. As a result, the time taken to get all the relevant caller and incident information (call handling time), notify first responders and have them prepare to respond (turnout time), and drive to the incident (travel time) are all critical elements of an effective response. These time segments are the focus of this section and are key indicators of total response time performance.

Total response time reflects the experience of the person making the 911 call. It is measured from the point of time the 911 call is received to the arrival of the first emergency vehicle. System performance can be managed and improved by implementing best practices and supporting technologies. As a result, total response time performance should be monitored and reported to the authority having jurisdiction (AHJ) regularly for the purposes of monitoring response time performance. The causes of significant changes in response time performance should be identified and discussed.

Figure 9 provides an overview of the incident intervention timeline. The definitions and descriptions of the actions taken in each time segment are provided below.

Figure 9: Incident Intervention Timeline



**Discovery:** This is the time between the start of the emergency incident and when a person or an engineered system has detected the incident.

**Emergency 911 Call:** This is the time taken dial 911 and notify the 911 call centre for the need for emergency services. It is the starting point of total response time.

**Alarm Handling:** This time segment begins when the 911 call is answered and ends with the notification of firefighters. It is the time taken to extract the necessary information from the 911 caller to allow the proper response to be initiated.

**Turnout Time:** This is the time segment begins when dispatch notifies the firefighters until the vehicle leaves the station for response. Turnout time reflects the time taken for career firefighters to dress in their personal protective equipment (PPE) and get seated in the fire truck. For volunteer firefighters this time segment includes the time taken to travel to the station, dress in PPE and leave the station.

**Travel Time:** This time segment begins when a fire apparatus leaves the station or otherwise begins the response to the scene of the emergency and ends at the time when the assigned vehicle arrives on scene. This time segment is a function of distance to the incident and the speed traveled within the road network. It is impacted by traffic flow and weather conditions.



**Total Response Time:** This time segment begins when the 911 call is answered and ends when the first apparatus capable of starting incident management arrives.

**Setup Time:** This is the time it takes (on-site) to evaluate the necessary actions, position the required resources, and start the intervention. In the case of a fire, completing size-up, assigning the necessary tasks, and deploying resources can provide delays on scene. A well-trained crew with adequate numbers of firefighters can minimize these delays while providing a safe, successful intervention.

### 4.3.2 Applying NFPA 1710 and 1720 Performance Standards

As discussed in 4.1.1, NFPA 1710 and NFPA 1720 standards were applied to evaluate the response performance of BFES. NFPA 1710 standards apply to the career staffed fire stations located in Station 1 and Station 2. Time standards are identified for alarm handling (alarm answering plus alarm processing times), turnout (or chute) time and travel time. NFPA 1710 also includes a several additional standards for fire, rescue, and EMS operations, and indicates the number of firefighters required to safely manage different types of fire and rescue incidents. This standard also provides a framework for developing response plans for higher hazard fires.

Table 24 NFPA 1710 Performance Standards summarizes the response standards based on a typical single-family dwelling of 2000 ft<sup>2</sup> without a basement and with no additional fire exposures to adjacent properties.

Table 24: NFPA 1710 Performance Standards

Time Segment	NFPA 1710 Standards
Alarm answering	15 sec/90 <sup>th</sup> Percentile
Alarm processing	60 sec/90 <sup>th</sup> Percentile
Turnout Career	80 sec/90 <sup>th</sup> Percentile
Travel (first arriving)	240 sec/90 <sup>th</sup> Percentile
Travel (full alarm)	480 sec/90 <sup>th</sup> Percentile
First arriving engine with 4 ffs	395 sec/90 <sup>th</sup> Percentile
Full alarm assignment with 16 ffs	635 sec/90 <sup>th</sup> Percentile

While no specific standard for total response time is identified, it can be inferred that the first engine company of four firefighters is to arrive no less than 395 seconds (6 min 35 sec), 90% of the time to all fire suppression incidents. This timeline includes alarm handling time, turnout time and travel time. Similarly, NFPA also does not specifically identify a response standard for the assembly time for the full alarm assignment. The full alarm response goal of 10 min 35 sec, 90% of the time is the inferred time standard for assembling an effective response force (ERF).

NFPA 1720 acknowledges the differences between career station performance and the limitations of a volunteer department. Recognizing that volunteer fire departments serve a variety of community types with varying population densities and geography, NFPA





developed response time and staffing standards relative to regional and individual demand zone conditions. NFPA 1720 response standards are lowered as population density decreases and travel distances increase within a demand zone increase. For example, the response goal for urban areas is to respond within 9 minutes, 90% of the time with 15 firefighters. The rural response standard is within 14 minutes, 80% of the time with six firefighters. Where population or geography is significantly different within the service area of a fire department, it is important to note that service levels may also vary accordingly.

In Belleville, the population density of rural response areas is less than 500 people/2.6 km<sup>2</sup> (mile<sup>2</sup>) and Response Areas 3, 4 and 5 are rural area demand zones. As a result, the BFES volunteer firefighter response performance is measured the 80<sup>th</sup> percentile response time of 14 minutes with 6 firefighters in the analysis to follow.

Table 25: NFPA 1720 Staffing and Response Time Standards

Demand Zone <sup>a</sup>	Demographics	Minimum Staff to Respond <sup>b</sup>	Response Time (minutes) <sup>c</sup>	Meets Objective (%)
Urban area	>1000 people/2.6km <sup>2</sup>	15	9	90
Suburban area	500-1000 people/2.6 km <sup>2</sup>	10	10	80
Rural area	<500 people/2.6 km <sup>2</sup>	6	14	80
Remote area	Travel distance ≥ 12.87 km	4	Directly dependent on travel distance	90
Special risks	Determined by AHJ	Determined by AHJ based on risk	Determined by AHJ	90

<sup>a</sup> A jurisdiction can have more than one demand zone.

<sup>b</sup> Minimum staffing includes members responding from the AHJs department and automatic aid

<sup>c</sup> Response time begins upon completion of the dispatch notification and ends at the time interval shown in the table.

The intent of the aggressive response goals in NFPA standards is to minimize total intervention time. Increased intervention time can have the following important impacts on a property owner/patient/victim:

- Decreased survivability
- Increased property loss in the event of fire
- Building design restrictions for response times beyond 10 minutes
- Potentially higher property insurance premiums based on extended response times and proximity to water supply.
- Longer-term economic impacts resulting from increased recovery time.

As discussed in 4.1, NFPA 1710 and 1720 performance standards are considered industry leading practices but not a legislated requirement. The emergency response model and service levels should be based on quantified community risks, an assessment of current response capability and a community’s ability to pay for it. All these factors must be



considered by the local municipal council when establishing formalized fire department service levels and response performance goals.

#### 4.4 Emergency Response Analysis

The time segments identified above are calculated by the response timestamps captured by the dispatching agency throughout an incident. The timestamps are recorded and used to compile a complete history for all responding emergency vehicles to every incident. Examples of typical incident timestamps include:

- Incidents begin.
- Station or firefighter notification
- Apparatus responding
- Apparatus arrived.
- Loss stopped.
- Leaving scene
- Returned to station.

The response performance analysis for BFES focuses specifically on emergency responses from 2018 to 2022 for urban and rural stations. Alarm processing time, assembly time, travel time and total response time are calculated. Emergency response performance information can be used by the fire chief and senior administration for several purposes including:

- Monitoring response efficiency and effectiveness
- Reporting response performance to community and elected officials
- Evaluating the effectiveness and compliance with national and provincial codes
- Evaluating the effectiveness and compliance with Council policies and local bylaws
- Identifying possible improvement strategies
- Developing or modifying service level standards
- Planning for future resource needs (operational and capital)

Historically, only average performance was measured and reported by fire departments. Average performance can be misleading as it is only achieved 50% of the time. Contemporary fire and emergency services report 80<sup>th</sup> or 90<sup>th</sup> percentile performance times to provide a more precise representation of response reliability depending upon whether they are volunteer or career fire station responses.

##### 4.4.1 Alarm Handling

Alarm handling time is the time taken for call answering and alarm processing in the dispatching process. Alarm handling standards identified in NFPA 1710 and in NFPA 1221: Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems were used for this analysis. BFES has 911 emergency calls transferred to their dispatch centre and only manages alarm processing. Alarm processing and dispatching is



completed by on-duty firefighters. The NFPA standard suggests alarm processing should be completed in 60 seconds, 90% of the time.

Alarm processing performance is manageable by implementing best practice processes, supporting technologies and performance monitoring processes. This benchmark should be monitored with the aim of ensuring this process is as efficient as possible to achieve optimal total response time performance. However, non-emergency requests for service, identifying rural addressing and remote locations, or getting adequate levels of incident details may delay the interrogation time required to gather the appropriate information for first responders.

A significant difference in the time taken to complete alarm processing between the urban and rural incidents was noted. As a result, the alarm processing times for emergency incidents originating in urban and rural response areas were analysed separately. Table 26: Urban Response Area Alarm Processing Performance provides 90<sup>th</sup> percentile times from 2018 to 2022. Compliance with the NFPA 1221 60 second standard is also reported for this period.

Table 26: Urban Response Area Alarm Processing Performance (in secs)

Response Area	2018	2019	2020	2021	2022	5 Year
Urban 1	97	94	113	112	116	106
Urban 2	109	108	113	105	119	110
Urban 90 <sup>th</sup> percentile	105	102	113	106	117	109
Urban 60 sec compliance	72%	76%	62%	64%	61%	67%

The following observations regarding alarm processing performance for urban areas were noted:

- The urban 90<sup>th</sup> percentile alarm processing increased slightly over this period.
- Over the five-year period BFES was able to achieve the 60 second performance goal approximately 67% of the time

Table 27: Rural Response Area Alarm Processing Performance identifies the time taken to process the 911 call in rural response zones and notify firefighters of the incident.

Table 27: Rural Response Area Alarm Processing Performance (in secs)

Response Area	2018	2019	2020	2021	2022	5 Year
Rural 3	185	282	220	142	213	214
Rural 4	223	183	362	217	176	219
Rural 5	127	231	179	179	211	177
Rural 90 <sup>th</sup> percentile	174	214	280	214	213	215
Rural 60 sec compliance	37%	43%	40%	42%	41%	40%



The following observations regarding alarm processing performance for rural areas were noted:

- The rural 90<sup>th</sup> percentile alarm processing increased by approximately 39 seconds between 2018 and 2022.
- Over the five-year period BFES was able to achieve the 60 second performance goal for rural incidents approximately 40% of the time
- The 90<sup>th</sup> percentile rural alarm processing time was a little more than twice the urban comparator.

#### 4.4.2 Turnout Time

Turnout time is the time taken from fire department/firefighter notification until the first emergency vehicle has responded. For career stations, turnout time is much shorter as firefighters are already in the station or available on a fire engine. For volunteer stations, turnout time includes the time required to travel to the fire station as well as any preparation before responding.

Turnout time performance should be monitored and reported to firefighting crews regularly. NFPA 1710 identifies a 90<sup>th</sup> percentile turnout time standard of 80 seconds for a career fire station responding to a fire/rescue incident. The 80 second standard can be a challenge to achieve. Attention to station design, activities within a station and firefighter awareness can all help to improve the performance and optimize response performance.

Table 28: Urban (Career) Turnout Performance identifies the 90<sup>th</sup> percentile BFES turnout times at Station 1 and Station 2. BFES compliance with this standard is also provided.

Table 28: Urban (Career) Turnout Performance (in secs)

Station	2018	2019	2020	2021	2022	5 year
Station 1	163	151	147	137	138	147
Station 2	154	154	140	144	149	149
90 <sup>th</sup> percentile	158	153	143	140	146	148
80 sec compliance	34%	32%	44%	48%	46%	41%

The following observations regarding turnout time performance were noted:

- The turnout time of both urban stations improved over the five-year period.
- The five-year 90<sup>th</sup> percentile turnout time was approximately one minute longer than the 80 second goal.

For volunteer firefighters, turnout time is calculated from the point of firefighter notification to the point of firefighters respond from the station in a fire apparatus. This time segment includes travel to the firehall as well as the time taken to dress in their personal protective equipment. NFPA 1720 does not include a specific assembly time standard. However, turnout time should be monitored to assess its impact on total response time and establishing achievable service levels.



Table 29: Rural (Volunteer) Turnout Performance identifies the annual 80<sup>th</sup> percentile turnout times for volunteers responding from Stations 3 and 4. The 80<sup>th</sup> percentile turnout time was calculated to align with the overall 80<sup>th</sup> percentile response goals found of 14 minutes in NFPA 1720 for rural populations (see p. 79, Table 25: NFPA 1720 Staffing and Response Time Standards). Turnout times for Station 5 were not calculated as this station does not have specific first due response assignments identified in response protocols.

Table 29: Rural (Volunteer) Turnout Performance (in secs)

Station	2018	2019	2020	2021	2022	5 Year
Station 3	304	428	417	477	667	481
Station 4	516	574	523	585	697	587
Station 5	N/A	N/A	N/A	N/A	N/A	N/A
80 <sup>th</sup> percentile	448	527	509	562	689	560

The following observations regarding rural chute time performance were noted:

- The turnout times for volunteers were increasing throughout this five-year period.
- The 2022 80<sup>th</sup> percentile was over 11 minutes.
- The five-year 80<sup>th</sup> percentile was approximately 9.3 minutes.

Turnout time for volunteer firefighters is affected by numerous factors including the time of an incident, availability of firefighters, road conditions and their travel distance to the fire station. As a result, it is difficult to assess whether volunteer firefighter turnout performance can be improved given the range of factors influencing it.



**Observation #19:** The five-year 90th percentile compliance with the NFPA 1710 80 second turnout time standard for career fire stations was 41%. Additionally, the turnout times for volunteer stations were trending upward.

**Recommendation #19:** *Turnout performance should be monitored and reported to staff with the aim of identifying improvement opportunities and establishing performance goals for career stations.*

*(Suggested completion: 24-120 months)*

**Rationale:** *Working with volunteer and career firefighters, BFES administration/senior officers should identify opportunities to improve turnout times and establish achievable turnout performance goals. The time taken to respond can be affected by several factors including station design, apparatus assignments, notification processes and activities within the station. Any improvement in turnout time will improve total response time performance.*

*Turnout times should be monitored and reported in a timely fashion to firefighters at these stations. BFES administration should consider implementing an exception report for a limited period with the sole purpose of analysing the root cause of the extended turnout times.*

### 4.4.3 Travel Time Performance

Travel time is the time taken to drive to the incident. It is measured from the point at which the responding vehicle leaves the station, or where a career station is responding when out of station, until the point of arrival on scene. Travel time is a function of distance to the incident and the speed travelled. It can be managed to a certain degree by distributing fire resources in optimal response locations within demand zones, introducing traffic pre-emption where appropriate and optimizing road networks. Travel time should be monitored to assess the distribution and concentration of resources required to maintain desired response times.

NFPA 1710 identifies a travel time performance goal of 240 seconds (four minutes), 90% of the time, for career fire stations. This standard is most frequently applied to urban and suburban developments. It can be a difficult standard for municipalities to achieve because cities more frequently develop outward than upward, and therefore cannot maintain fire station distribution required to achieve a four-minute travel time 90% of the time.

Table 30 identifies the 90<sup>th</sup> percentile drive times taken for fire apparatuses responding from BFES urban Station 1 and Station 2 to arrive at the incident. These apparatuses included fire engines, ladders, and rescue trucks.





Table 30: Urban Station Travel Performance (in secs)

Station	2018	2019	2020	2021	2022	5 Year
Station 1	332	313	313	329	351	328
Station 2	333	332	332	319	339	332
90 <sup>th</sup> percentile	333	324	326	325	343	330
240 sec compliance	69%	70%	73%	73%	69%	71%

The following observations regarding travel times were noted:

- The five-year travel times were relatively equal for both stations.
- The five-year 90<sup>th</sup> percentile travel time for both stations were 330 seconds (5.5 minutes)
- Travel times were relatively stable throughout this period, with a slight upward trend in 2022.
- Four-minute travel times were achieved approximately 70% of the time.

NFPA 1720 acknowledges the considerable variations in size and population densities of the response areas of many volunteer fire services. Depending upon the specific geography, it offers several different response time benchmarks, but it does not identify a specific travel time standard.

Table 31 identifies the travel time for fire apparatus responding from BFES Stations 3, 4 and 5. This information is provided as context only and not measured for compliance as there is no specific standard.

Table 31: Volunteer Travel Performance (in secs)

Station	2018	2019	2020	2021	2022	5 Year
Station 3	372	446	377	370	433	406
Station 4	392	490	488	450	459	453
Station 5	499	433	404	313	282	404
80 <sup>th</sup> percentile	394	489	467	429	449	447

The following observations regarding travel times were noted:

- Five-year travel times were longest at approximately 7.5 minutes from Station 4
- The 80<sup>th</sup> percentile travel times varied from slightly from year to year, increasing from Stations 3 and 4 over this period.

#### 4.4.4 Total Response Time

Total response time is measured from the point at which the emergency call is answered in the 911 dispatching centre to the time the first fire or rescue apparatus arrives at the incident. This time best reflects the emergency system’s overall response performance and the experience of the person requesting the service.



The NFPA 1710 standard implies a response time performance goal of 395 seconds for the first arriving fire apparatus in urban areas with four firefighters (Section 4.3.2). Few career municipal fire departments in Canada can fully comply with the NFPA 1710 inferred 90<sup>th</sup> percentile response standard of 395 seconds. It is considered a best practice and aspirational goal. As a point of reference, many mid-sized cities in Canada are opting for a response goal nearing 10 minutes.

Table 32 identifies BFES 90<sup>th</sup> percentile response performance, and both the 380 second (6 minutes 20 seconds) and 600 second (10 minute) compliance. BFES receives the 911 call from the primary service answering point and then dispatches the incident. The 15-second NFPA standard taken for call answering is not include in the inferred total response time. Therefore, the inferred NFPA 1710 total comparative career station response standard used in this analysis is 380 seconds. Further, a 600 second (10 minute) compliance is provided for additional context.

Table 32: Urban Response Performance (in secs)

Station	2018	2019	2020	2021	2022	5 Year
Station 1	509	492	511	508	546	514
Station 2	517	501	502	479	526	507
90 <sup>th</sup> percentile	514	498	508	489	538	510
380 sec compliance	62%	64%	67%	69%	61%	64%
600 sec compliance	96%	96%	96%	96%	93%	95%

The following observations regarding urban emergency response performance were noted:

- The urban station response times trended slightly upward during this period.
- The five-year 90<sup>th</sup> percentile response time from urban stations was 8.5 minutes.
- Overall, the BFES urban station responses achieved a 4.3-minute response 64% of the time.
- These stations achieved a 10-minute response time to 95% of the incidents.

NFPA 1720 response standards are defined slightly differently. Response time standards are based on population density. As identified on p. 79 Table 25: NFPA 1720 Staffing and Response Time Standards, a rural response time standard of 14 minutes applies to response areas 3, 4 and 5. Further, total response time is typically measured from the point of fire department (firefighter) notification to the point of the first arriving fire apparatus. However, for the purposes of comparing the response times between urban and career stations, and to be consistent with BFES reporting, response time was calculated from the point the 911 call was received in the dispatch centre to the point of the first arriving fire apparatus.

Table 33 identifies the BFES response times for the first arriving fire apparatus responding from Stations 3, 4 and 5. Responses from Station 5 were limited as apparatuses in this station are not assigned a specific first response area. In the five-year period, the Station 5 fire engine (P651) responded to 100 incidents, whereas the fire engines from Station 3 (P531) and Station



4 (P541) responded to 392 and 689 incidents respectively. The responses from these stations included multiple station response incidents. Apparatus from Stations 3 and 4 are typically first to respond in response area 5 (see p.136 Map 1.).

Table 33: Volunteer Response Performance (in secs)

Station	2018	2019	2020	2021	2022	5 Year
Station 3	853	1071	1093	963	1108	1015
Station 4	894	1124	1044	1073	1142	1081
Station 5	1025	1120	1125	1064	1098	1120
80 <sup>th</sup> percentile	889	1121	1062	1069	1129	1076
840 sec compliance	75%	51%	47%	44%	40%	51%

The following observations regarding rural emergency response performance were noted:

- Rural station response time increased for all stations during the five-year period.
- The five-year 80<sup>th</sup> percentile response time is over 18 minutes from Stations 3 and 4, and 16 minutes from Station 5 in 2022
- A 14-minute response time for the first arriving fire apparatus was achieved for 51% of all incidents during this period.

The level of service, particularly the response time, is considerably different between career and volunteer stations in Belleville. This is to be expected. The initial response time for urban fire apparatus was approximately 9 minutes or less to 90% of emergencies in 2022; rural fire apparatus arrived within nearly 19 minutes to 80% of emergencies in that same year. Recommendation #8 has identified the need for BFES to review and evaluate the effective response force for both the rural and urban areas and to provide options to improve the effectiveness and efficiencies of this response time across the city.

It was difficult to assess the differences in the number of firefighters and fire apparatus responding between urban and rural stations. Minimum urban fire station staffing is five firefighters from Station 1 and Station 2. The data was not available to assess the number of volunteer fighters responding Section 4.6 Effective Response Force). Despite both urban and rural stations being in the same department, language within collective agreements limits the ability to respond within each other’s response areas.

Levels of service do not have to be standardized across a community. The Centre for Public Safety Excellence and International Association of Fire Chiefs developed a standard of cover framework to support the process of establishing fire department service types and service levels. It is a comprehensive process to identifying community risks, assessing fire department capability, and establishing appropriate emergency response service levels to mitigate community risks. BFES response capacity within each response area should be assessed to inform service level decisions. The outcome of this process results in a standard of cover policy including service level recommendations to be considered for approval by the City of Belleville Council. As previously recommended at Section 3 BFES needs to complete a level of service policy to support the development of service level recommendations within each response zone.



**Observation #20:** In general, BFES has historically managed the city’s common risks and continues to serve the residents well. However, Belleville City Council has not formally identified desired response time service levels in policy. By-law Number 2011-59 outlines which services can be provided by the BFES. This policy does not reference response time expectations or minimum response capacity.

**Recommendation #20: Establish council approved service levels for Belleville Fire and Emergency Services.**

*(Suggested completion: 18-24 months)*

**Rationale:** *NFPA 1201: Standard for Providing Emergency Services to the Public discusses the importance of formally establishing service types and service levels. Section 4.5.3.1 states:*

*“The fire and emergency services administration (FESA) leader shall develop and adopt a formal policy statement that includes the specific types and levels of services to be provided by the organization, the service area, and the delegation of authority to subordinates.”*

*As the population and geographic footprint of a community increase, a fire department will experience an increase in concurrent requests for service, longer travel distances and a higher frequency of complex and concurrent incidents. Developing formalized service levels and reporting performance informs council on current performance and fire department capacity to manage community risks.*

#### 4.5 Critical Task Analysis

A critical task analysis for common incident types establishes the resources required to safely achieve tactical objectives based on resource availability. The rationale for completing a critical task analysis is to identify whether response policies and guidelines align with available resources. In other words, are enough firefighters (Effective Response Force: ERF) responding to complete the critical tasks on emergency scenes in a safe and timely manner.

However, the optimal number of firefighters are not always available. Response policies and guidelines should identify critical task assignments and tactical objectives based on available resources. The optimum number of firefighters to manage larger and more complex incidents may not be dispatched initially due to the availability of firefighters. As a result, tactical objectives should be scaled to reflect these limitations. For example, an interior fire attack or rescue may not be possible with a single engine company and a limited water supply. Response policies or guidelines should also identify a contingency plan to call-in of off-duty firefighters or initiate mutual aid resources/automatic aid for larger incidents complex incidents.

The following tables provide examples of critical task analyses that should be embedded in fire department standard operating guidelines or policies. The purpose of completing a critical task analysis is to identify the resource requirements and embed task assignments in standard operating guidelines. The examples provided are intended to illustrate leading practices with



respect to the ERF required to safely manage commonly occurring emergency incidents. They are provided as a guide and not intended to specifically represent the BFES response capacity or apparatus.

*Table 34: Low Risk: Small fire (no exposures): garbage, vehicle – private, grass, investigate (external), monitoring alarm (w/o confirmation)*

Initial Deployment	No. FF	Task Assignment
Engine	4	Incident Command, Scene Safety, Size up, IAP Development, Accountability, Resource Determination, Water Supply, 360 assessment, Forcible Entry, Primary Search, Fire Control, Incident Stabilization
Total Personnel	4	

*Table 35: Low Risk: Medical incident, cardiac arrest (Vasospastic Angina)*

Initial Deployment	No. FF	Task Assignment
Engine or Rescue	4	Scene safety, Patient Assessment/CPR (Cardiopulmonary resuscitation), Patient History, Apply Automatic External Defibrillator, Assist with Patient Packaging
Total Personnel	4	

*Table 36: Low Risk: Medical incident, vehicle vs. pedestrian*

Initial Deployment	No. FF	Task Assignment
Engine	4	Incident Command, scene safety, patient assessment / Care, patient packaging, Traffic Management
Rescue	4	Stabilization, Extrication, Traffic Management
Total Personnel	8	



Table 37: Low to Moderate Risk: Attached garage, single family residential (detached/duplex)

Initial Deployment	No. FF	Task Assignment
Engine	4	Incident Command, Scene Safety, Size up, IAP Development, Accountability, Resource Determination, Water Supply, 360 assessment, Forcible Entry, Primary Search, Fire Control, Incident Stabilization
Ladder (if available)	4	Scene Safety, Water Supply, Aerial Operations, On-deck Assignment, Primary Search, Fire Control
Rescue	2	Scene Safety, On-Deck, Primary/Secondary Search, Fire Control
2 <sup>nd</sup> Engine	4	Scene Safety, Water Supply, On-deck Assignment, Primary Search, Fire Control
Platoon Chief	1	Transfer of Command, Scene Safety, IAP Confirmation and Evaluation, Accountability, Resource Management.
Rehabilitation/Command Unit		Rehab, Command area, protection from elements
Total Personnel	17	

Table 38: Low to Moderate Risk: Small quantity (<20 L) of known product (gasoline, anti-freeze), open space natural gas smell or odor from unknown source

Initial Deployment	No. FF	Task Assignment
Engine	4	Incident Command, Scene Safety, Size up, IAP Development, Accountability, Resource Determination, Water Supply, 360 assessment, Forcible Entry, Incident Stabilization
HAZMAT (Hazardous Materials) Unit	4	<ul style="list-style-type: none"> <li>• Hazard and risk evaluation</li> <li>• Selection of personal protective equipment</li> <li>• Information management and resource coordination</li> <li>• Implement response objectives.</li> <li>• Decontamination and clean-up operations</li> <li>• Terminate the incident</li> </ul>
Total Personnel	8	

Table 39: Moderate Risk: Motor vehicle crash (1-3 private vehicles)

Initial Deployment	No. FF	Task Assignment
Rescue	4	Incident command and size-up, safety, establish outer perimeter, pump operation, 2 FFs prepare hand line.
Engine	4	Establish inner perimeter, triage patients, patient care, extrication, patient packaging.
Total Personnel	8	





Table 40: Moderate Risk: Surface water, swift water, or ice rescue

Initial Deployment	No. FF	Task Assignment
Water Rescue Unit	4	Officer of first arriving unit on scene assumes command, size up, scene safety and communications, patient contact, shore rescue if possible or water/ice rescue if required.
Rescue	4	Addition Resources for Shore operations, On Deck, Patient care
Squad	4	Addition Resources for Shore operations, On Deck, Patient care
Platoon Chief	1	Overall Incident Command, safety, accountability, resource management.
<b>Total Personnel</b>	<b>13</b>	

Table 41: Moderate Risk: Grass/wildland/brush fire (with exposures)

Initial Deployment	No. FF	Task Assignment
Bush Buggy	4	Incident Command, Scene Safety, Size up, IAP Development, Accountability, Resource Determination, Water Supply, Fire Control, Incident Stabilization
Tender	2	Water Supply
Engine	4	Firefighters for Operations
Platoon Chief	1	Transfer of Command, Scene Safety, IAP Confirmation and Evaluation, Accountability, Resource Management
<b>Total Personnel</b>	<b>11</b>	

Table 42: High Risk: Commercial, industrial, strip mall, warehouse, mid-rise residential

Initial Deployment	No. FF	Task Assignment
Ladder	4	Incident Command, Scene Safety, Size up, IAP Development, Accountability, Resource Determination, Water Supply, 360 assessment, Aerial Operations, Forcible Entry, Primary Search, Fire Control, Incident Stabilization
Engine	4	Scene Safety, Water Supply, On-deck Assignment, Primary Search, Fire Control
Rescue	4	Scene Safety, On-Deck, Primary/Secondary Search, Fire Control
2 <sup>nd</sup> /3 <sup>rd</sup> Engines	8	Scene Safety, Water Supply, On-deck Assignment, Primary Search, Fire Control
Platoon Chief	1	Transfer of Command, Scene Safety, IAP Confirmation and Evaluation, Accountability, Resource Management
Rehabilitation/Command Unit	2	Rehab, Command Area, Protection from Elements
<b>Total Personnel</b>	<b>21</b>	



**Observation #21:** BFES standard operating guidelines do not identify the number of firefighters and resources required to complete tactical or critical tasks. Critical task analyses will clarify incident resource requirements and identify the critical tasks to clarify firefighter tasks and manage an incident efficiently and safely.

**Recommendation #21: Complete and maintain as required critical task analyses for common incident types and include them in response operational guidelines or response policies.**

*(Suggested completion: 12-120 months)*

**Rationale:** *Critical task analyses should be used to identify operational limitations in policy to clarify incident command objectives and maintain safe operations. As described above, low to medium incidents will often require more than 10 firefighters to complete concurrent critical tasks safely and minimize intervention time. The most common number of initial responders for BFES urban structure fire incidents is 10 (see Section 4.6). As a result, critical task analysis will identify incident types where tactical firefighting objectives may require modification and immediate call back or mutual aid requests can be automated.*

*Further, volunteer station response can may be somewhat uncertain. The number of firefighters arriving may be staggered or limited. As a result, tactics and task assignments should be scaled to reflect available resources. For example, if the number of assembled firefighters or water supply are not sufficient to support an interior fire attack or rescue, fire tactics should be limited to exterior and defensive operations.*

## 4.6 Effective Response Force

This section provides further explanation on the importance of assembling an effective response force (ERF). Response performance is based on two key components – a timely response time and the ability to assemble an effective response force. Adequate numbers of firefighters and the appropriate fire/rescue apparatuses must respond to mitigate an emergency incident safely.

A fire department’s resource concentration and distribution will determine its ability to provide both a timely and effective response. Resource concentration refers to the numbers of firefighters and fire equipment within a fire station. Resource distribution refers to the location of fire stations in the department’s demand zones (or response areas). Both components will impact a department’s ability achieve limit the total intervention time for emergency incidents.

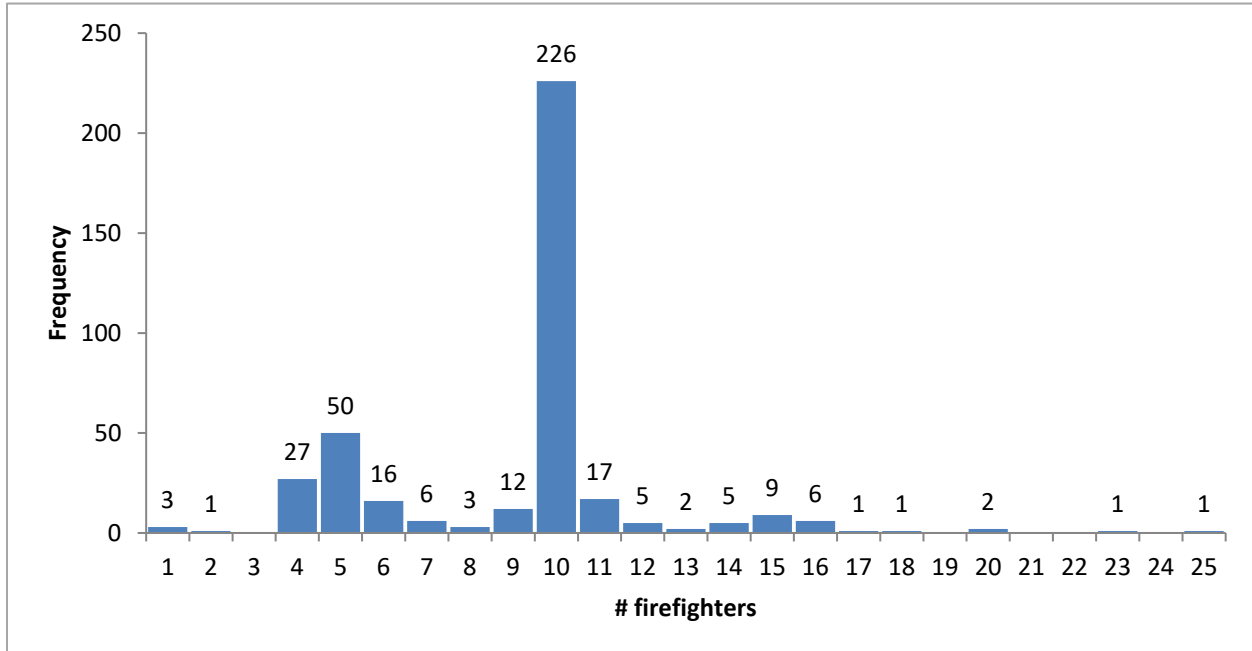
ERF standards are based on fire response research completed by organizations such as NFPA and the National Institute of Standards and Technology (NIST). These standards are established to ensure adequate resources are available to complete critical tasks in a safe and timely manner. NIST research identified over 22 essential fire ground tasks at a typical single-family house fire. NFPA suggests a minimum of 16 firefighters, or four companies of four firefighters, are required for a full alarm assignment (17 if an aerial apparatus is used) for residential house fire located in



an urban area. The key point is that even a low-risk and relatively routine structure fire requires considerable resources to complete concurrent tasks and minimize intervention time.

Chart 6. Firefighters Responding to Urban Response Area Structure Fires identifies the number of firefighters responding to structure fires in response areas 1 and 2. BFES minimum staffing for Fire Stations 1 and 2 is five firefighters for each station. As a result, the most common number of firefighters responding to urban structure fires was 10.

Chart 6: Firefighters Responding to Urban Structure Fires (2018-2022)



The following observations regarding rural emergency response performance were noted:

- Approximately 60% of all urban structure fires had 10 firefighters or two stations responding.
- Nearly 13% (50) structure fire incidents required more than 10 firefighters.
- 12 incidents required more than 15 firefighters.

Table 43 summarizes the 90<sup>th</sup> percentile time take to assemble 10 firefighters from Stations 1 and 2 to urban structure fires in Belleville. The 90<sup>th</sup> percentile time could only be calculated for urban structure fire assembly times where 10 firefighters responded because of the limited data in responses with more or fewer firefighters responding.

Table 43: 90th Percentile Time to Assemble 10 Firefighters (in secs)

# firefighters	2018	2019	2020	2021	2022	5 Year
10	394	430	383	294	543	441



The following observations regarding the time taken to assemble 10 firefighters were noted:

- 10 firefighters arrived within 7 min 21 sec or less to 90% of structure fires during this period.
- The 90<sup>th</sup> percentile time taken for both Stations 1 and 2 to arrive increased in 2022 to nine minutes.

**Observation #22:** The data to assess the number of firefighters responding to structure fires in the rural response areas 3, 4 and 5 was not available. The number of firefighters responding to these incidents from Stations 3, 4 and 5 was not linked to the response or incident data. Further, department policy does not identify the minimum number of firefighters that must assemble on a fire engine or rescue truck before the apparatus can respond. Additionally, firefighters may respond directly to an emergency incident as opposed to responding on a fire apparatus making it difficult to assess response time.

**Recommendation #22: Record and monitor the minimum number of firefighters responding to emergency incidents from Stations 3, 4 and 5.**

*(Suggested completion: 1-120 months)*

**Rationale:** *A volunteer fire and rescue departments' ability to respond with an effective response force hinges on firefighter availability and ability to respond. Sustaining adequate numbers of fully trained firefighters is increasingly difficult as regulated training and certification requirements evolve. This information is essential in assessing the effectiveness and future sustainability of the volunteer firefighter model. This is not to say the response is ineffective. The intention of the recommendation is to highlight that this data is not available making it difficult to fully assess the effective response force for response areas 3,4 and 5.*

## 4.7 Response Coverage Mapping

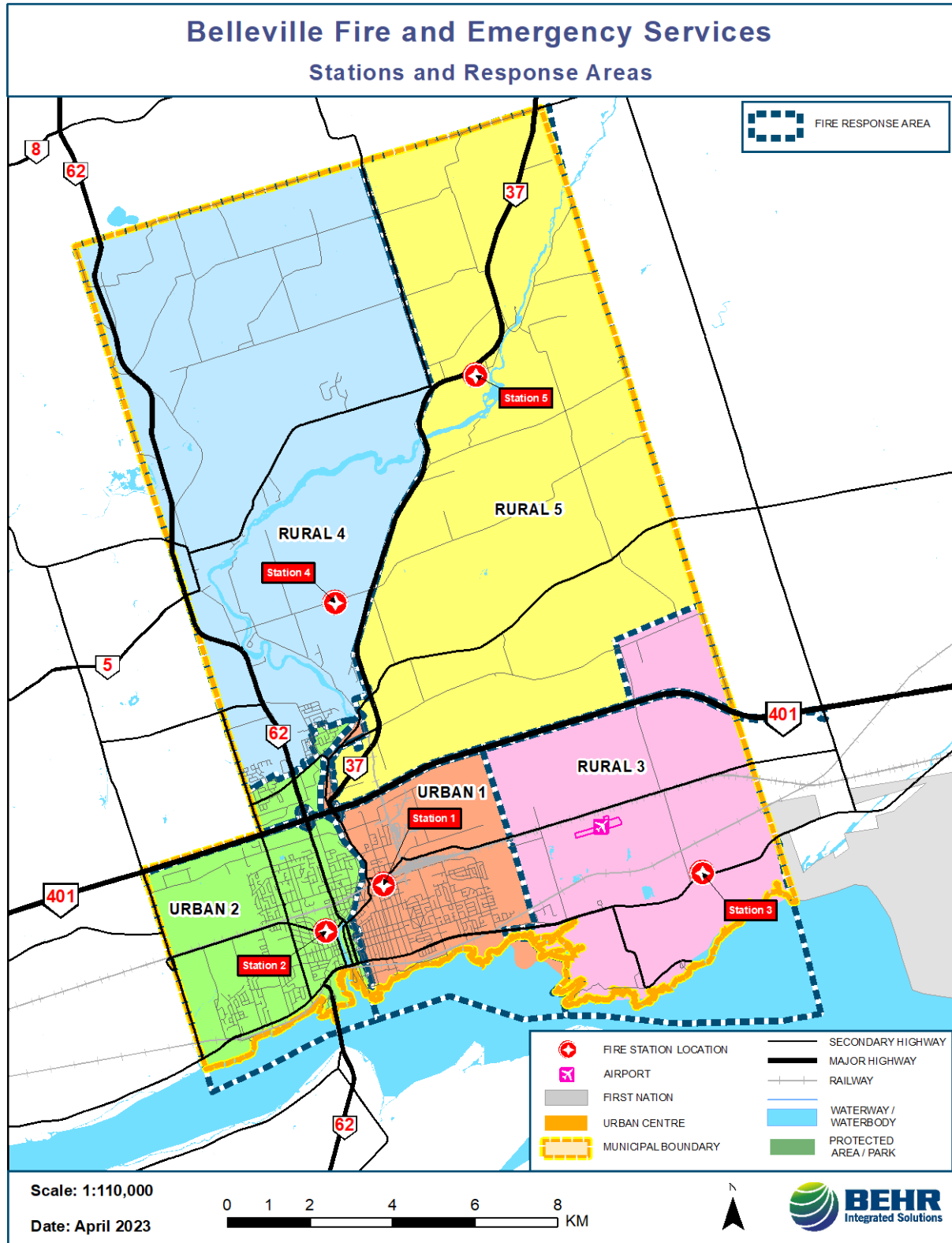
This section provides maps of the current BFES stations and their respective response zones. It also includes an analysis of incident location and the response coverage provided by the current station locations. Further, this section provides an of alternate urban station locations.

### 4.7.1 Current BFES Resource Distribution and Concentration

BFES has five fire stations and associated response areas (see Map 1). The urbanized areas of Belleville are largely contained within urban response areas 1 and 2. Station 1 provides the primary response in urban area 1; Station 2 provides the primary response in urban response area 2. Both stations are staffed with a minimum of five firefighters. Station 1 houses a pumper, ladder truck, rescue truck and rescue boat. Two pumper trucks and a ladder truck are in Station 2.

The rural response areas 3, 4 and 5 are covered by the volunteer firefighter Stations 3, 4 and 5 respectively. Minimum response staffing has not been established for any of the volunteer stations. Station 3 has a pumper truck, rescue truck and water tanker. Station 4 houses two tanker trucks, a pumper and rescue truck. Station 5 has a single pumper truck.

Map 1: Station Location and Primary Response Areas





### 4.7.2 Incident Location Density Mapping

Table 44: Count of Incidents by Response Area identifies the frequency of incident types in each of the response areas. During this period, nearly 90% of the incidents occurred within the urban response zones, with 54% of all incidents occurring in urban response area 2. Rural response area 4 had twice the number of all incident types than the other rural response areas.

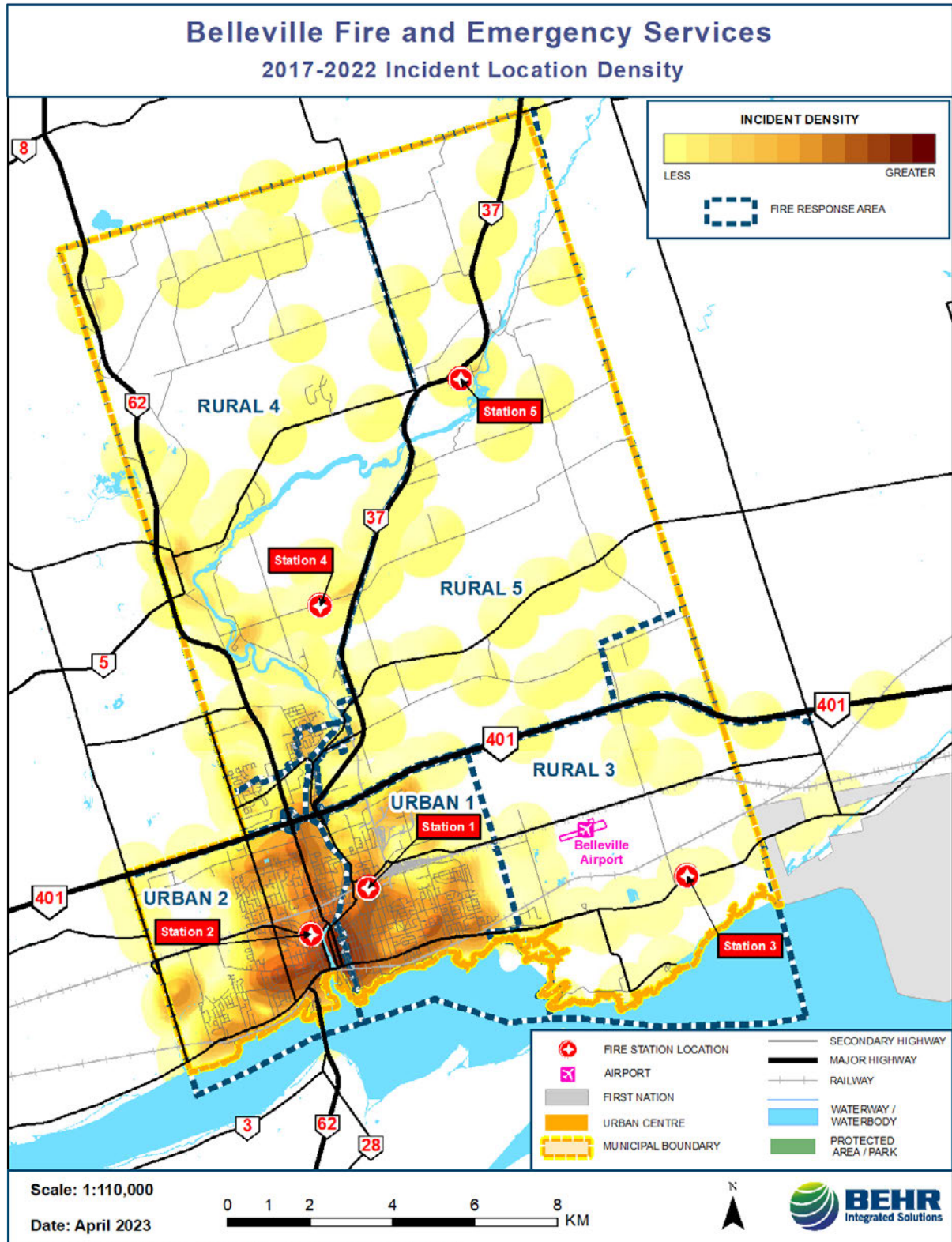
Table 44: Count of Incidents by Response Area (2018-2022)

Incident Type	Response Area						Total
	Urban Area 1	Urban Area 2	Rural Area 3	Rural Area 4	Rural Area 5	Other	
Medical	1128	2086	42	125	70	9	3460
Public Service	953	1174	35	146	33	2	2343
Alarms	701	1059	23	86	37	6	1912
Fire	478	675	48	123	67	23	1414
MVC	154	321	44	95	38	12	664
Dangerous Goods	77	111	2	5	5	1	201
Rescue	52	97	8	2	1	7	167
Other	4	5	0	0	1	2	12
<b>Total</b>	<b>3547</b>	<b>5528</b>	<b>202</b>	<b>582</b>	<b>252</b>	<b>45</b>	<b>10173</b>

Map 2 identifies where in Belleville incidents occur most frequently. The darkest regions of the map had high incident frequency and the lighter colored areas had infrequent or no incidents during this period. This map illustrates that from 2018-2022, most emergency incidents occurred in the core of the urbanized response areas. The lighter colored circles in the rural areas represent single or very small clusters of incidents. There were only a few in the semi-rural regions of development in the southern portions of response area 4 where incidents occurred frequently in the rural response areas.



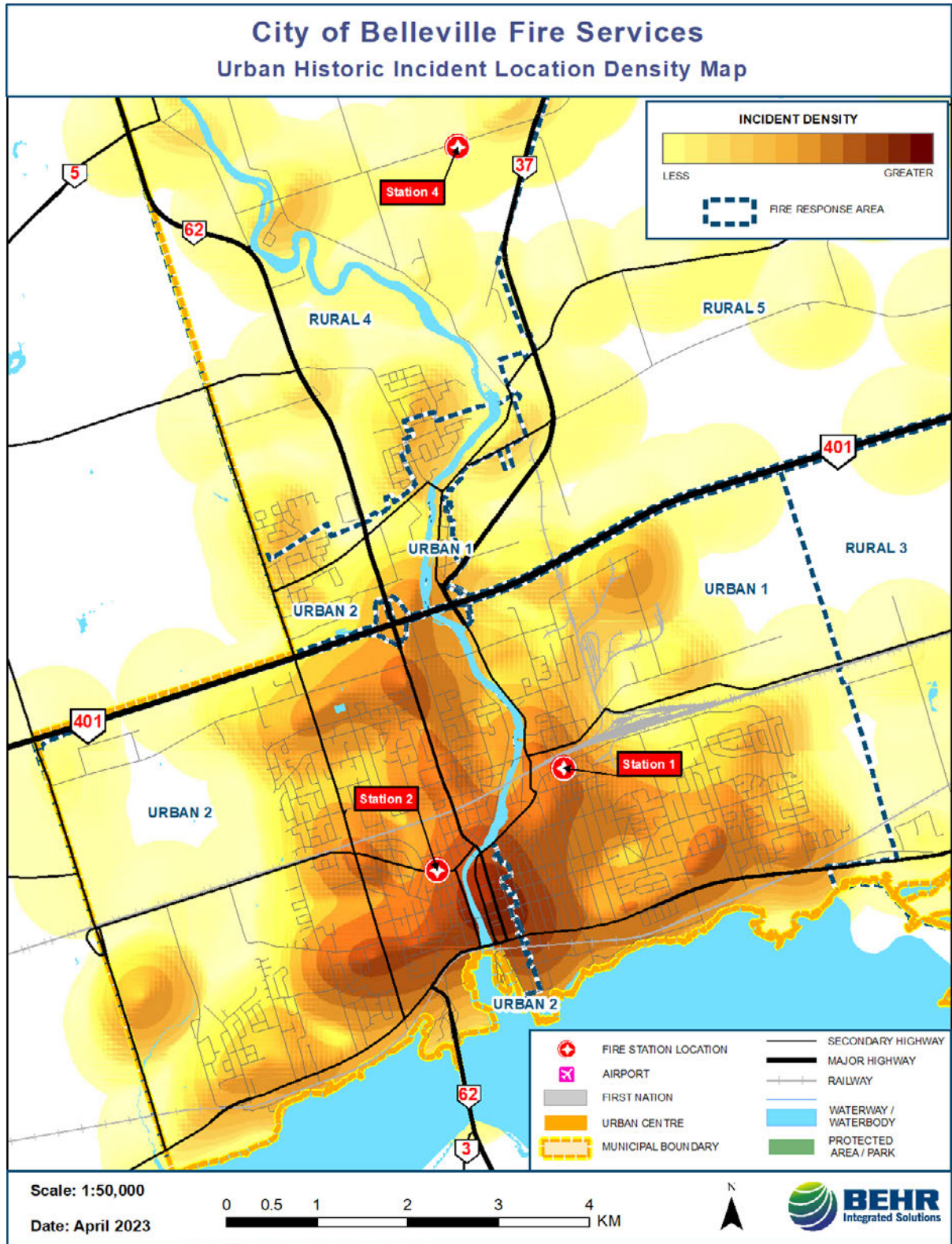
Map 2: Incident Location Density





Map 3 focuses on the specific urban neighbourhoods within Belleville. Most incidents occurred on either side of Pinnacle Street from the waterfront to Highway 401. The map also identifies several emerging areas within the city that have an increasing number of incidents. Nodes of higher incident frequency are present in the areas of new development north of Maitland Drive, near Loyalist College, Bayview Mall areas, light industrial areas in north-eastern area of the city.

Map 3: Incident Location Density in Urban Core







### 4.7.3 Station Response Coverage

Station response area coverage is mapped by calculating a theoretical travel time in seconds. The time is entered into a geographic information system (GIS) program using the municipalities road network data to plot the and the response area covered by a station within a certain time. The methodology used to calculate the theoretical travel time and area coverage was based on the following formula:

Response Time Goal – (90<sup>th</sup> Percentile Alarm Processing Time + 90<sup>th</sup> Percentile Chute Time) = 90<sup>th</sup> Percentile Theoretical Travel Time

The calculated theoretical travel time using 90<sup>th</sup> percentiles is a conservative calculation. Use of the 90<sup>th</sup> percentile alarm handling and chute times to calculate theoretical travel time reflects the potential response area for 90% of all incidents. In comparison, if 50<sup>th</sup> percentiles times were used the theoretical travel time would be longer and response area larger, but only be achieved about 50% of the time. As a result, this methodology provides a more reliable representation of the response area coverage within a given response time goal.

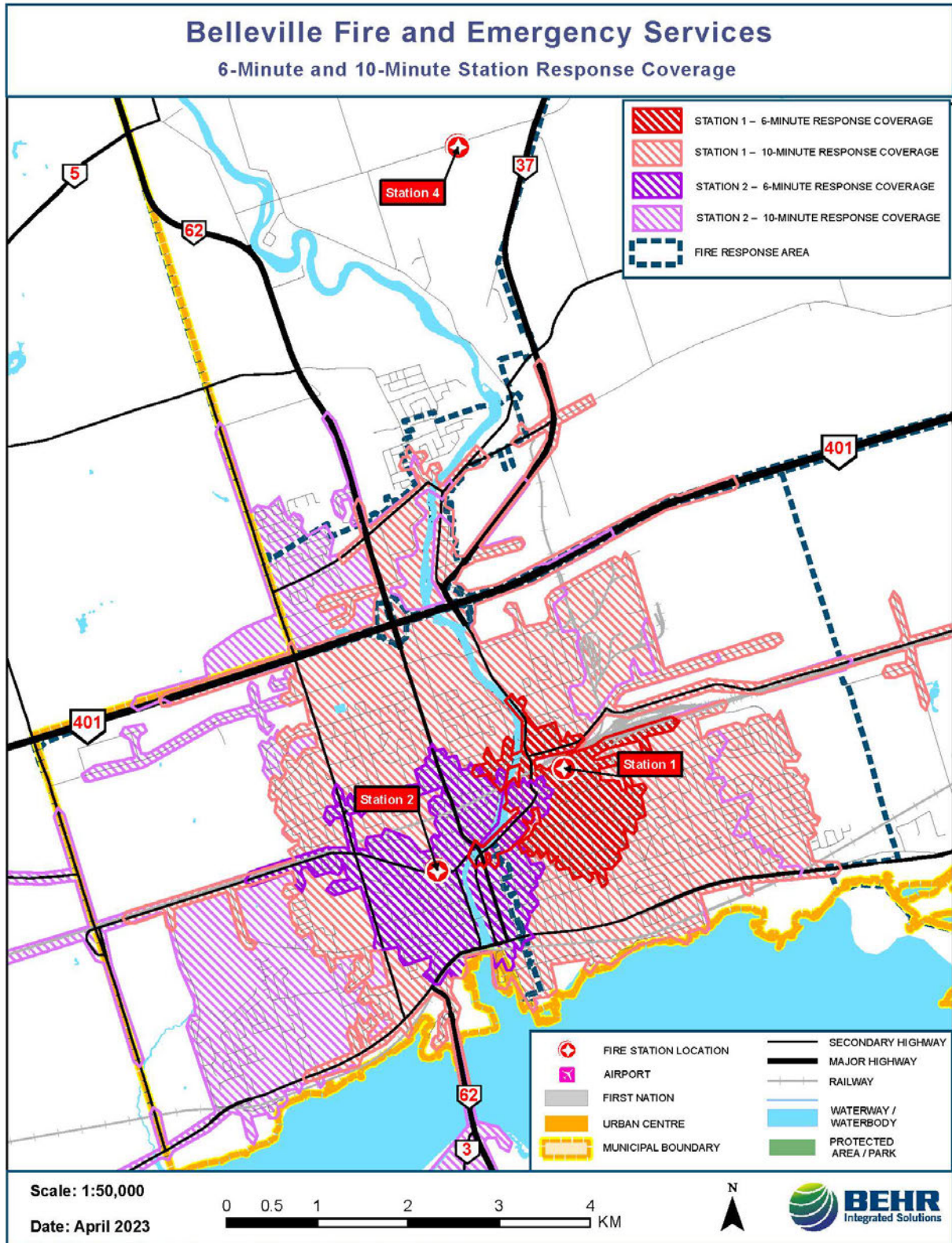
Map 4 provides the response area for BFES Stations 1 and 2. It identifies the total response time for both at 380 sec (NFPA 1710 6 min 20 sec goal) and 600 sec (10 minute) total response time goals. The travel time was calculated as follows:

1. 380 sec goal - (109 sec + 148 sec) = **123 sec** of plotted theoretical travel time
2. 600 sec goal - (109 sec + 148 sec) = **343 sec** of plotted theoretical travel time

The darker red and purple outlined areas represent the potential response area covered by these stations within approximately six minutes 90% of the time from 2018 - 2022. Combined, the two stations could provide a six-minute to a portion of the city's core. The overlap in response areas was limited to a small area on either side of the river in the city's core.

The lighter colored areas represent the potential response area covered within 10 minutes 90% of the time during this same study period. When combined, 10-minute response coverage was provided across most of the urban developed areas of Belleville. The only exception might have been in the northern most streets of response area 2. The areas of cross-coverage, where the 10-minute response area overlapped, was expanded to most of the urban roads as well except for the most western and eastern neighbourhoods.

Map 4: BFES Urban Fire Station Total Response Time Coverage





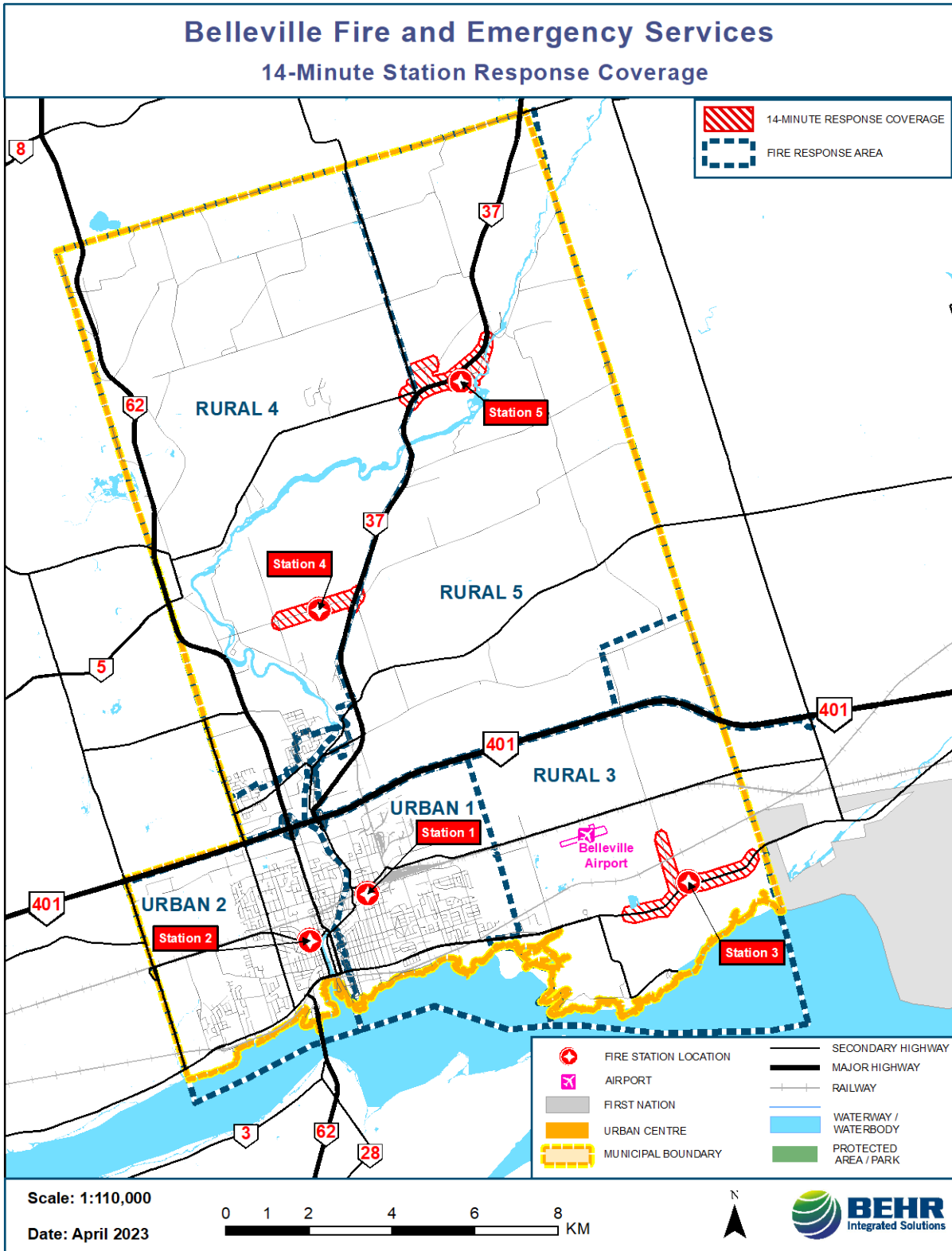
Map 5 provides the theoretical response coverage for Stations 3, 4 and 5. NFPA 1720 offers a total response time goal of 14 minutes for the first arriving fire apparatus for rural population densities. This response goal should be achieved 80% of the time. In this case, the five-year 90<sup>th</sup> percentile rural alarm handling and 80<sup>th</sup> percentile rural station chute times were used. Using this approach, the following 80<sup>th</sup> percentile theoretical travel time from 2018-2022 was calculated using the following formula:

1.  $840 \text{ sec goal} - (215 \text{ sec} + 560 \text{ sec}) = \mathbf{65 \text{ sec}}$  of plotted theoretical travel time.

As illustrated in Map 5, from 2018-2022 the 14-minute response coverage for all rural stations was limited to small sections of local roads near each station 80% of the time. The red areas outlined on the map indicate that most locations within response areas 3, 4 and 5 cannot be reached within a 14-minute timeframe. This is in part a result of the extended time taken for dispatching rurally and the time taken for volunteer firefighters to travel to the station and respond (see Section 4.4). A reduction in these combined times will improve response coverage from these stations.



Map 5: BFES Rural Fire Station Response Coverage





#### 4.7.4 Station Location Analysis

Behr Integrated Solutions was asked to consider current station locations and provide a recommendation regarding potential station relocation options. Numerous factors from sections within this report were considered in this analysis including:

- Community growth patterns
- Staffing models and interoperability
- Current station functionality and locations
- Areas of highest emergency incident demand
- Incident type and frequency
- Response performance
- Community risks

The detailed analysis and discussion regarding each of these topics was provided in their respective sections. In summary, urban growth and demand for emergency services is expected to outpace future growth in the rural response zones.

Based on the limited data to assess the rural station response it is difficult to provide a full analysis of the sustainability and the effectiveness of the volunteer stations in the future. It is hoped that discussions lead to a higher degree of interoperability and cross-functionality between urban and rural firefighters. This issue is addressed in Section 3

As a result, options to align the distribution and concentration of BFES resources focuses on the urban Stations 1 and 2. Urban Station 1 opened in 2015 and houses fire operations, fire prevention, dispatching and administrative staff. This Station is functional and generally well located. Station 2 opened in 1949 and has obvious deficiencies with respect to contemporary fire station design (see Section 3). Currently the urban career stations provide a timely response and are generally well-located within their response areas to provide good coverage.

Looking to the future, demand for services will continue to increase as the population and community risks as Belleville develops. Community growth in the western fringes is expected to continue, with some suburban and urban developments emerging to the north as well. Continued pressure to increase higher density housing is likely to increase the occurrence of fire-related incidents in multi-family, mid- and high-rise buildings. As the risk profile for this community changes, the capacity of the current staffing and response model of BFES will need to be addressed. The urban stations are best positioned to address these future pressures.

Based on these factors, the option to build and relocate Station 2 presents the best value proposition for the citizens of Belleville. A complete assessment of the functional requirements, design and land area required for a new Station 2 is beyond the scope of this project. However, two options involving the relocation of Station 2 are identified in Maps 6 and 7. The red area in both maps identifies the 90<sup>th</sup> percentile 10-minute response area coverage provided by a new Station 2 located in two separate locations. Both locations would



meet the needs of the community and support a timely response. The maps outline the slight differences in coverage provided within 10 minutes.

Map 6 identifies the response coverage provided by relocating Station 2 near the intersection of Sydney Street and College Street. As illustrated, this location expands 10-minute coverage slightly northward while maintaining coverage to the western boundary. This location should support a 10-minute response to all future areas developed in the western neighbourhoods of the city. However, it shifts the south-eastern boundary of the 10-minute response a little westward, however this area is covered within the 10-minute response area of Station 1.

Map 7 identifies the response coverage provided by relocating Station 2 slightly further northward along Sydney Street to Bell Boulevard. As illustrated, the 10-minute response coverage area is extended further northward and in both directions along Highway 401. However, the southwest corner of the city likely falls outside of the 10-minute response time coverage.

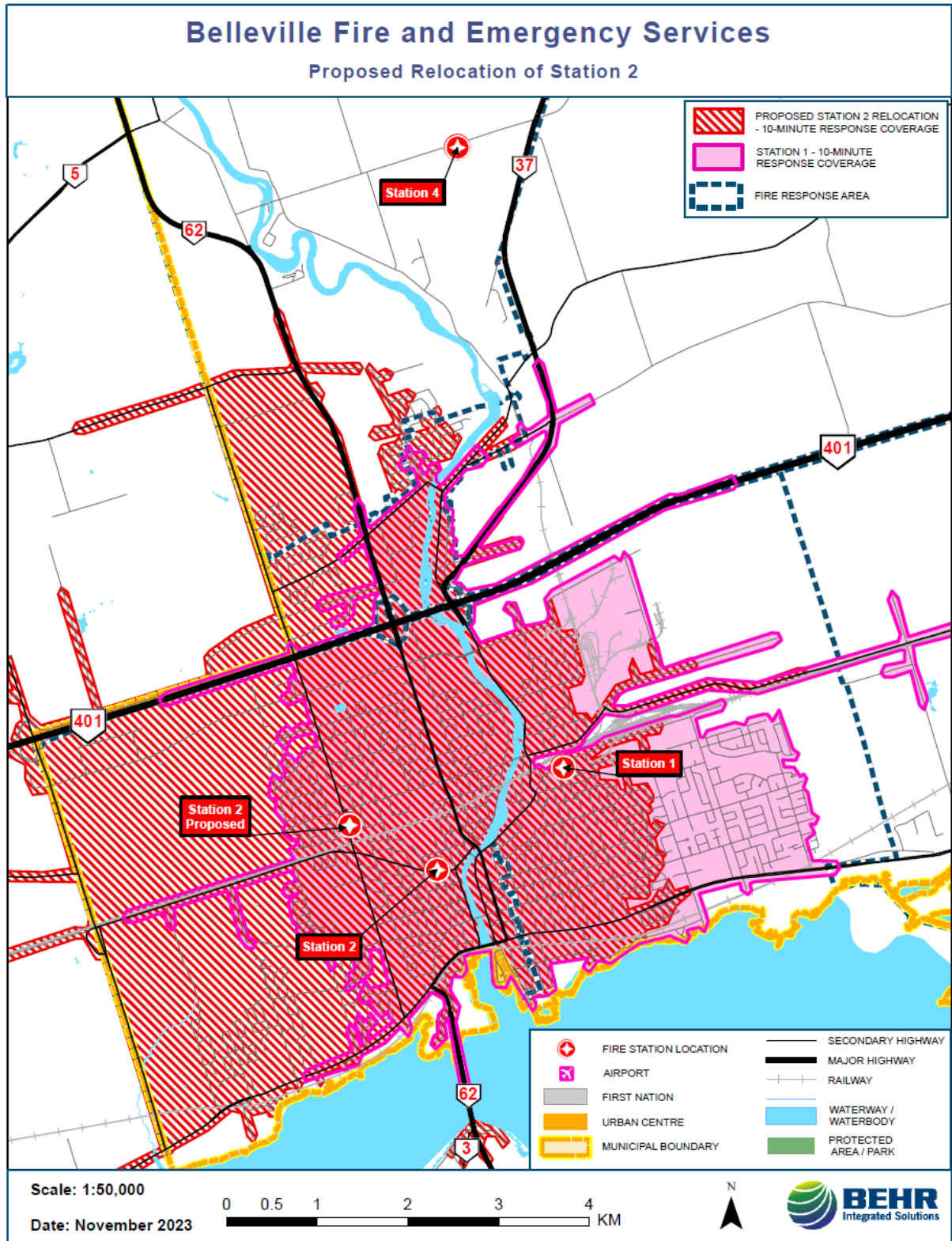
**Observation #23:** Both locations will serve the community well and support a 10-minute response time for most of Belleville. Like any development in an urban area, the availability of the land area required to build a new fire station and the cost of the land are key limitations to either option. Alternative sites in these general areas would also be reasonable to consider.

**Recommendation #23:** *The location of proposed Station 2 in Map 6 on page 143 is the recommended option.*

*(Suggested completion: 48-60 months)*

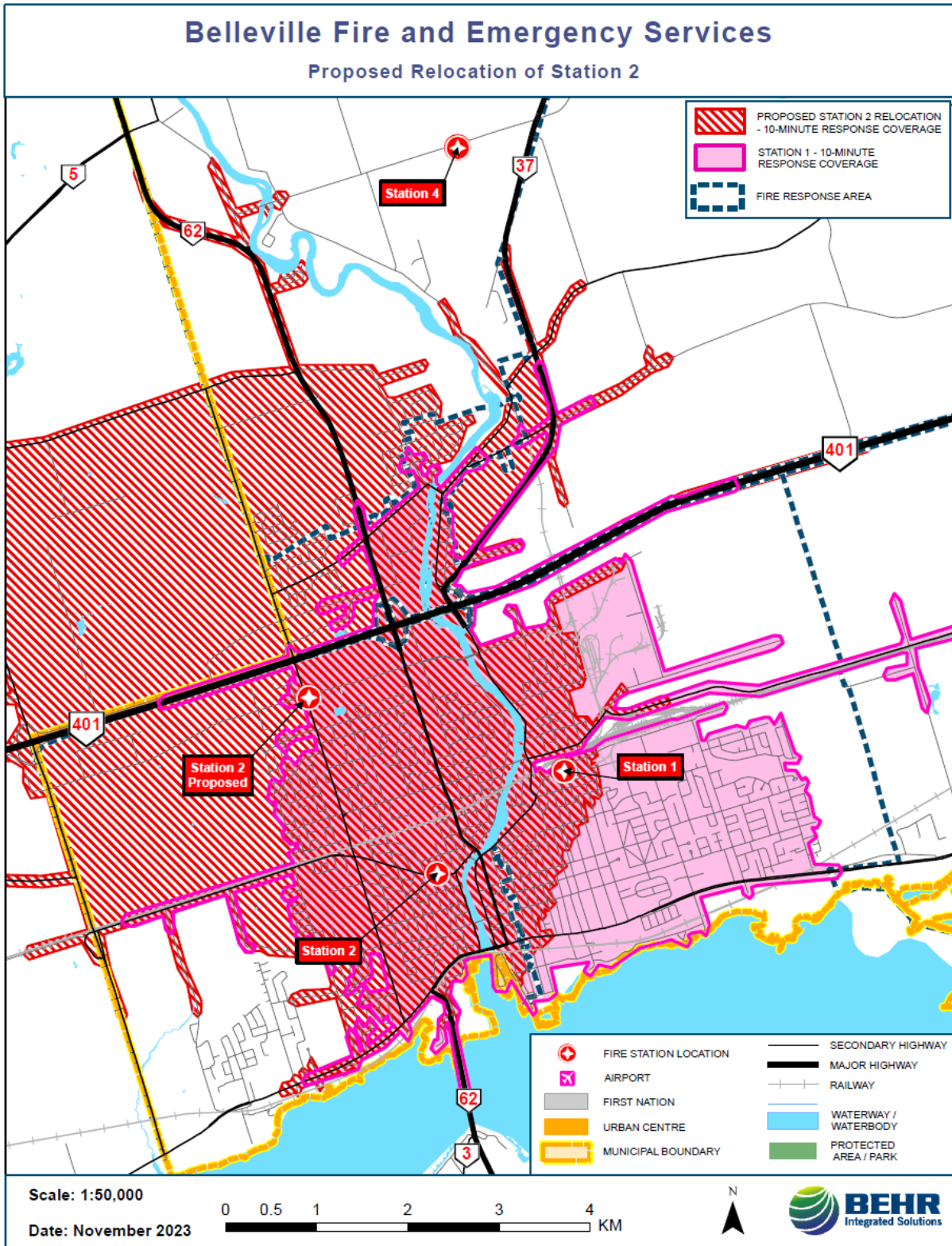
**Rationale:** *By locating Station 2 slightly further southward provides response coverage to the southwest sector of the city that is a higher demand area for emergency response.*

Map 6: Sydney St. and College St. Station 2 Relocation





Map 7: Sydney St. and Bell Blvd. Station 2 Relocation



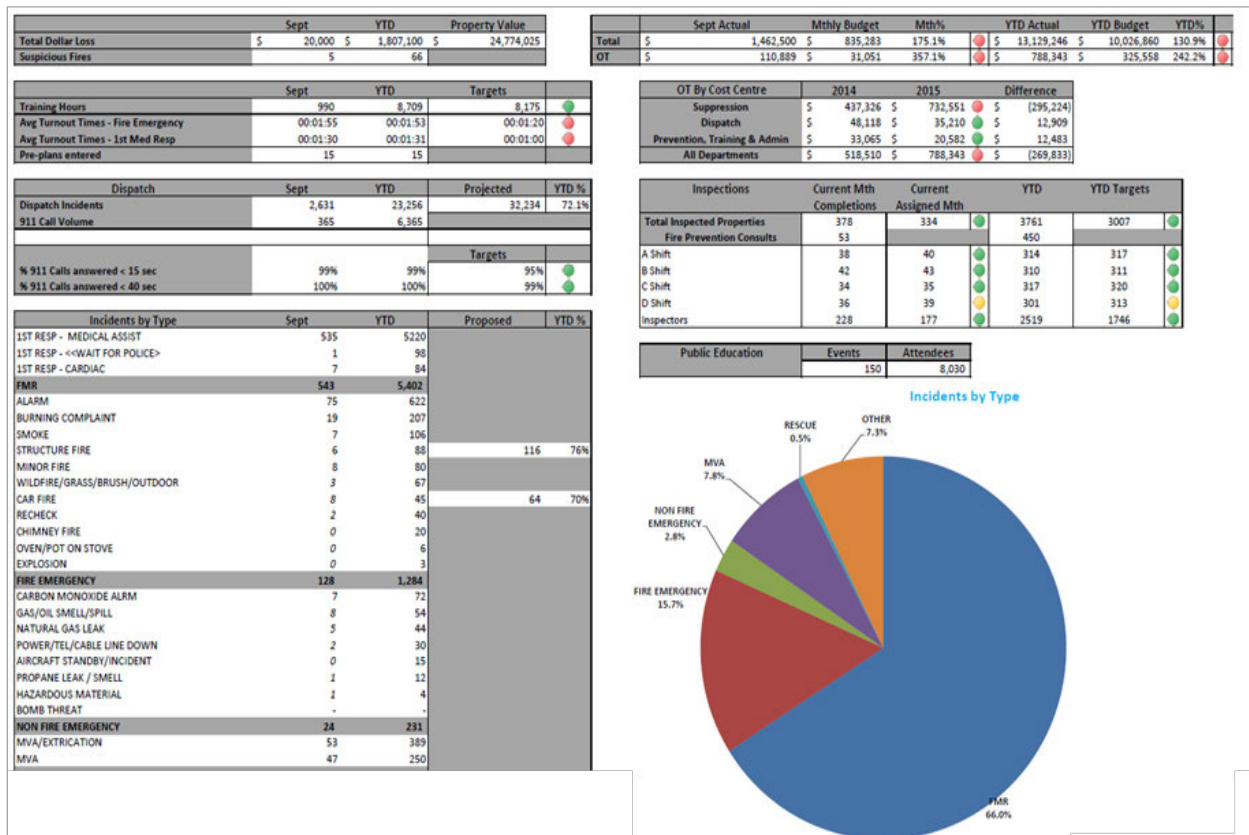
### 4.8 Measuring, Managing and Reporting Performance

Performance measurement and reporting is key to moving toward a data-based culture of performance improvement and away from mere opinion. Performance measurement and reporting supports the following:

- Determining a baseline performance level according to the indicators
- Establishing achievable service goals based on current performance.
- Identifying the gap between desired goals and current performance levels
- Tracking progress toward achieving goals
- Benchmarking performance between departments
- Identifying problems and root causes
- Planning

One approach to providing timely information to fire staff is to develop a performance dashboard. CAD and RMS technologies must be integrated to support this tool. Figure 10 provides an example of the information that could be reported on a performance dashboard.

Figure 10: Performance Dashboard







**Observation #24:** BFES has not provided City of Belleville Council with an annual report or regular updates on service pressures and service performance. Formalized service levels and performance expectations have not been established. Further, current alarm processing and chute times are somewhat extended and may offer the opportunity to improve overall response performance if improved. BFES currently uses a Crisys records management system which is believed to be capable of developing adequate reports.

**Recommendation #24: Develop appropriate performance reports for Belleville City Council and BFES staff.**

*(Suggested completion: 12-18 months)*

**Rationale:** Fire departments are typically data-rich organizations. Performance data will assist with developing achievable service levels and performance goals. Timely reporting of operational performance also supports initiatives to improve overall response times. Under the Fire Protection and Prevention Act 6.(3), the fire chief is ultimately responsible to council of the municipality that appointed him or her for the delivery of fire protection services. In the absence of this information, neither the fire chief, city council, senior city administration or the fire department staff know whether they are successful in meeting service expectations defined by Council.



## CONCLUSION

This Fire Master Plan was completed to assist the City of Belleville and BFES in evaluating the current service delivery model and develop a strategy to inform future investments in fire, rescue, and emergency services. The plan involved a comprehensive analysis of all key elements of service delivery. This analysis included a review of the operational and administrative aspects of the BFES, community profile and risks, staffing, core service and program delivery, training, recruitment and retention, facilities, and major equipment.

Further, BFES response data was assessed with a focus on the current performance, capabilities and alignment with both existing and projected risks and levels of demand.

There are several observations and recommendations provided in this master plan to improve operational effectiveness and efficiencies. Key among the 25 recommendations is:

- Mayor and Council must mandate that the Belleville Fire and Emergency Services be established as a fully integrated service delivery system. The outcome would be reduced duplication, service level inconsistencies and fragmentation. The transformation of the Belleville Fire and Emergency Services organization culture to a cohesive team that fully supports working together to improve service delivery and public safety.
- BFES undertake a complete review of the Bylaw to Establish and Regulate a Fire Department and Emergency Services dated 2011 and include response capacities and performance targets for the core services. Alternatively, Council approves as separate service delivery policy for Belleville Fire and Emergency Services that is not part of the Bylaw.
- Establish a third engine company by Increasing the career staffing by 16 firefighter positions and one platoon chief position on each of the four platoons. The additional of a third engine company and platoon chief will provide additional response capacity to enhance the urban area effective response force, reduce the reliance on the recall of off duty career and/or mobilization of the volunteer firefighters, increase the ability to manage coincidental and sequential emergencies and to bolster the rural areas response time and effective response force challenges.
- BFES commence an analysis of the rural area responses to accurately determine the operational effectiveness and the achievement of the effective response force. The consistent achievement of the recommended effective response force has a direct impact on firefighter and public safety and increases the risk potential for loss of life, extensive property loss and environmental damage.
- Replacement of current fire station 2 to one of the proposed locations contained in Section 4 of this FMP. Further with the replacement of a new station 2, that station 4 be evaluated for operational viability including the need to replace this dysfunctional station.



Although each recommendation has a corresponding timeframe, it is important to note this FMP needs to be revisited on a regular basis to confirm that the observations and recommendations remain relevant. The recommendations outlined in this FMP will better position the City and BFES to mitigate and manage community risks, monitor response capabilities and performance, and maintain excellent community relationships and value for money.

Our interactions with the staff revealed a highly professional and dedicated organization that is committed to providing the best possible service to the citizens of Belleville.



## APPENDICES

**Appendix A: Glossary of Terms**

**Appendix B: List of Figures, Maps, and Tables**

**Appendix C: Theoretical Response Mapping Methodology**

**Appendix D: Online Firefighter Questionnaire Results**

**Appendix E: Apparatus and Light Duty Inventory**

**Appendix F: NFPA Training Standards for Fire Protection Services**



## APPENDIX A GLOSSARY OF TERMS

Term	Definition
Apparatus	Any vehicle provided with machinery, devices, equipment, or materials of the Fire department for firefighting as well as equipment used to transport firefighters or supplies.
Assembly Time	From the time the notification sounds in the fire station until the first vehicle leaves the station. In a full-time department this is expected to be within 80 seconds but for volunteer departments the time to collect a response crew can vary widely depending on location and time of emergency as well as all the factors that impact travel time.
Chute Time	See Assembly Time
Dangerous Goods	This term is synonymous with the terms hazardous materials and restricted articles. The term is used internationally in the transportation industry and includes explosives and any other article defined as a combustible liquid, corrosive material, infectious substances, flammable compressed gases, oxidizing materials, poisonous articles, radioactive materials, and other restrictive articles.
Discovery	This is the time between the start of the emergency and when someone or an engineered system has detected the incident.
Dispatch Time	This is the time required to extract the necessary information from the caller to allow the proper response to be initiated. The dispatcher identifies the correct fire location and initiates the dispatch by paging the appropriate fire station.
Emergency Call	This is the period between discovery and the actual notification of emergency services.
Emergency Communications Centre (ECC)	A facility dedicated to service receives calls, processes them, and then dispatches emergency units to the correct location in the appropriate time.
Emergency Operations Centre (EOC)	The protected sites from which civil officials coordinate, monitor, and direct emergency response activities during an emergency or disaster.
Emergency	Any occasion or instance that warrants action to save lives and to protect property, public health, and safety. A situation is larger in scope and more severe in terms of actual or potential effects.
Fire Suppression	The application of an extinguishing agent to a fire at a level such that an open flame is arrested; however, a deep-seated fire will require additional steps to assure total extinguishment.
Hazard Analysis	A document, which identifies the local hazards that have caused, or possess the potential to adversely affect public health and safety, public and private property, or the environment.



Term	Definition
Impact	The effect that each hazard will have on people such as injury and loss, adverse effects on health, property, the environment, and the economy.
Incident	A situation that is limited in scope and potential effects.
Intervention Time	The time from fire reporting to the point where the first arriving pumper, or other apparatus providing comparable functions, arrives at the fire scene and directs an extinguishing agent on the fire.
Mutual Aid Agreement	An agreement between jurisdictions to assist each other during emergencies by responding with available personnel and apparatus.
National Fire Protection Association	The National Fire Protection Association (NFPA) is an internationally recognized trade association established in 1896 that creates and maintains standards and codes for usage and adoption by local governments to reduce the worldwide burden of fire and other hazards. This includes standards and guidelines to which many fire departments utilize to continue day-today operations.
Response	Those measures undertaken immediately after an emergency has occurred, primarily to save human life, treat the injured, and prevent further injury and losses. They include response plan activation, opening and staffing the Emergency Operations Centre, mobilization of resources, issuance of warnings and direction, provision of aid, and may include the declaration of a State of Local Emergency.
Risk	The chance or likelihood of an occurrence based on the vulnerability and known circumstances of a community.
Setup Time	This is the time necessary on site to evaluate the necessary actions, position the required resources and commence the intervention. In the case of a fire, completing size-up, assigning the necessary tasks, and deploying resources can provide delays on scene. A well-trained crew can minimize these delays while providing a safe, successful response.
Standard Operating Guidelines (SOG)	A written organizational directive that establishes or prescribes specific operational or administrative methods to be followed routinely, which can be varied due to operational need in the performance of designated operations or actions.
Standard Operating Procedures (SOP)	A written organizational directive that establishes or prescribes specific operational or administrative methods to be followed routinely for the performance of designated operations or actions.
Travel Time	Once a vehicle leaves the station, it must negotiate the best route between that point and the location of the emergency. Factors to consider for travel time are driver skill, weather, traffic, topography, road conditions and vehicle capabilities.





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## APPENDIX C

# THEORETICAL RESPONSE MAPPING METHODOLOGY

Response travel times are directly influenced by station location and can be varied based upon a cost/risk analysis and the development of performance targets.

### Base Data Layers Requested

- Hydrology
- Single Line Road/Transportation Network
- Railways
- Municipal Boundaries
- Parks
- Projection File
- Orthophoto (GeoTIFF, Mr.SID (multiresolution seamless image database)), if available
- Emergency Services Locations

### Data Formats

- Preference of ESRI Shapefiles

### Purpose of Files

- A. Hydrology
  - i. Identify needs for response to water locations (if dependent on a water response unit)
  - ii. Can be identified and analyzed with the rail network to locate spill contaminations, as well as containment for overland flow & flooding to water spills.
  - iii. Locations of bridge crossings which can convert to varying incidents, as MVC/Motor Vehicle Accident, spill contaminants, etc.
  - iv. Assists in the definition of the map for locational awareness by others.
  - v. Completes the map.
- B. Single Line Road/Transportation Network
  - i. Used to determine response times from emergency locations to determine a network based on road speeds.
  - ii. Roads are created into a network for response.
- C. Railways
  - i. Identified risk areas for impeding response time when crossing a roadway or proximity to municipal areas will also determine the response and apparatus used for a derailment response or other rail emergency or risks, such as chemical spill evacuations.
- D. Municipal Boundaries



- i. Identifies the limits to response for mutual aid and responsibilities when overlaps occur within a response area. Also identifies sub areas for specific mapping and identification of municipal and regional response zones. Provides information for gap analysis for future state locations or refinement of locations.
- E. Parks
- i. Identifies the potential risk areas due to accessibility issues for tracts of land, as well as constraints and opportunities for new locational analysis for or against new stations within a municipality. Ability to determine development of new locations due to proximity. Parks are identified as local, regional, provincial, and national.
- F. Projection File
- i. To ensure that we have the same data set up as being used by the Municipality or Client, measurements (both distance and time) and spatial location are correct when determining analysis.
- G. Orthophoto (GeoTIFF, Mr.SID (multiresolution seamless image database)), if available
- i. We typically do not use the ortho on the output maps, but the analysis sometimes needs clarification of what is on the ground, and we use it to quickly ground truth locations and information needed prior to asking clients for clarification, or to substantiate clarification of an area.
  - ii. Is a nice to have, yet hard to use, as it takes up a lot of memory/space and is difficult to ship/transfer.
- H. Emergency Services Locations
- i. Identify the actual location rather than a theoretical location based on an address match to ensure that the data location is as correct as possible, and no mis-locations are identified on the initial running of the theoretical response times.
  - ii. Locations may be moved from within a parcel to the front of the parcel whereby it touches the road network. Ensures the response from the station is captured. There are no corrections made to the movement of station to time, as it is typically within 50 metres.

## Theoretical Response Zone

- A. Assumptions
- i. Weather is average – no storms, rain, snow etc.
  - ii. Roadway segments contain a node/junction at intersections.
    - If not available, road network needs to be cleaned and fixed.
  - iii. Roadways need to sometimes extend beyond some municipalities.
  - iv. Emergency responders are trained on response vehicles.
  - v. Response vehicles are in good condition.
  - vi. Roads are dry and in good condition.
  - vii. Left turns are not reduced by a time %



- viii. Road speeds are provided by client; if not,
  - Road class table used to populate speeds based on road classification.
  - Road speeds are reduced from the posted sign, typically no more than 5%
- ix. Traffic volume is average, there is no congestion or there is a free-flowing lane to be used.
- x. Rail crossings are free to cross and do not impede response.
- xi. Time of day is based on an average time from 9 am – 9 pm
- xii. Opticom (or similar product for traffic light manipulation) are present to allow for free moving response.
- xiii. Intersections of roads are not reduced (the roads are reduced from other project limits and averaged over time for generality of best fit)
- xiv. School zones are not adjusted unless identified, then changes to road net are made.

**B. Response Time**

- i. Customized response based on Emergency Services Input
- ii. Response time includes 80% of all calls for service.
- iii. Total drive time along roads (determined above by road speeds)
- iv. Variances are identified and are tweaked based on known data or other trends.

**C. Response Polygons**

- i. Identify general area of response from the outer most limits driven.
- ii. Also identify response zones for mutual aid
- iii. Identify gaps in response.
- iv. Aid in the development of Fire Zones for response
- v. Assist in the identification of new stations.
- vi. Also identifies needs to move stations to another location, as required.

**Additional Analysis**

**A. Out of Scope Analysis (needs further discussion with client)**

- i. Transition from project to operationally based:
  - Specific distance and travel
  - Based on time of day
  - Based on time of year
  - Call volume
  - Call types
  - Modeling
  - Scripting for batch work

**B. Data Availability**

- i. When data available from clients is detailed enough, it is used.





ii. Not all data is detailed enough, and assumptions are made.

C. Analysis

i. Additional analysis can be performed (as reduction of road speeds to an intersection)

- For above example, identification of intersections can be complex, and data not always available:

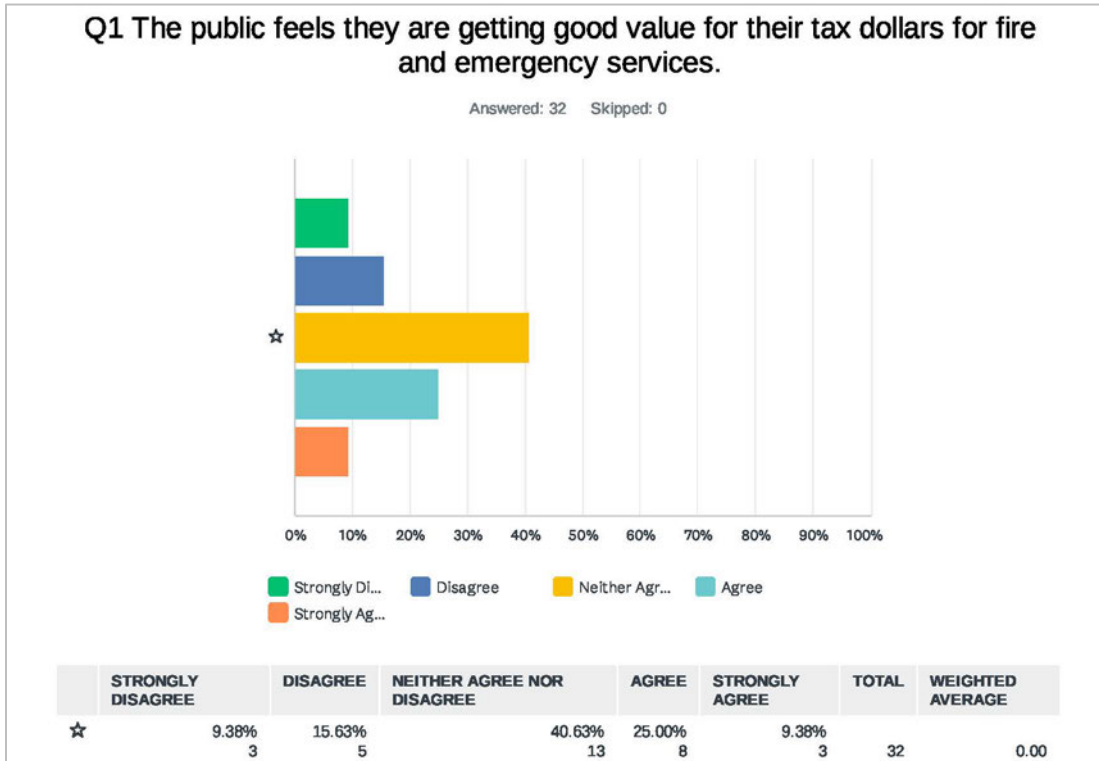
- Stop Sign
- 3-Way Stop
- Yield
- Lights
- Flashing Light

ii. Tends to be time consuming.

- Clients not willing to engage cost of this project.
- Levels of data may not be accessible.
- Missing detail
- Usually is a one-off project and new data being typically not leveraged

## APPENDIX D

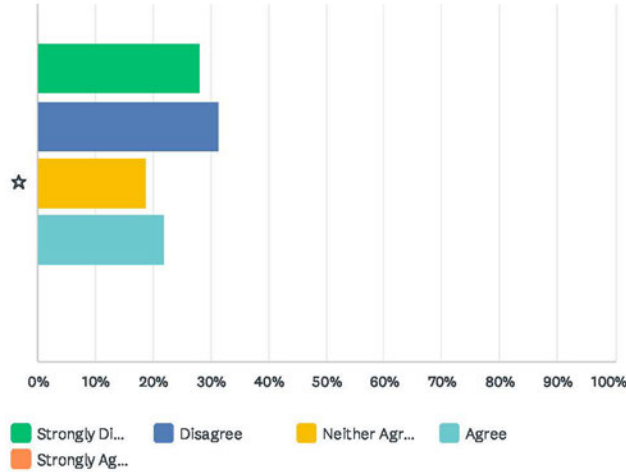
### ONLINE FIREFIGHTER QUESTIONNAIRE RESULTS





**Q2 The public has a good understanding of the fire service and its capabilities.**

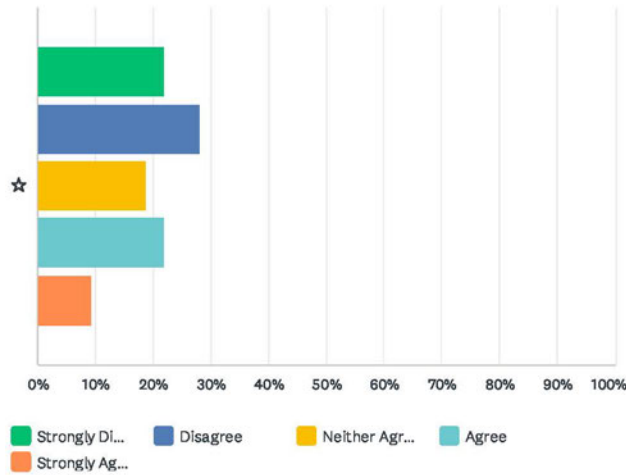
Answered: 32 Skipped: 0



	STRONGLY DISAGREE	DISAGREE	NEITHER AGREE NOR DISAGREE	AGREE	STRONGLY AGREE	TOTAL	WEIGHTED AVERAGE
☆	28.13%	31.25%	18.75%	21.88%	0.00%	32	0.00
	9	10	6	7	0		

**Q3 Your community receives adequate fire/rescue protection.**

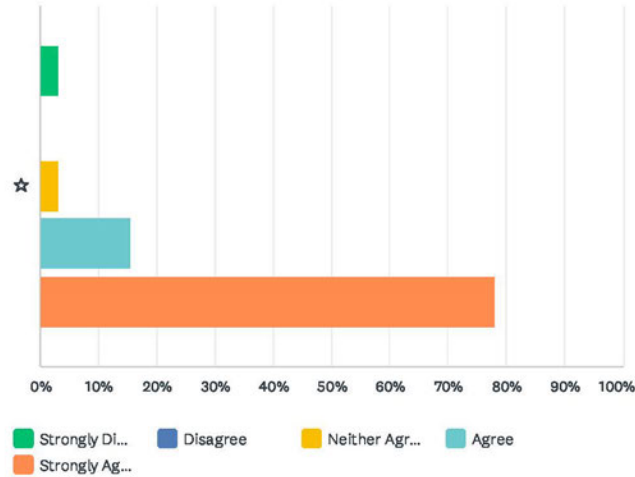
Answered: 32 Skipped: 0



	STRONGLY DISAGREE	DISAGREE	NEITHER AGREE NOR DISAGREE	AGREE	STRONGLY AGREE	TOTAL	WEIGHTED AVERAGE
☆	21.88%	28.13%	18.75%	21.88%	9.38%	32	0.00
	7	9	6	7	3		

**Q4 Based on the rate of community and economic growth, fire service demands will increase in the future.**

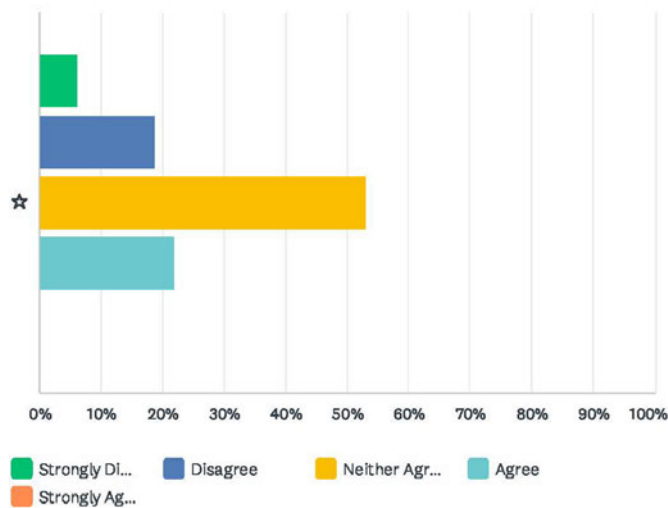
Answered: 32 Skipped: 0



	STRONGLY DISAGREE	DISAGREE	NEITHER AGREE OR DISAGREE	AGREE	STRONGLY AGREE	TOTAL	WEIGHTED AVERAGE
☆	3.13%	0.00%	3.13%	15.63%	78.13%	32	0.00
	1	0	1	5	25		

**Q5 The community has adequate alternate fire risk reduction strategies (e.g. residential sprinklers, FireSmart program, public education).**

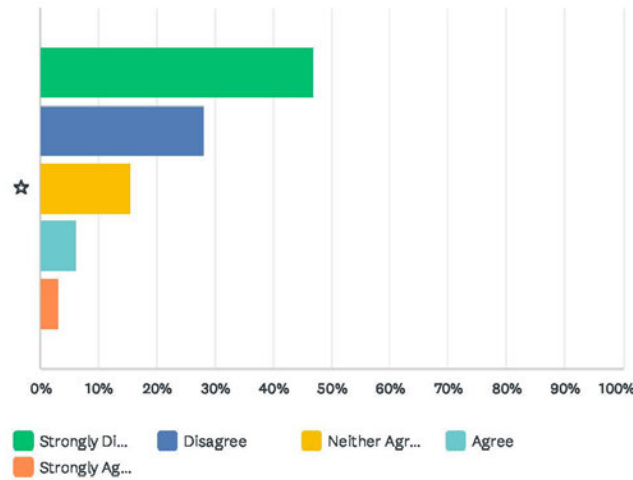
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	STRONGLY DISAGREE	DISAGREE	NEITHER AGREE NOR DISAGREE	AGREE	STRONGLY AGREE	TOTAL	WEIGHTED AVERAGE
☆	6.25%	18.75%	53.13%	21.88%	0.00%	32	0.00
	2	6	17	7	0		

**Q7 The fire service's current response model is adequately staffed for fire/rescue response.**

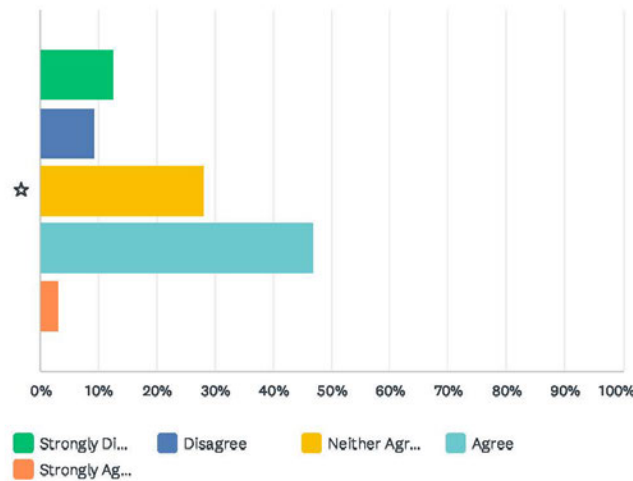
Answered: 32 Skipped: 0



	STRONGLY DISAGREE	DISAGREE	NEITHER AGREE NOR DISAGREE	AGREE	STRONGLY AGREE	TOTAL	WEIGHTED AVERAGE
☆	46.88%	28.13%	15.63%	6.25%	3.13%	32	0.00
	15	9	5	2	1		

**Q8 The fire service's policies/procedures reflect fire/rescue industry best practices.**

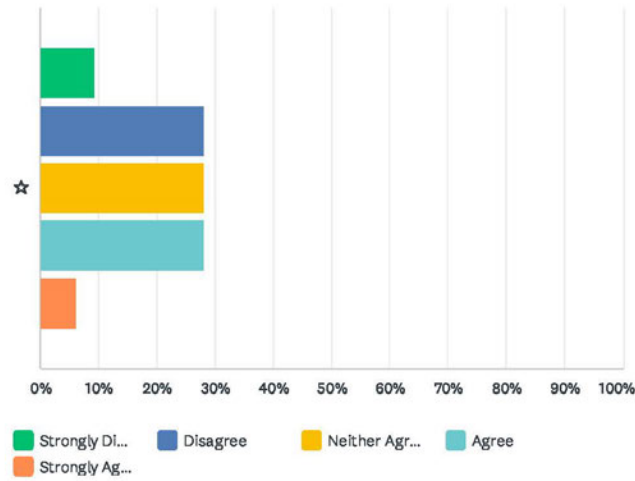
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	STRONGLY DISAGREE	DISAGREE	NEITHER AGREE NOR DISAGREE	AGREE	STRONGLY AGREE	TOTAL	WEIGHTED AVERAGE
☆	12.50%	9.38%	28.13%	46.88%	3.13%	32	0.00
	4	3	9	15	1		

**Q9 Medical responses are over tasking the service's response capacity.**

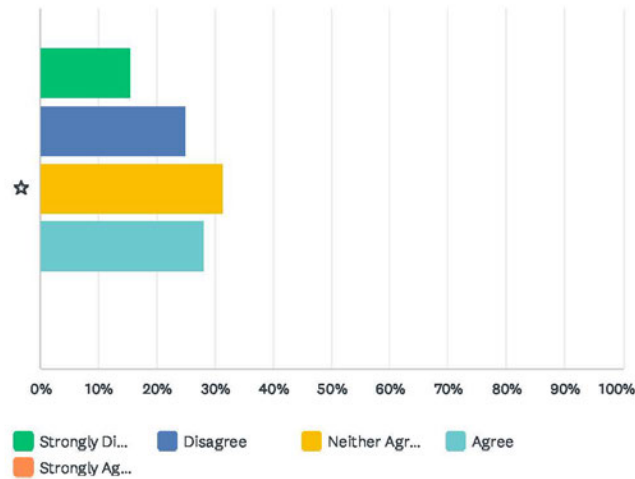
Answered: 32 Skipped: 0



	STRONGLY DISAGREE	DISAGREE	NEITHER AGREE NOR DISAGREE	AGREE	STRONGLY AGREE	TOTAL	WEIGHTED AVERAGE
☆	9.38%	28.13%	28.13%	28.13%	6.25%	32	0.00
	3	9	9	9	2		

**Q11 Your current recruiting program is effective.**

Answered: 32 Skipped: 0

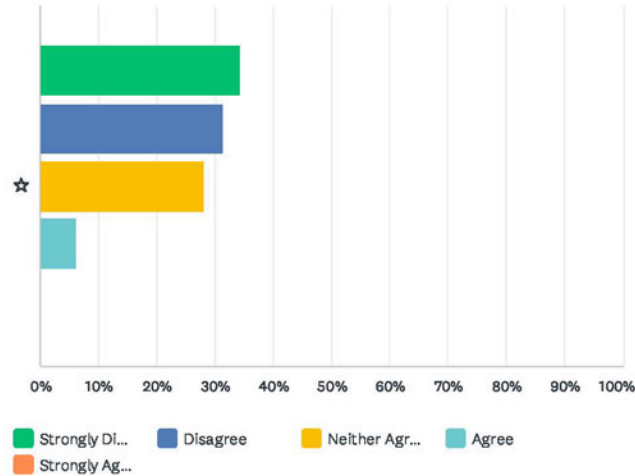


	STRONGLY DISAGREE	DISAGREE	NEITHER AGREE NOR DISAGREE	AGREE	STRONGLY AGREE	TOTAL	WEIGHTED AVERAGE
☆	15.63%	25.00%	31.25%	28.13%	0.00%	32	0.00
	5	8	10	9	0		



**Q12 The current level of live-fire and specialty team training is adequate for the services provided.**

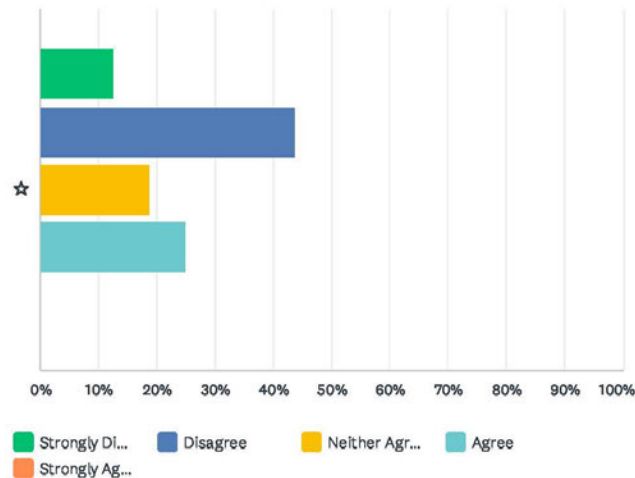
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	STRONGLY DISAGREE	DISAGREE	NEITHER AGREE NOR DISAGREE	AGREE	STRONGLY AGREE	TOTAL	WEIGHTED AVERAGE
☆	34.38% 11	31.25% 10	28.13% 9	6.25% 2	0.00% 0	32	0.00

**Q13 The current level of theoretical fire/rescue or leadership training you receive is adequate.**

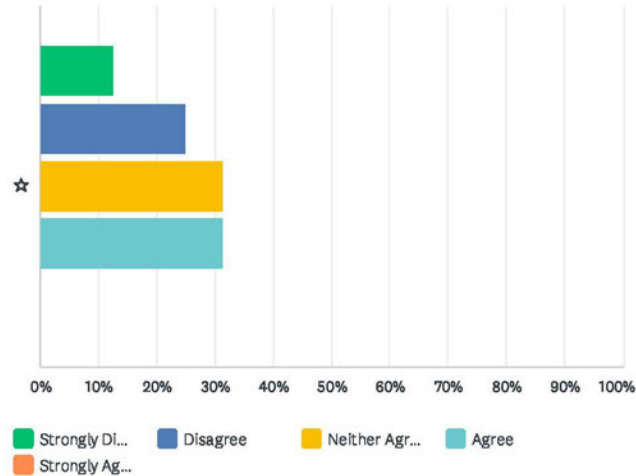
Answered: 32 Skipped: 0



	STRONGLY DISAGREE	DISAGREE	NEITHER AGREE NOR DISAGREE	AGREE	STRONGLY AGREE	TOTAL	WEIGHTED AVERAGE
☆	12.50% 4	43.75% 14	18.75% 6	25.00% 8	0.00% 0	32	0.00

### Q14 You receive adequate training to maintain competencies and certifications.

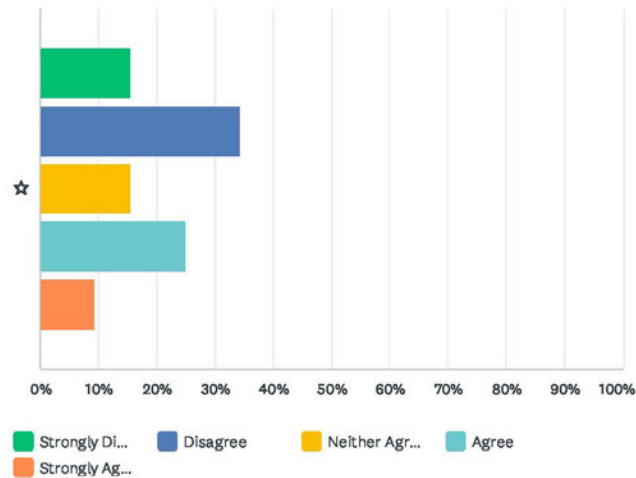
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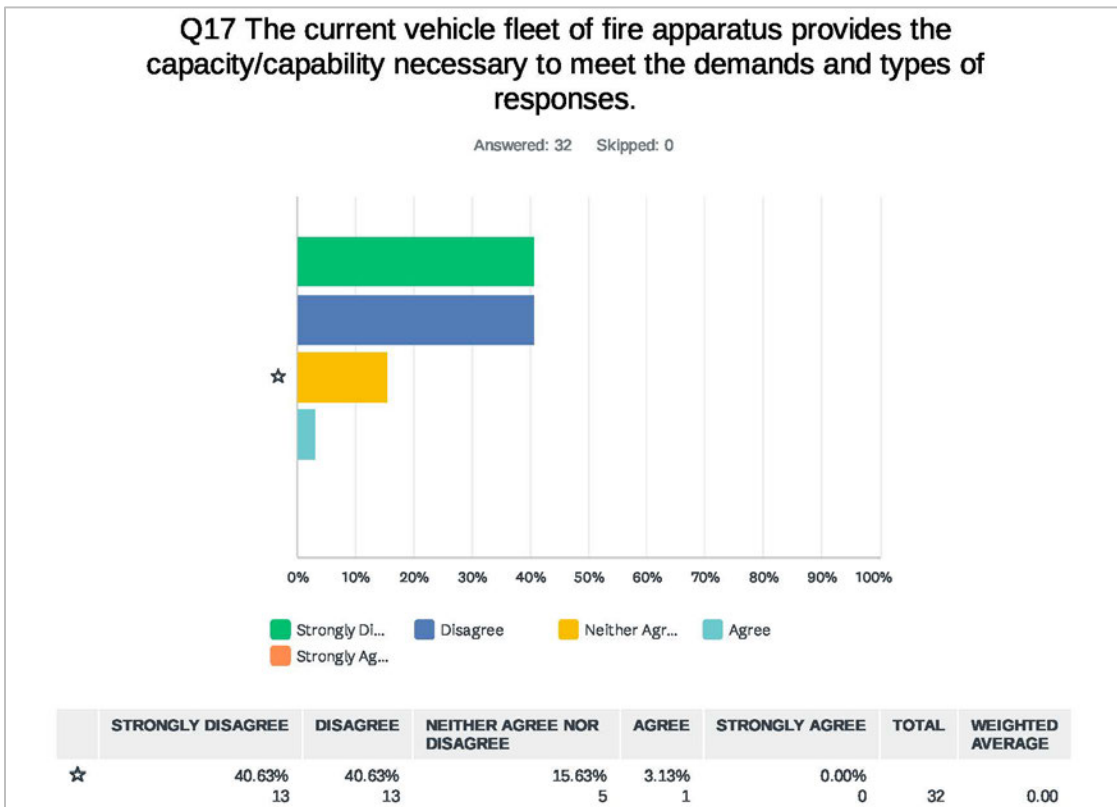
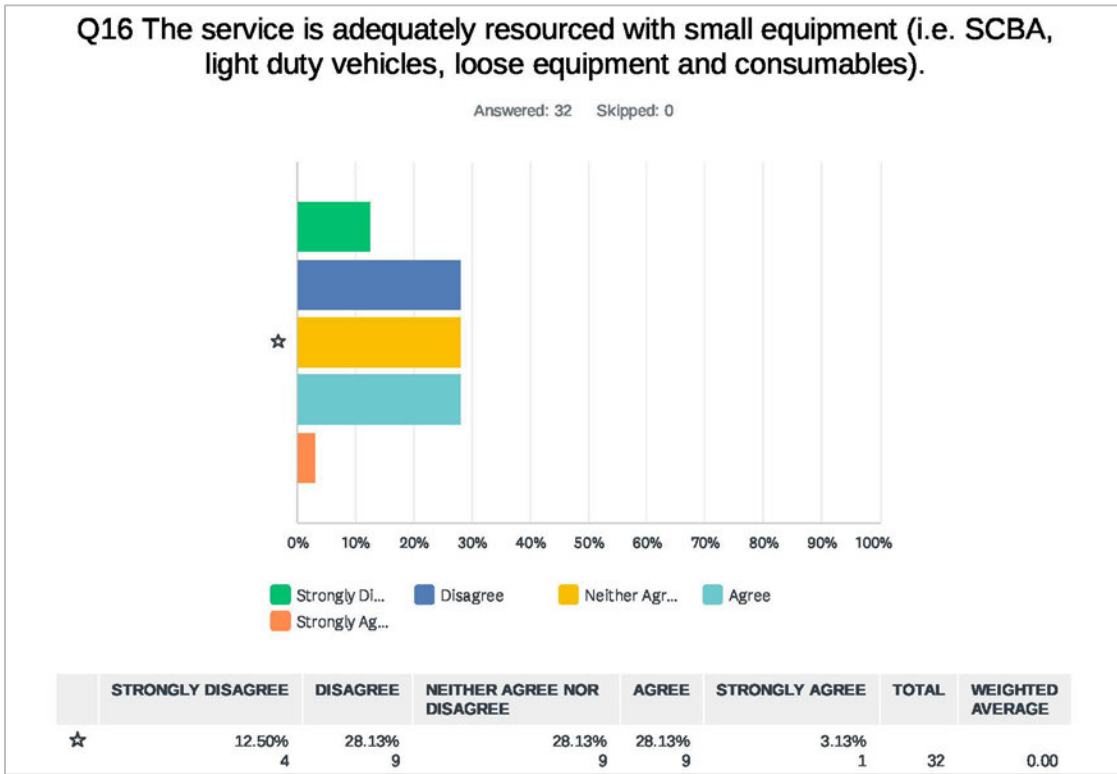
	STRONGLY DISAGREE	DISAGREE	NEITHER AGREE NOR DISAGREE	AGREE	STRONGLY AGREE	TOTAL	WEIGHTED AVERAGE
☆	12.50%	25.00%	31.25%	31.25%	0.00%	32	0.00
	4	8	10	10	0		

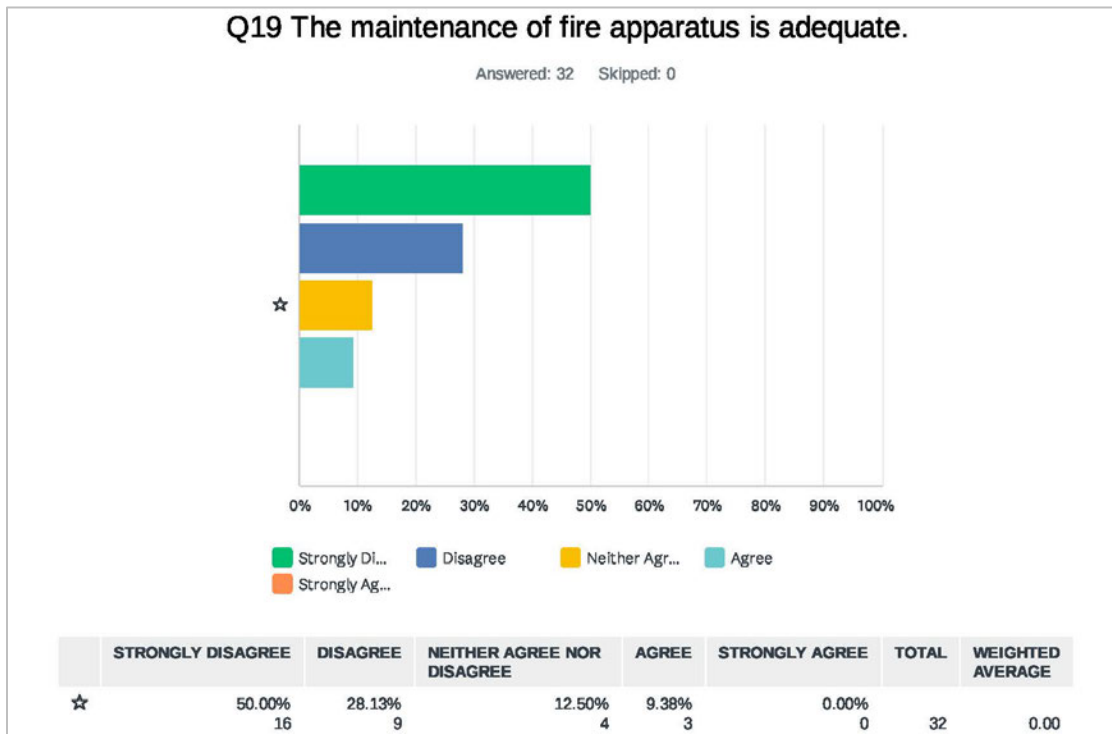
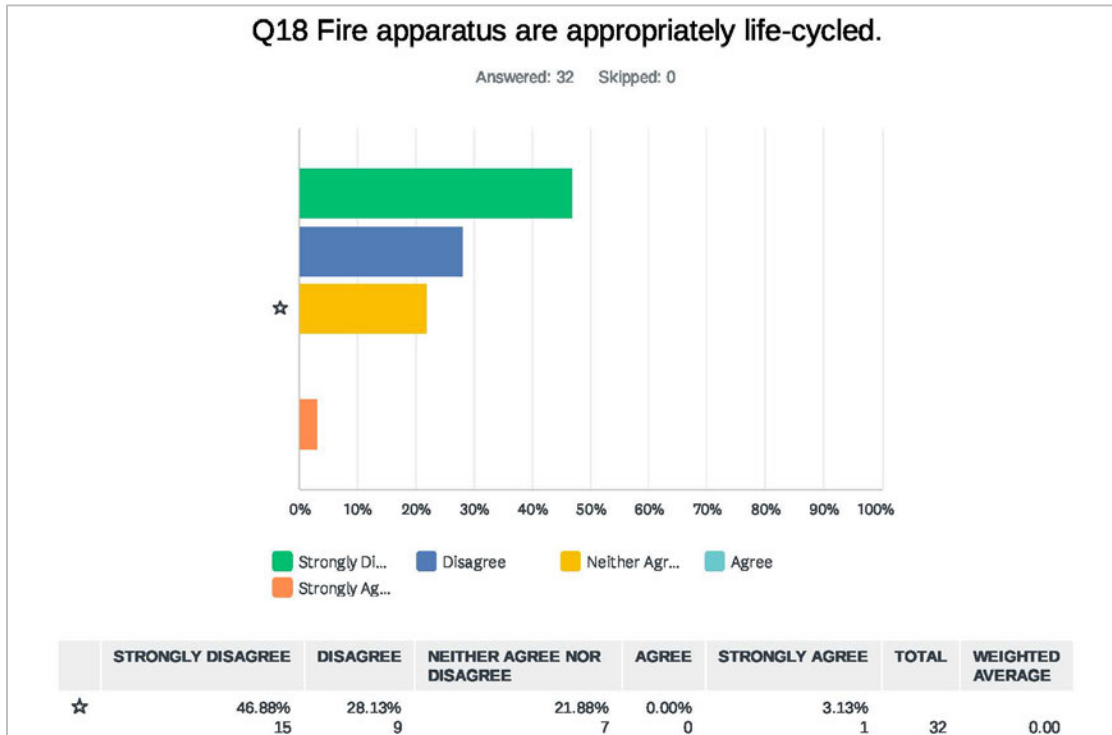
### Q15 Recruits are adequately trained before they are assigned to full duty.

Answered: 32 Skipped: 0



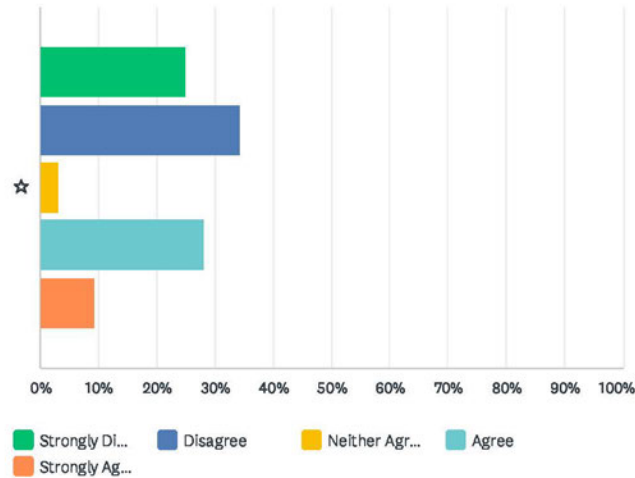
	STRONGLY DISAGREE	DISAGREE	NEITHER AGREE NOR DISAGREE	AGREE	STRONGLY AGREE	TOTAL	WEIGHTED AVERAGE
☆	15.63%	34.38%	15.63%	25.00%	9.38%	32	0.00
	5	11	5	8	3		





**Q20 The current fire station is functional and meet the operational requirements of the department.**

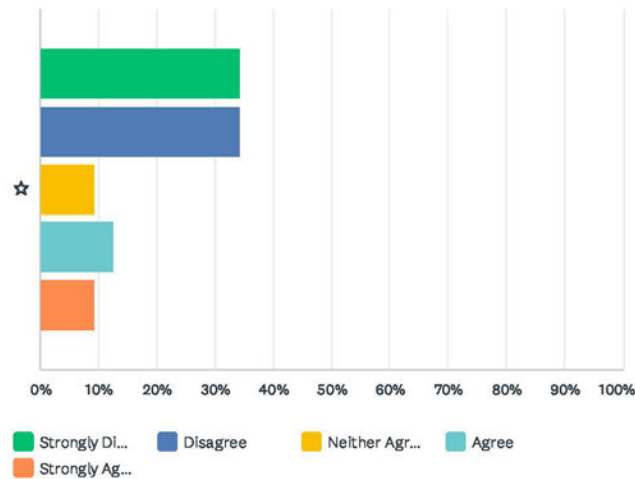
Answered: 32 Skipped: 0



	STRONGLY DISAGREE	DISAGREE	NEITHER AGREE NOR DISAGREE	AGREE	STRONGLY AGREE	TOTAL	WEIGHTED AVERAGE
☆	25.00%	34.38%	3.13%	28.13%	9.38%	32	0.00
	8	11	1	9	3		

**Q21 The current fire station is strategically located for adequate geographic coverage.**

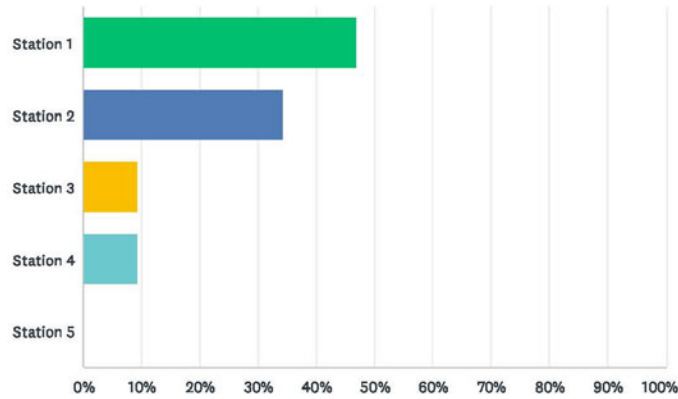
Answered: 32 Skipped: 0



	STRONGLY DISAGREE	DISAGREE	NEITHER AGREE NOR DISAGREE	AGREE	STRONGLY AGREE	TOTAL	WEIGHTED AVERAGE
☆	34.38%	34.38%	9.38%	12.50%	9.38%	32	0.00
	11	11	3	4	3		

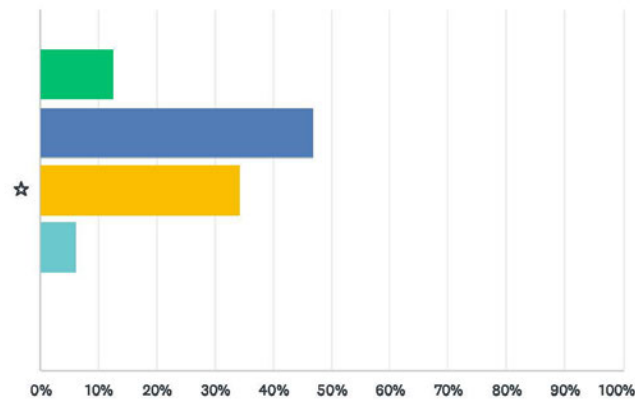
### Q22 Which fire station do you currently operate from?

Answered: 32 Skipped: 0



### Q23 The service keeps pace with leading technology in communications systems.

Answered: 32 Skipped: 0



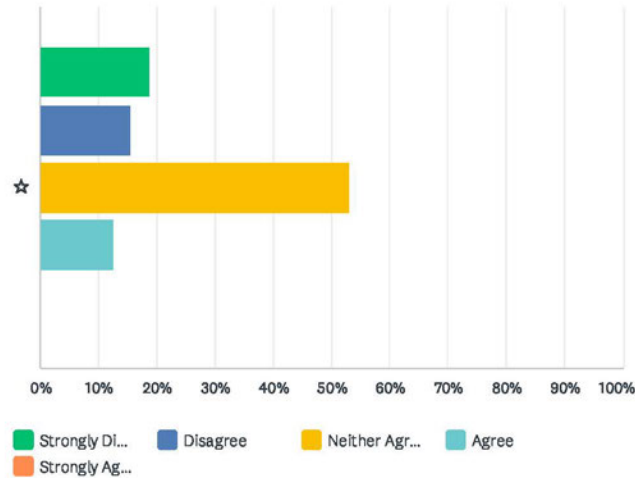
■ Strongly DI... 
 ■ Disagree 
 ■ Neither Agr... 
 ■ Agree 
 ■ Strongly Ag...

	STRONGLY DISAGREE	DISAGREE	NEITHER AGREE NOR DISAGREE	AGREE	STRONGLY AGREE	TOTAL	WEIGHTED AVERAGE
☆	12.50%	46.88%	34.38%	6.25%	0.00%	32	0.00
	4	15	11	2	0		



**Q24 The service keeps pace with leading technology in records management system and mobile CAD systems.**

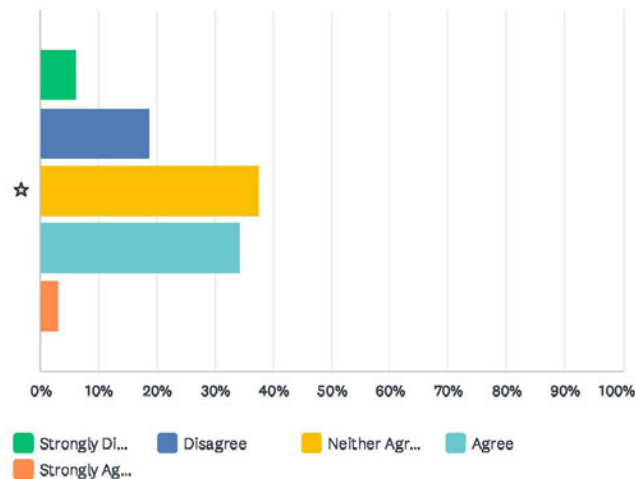
Answered: 32 Skipped: 0



	STRONGLY DISAGREE	DISAGREE	NEITHER AGREE NOR DISAGREE	AGREE	STRONGLY AGREE	TOTAL	WEIGHTED AVERAGE
☆	18.75%	15.63%	53.13%	12.50%	0.00%	32	0.00
	6	5	17	4	0		

**Q25 The service keeps pace with leading technology in station alerting and pre-alerting.**

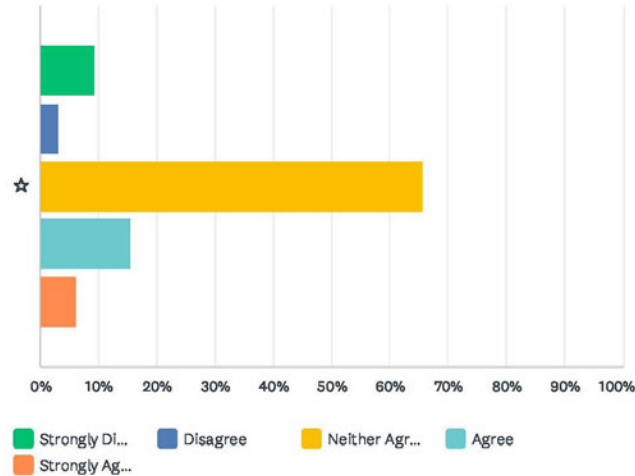
Answered: 32 Skipped: 0



	STRONGLY DISAGREE	DISAGREE	NEITHER AGREE NOR DISAGREE	AGREE	STRONGLY AGREE	TOTAL	WEIGHTED AVERAGE
☆	6.25%	18.75%	37.50%	34.38%	3.13%	32	0.00
	2	6	12	11	1		

**Q26 The service keeps pace with leading technology in records management and fire reporting systems.**

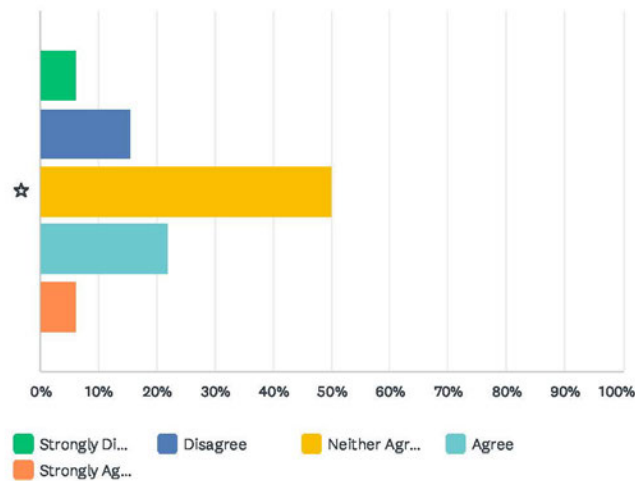
Answered: 32 Skipped: 0



	STRONGLY DISAGREE	DISAGREE	NEITHER AGREE NOR DISAGREE	AGREE	STRONGLY AGREE	TOTAL	WEIGHTED AVERAGE
☆	9.38%	3.13%	65.63%	15.63%	6.25%	32	0.00
	3	1	21	5	2		

**Q27 The service keeps pace with leading technology in online learning management systems (LMS).**

Answered: 32 Skipped: 0

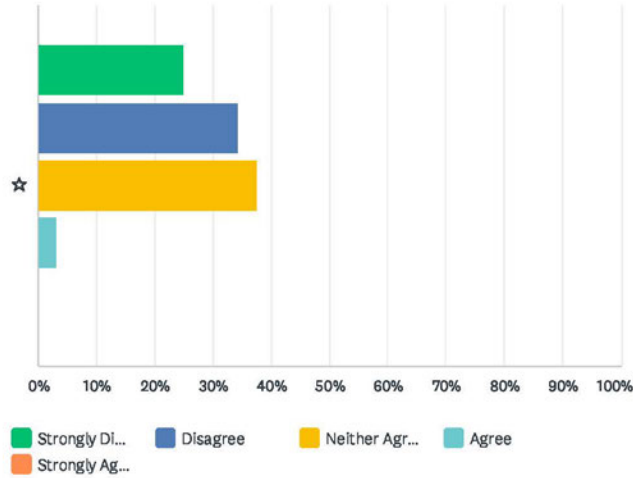


	STRONGLY DISAGREE	DISAGREE	NEITHER AGREE NOR DISAGREE	AGREE	STRONGLY AGREE	TOTAL	WEIGHTED AVERAGE
☆	6.25%	15.63%	50.00%	21.88%	6.25%	32	0.00
	2	5	16	7	2		



**Q28 The service keeps pace with leading technology in traffic pre-emption system.**



Answered: 32 Skipped: 0



	STRONGLY DISAGREE	DISAGREE	NEITHER AGREE NOR DISAGREE	AGREE	STRONGLY AGREE	TOTAL	WEIGHTED AVERAGE
☆	25.00% 8	34.38% 11	37.50% 12	3.13% 1	0.00% 0	32	0.00

## APPENDIX E APPARATUS AND LIGHT DUTY INVENTORY

The proceeding information was supplied by Belleville Fire and Emergency Services. The tank, foam and pump capacity measurements may differ (USG, US IMP, Metric) due to the origin and description of the apparatus.

<b>Station 1</b>			
			
Unit Number:	711	Unit Number:	715
Year/Make:	2011 Spartan Gladiator	Year/Make:	2011 Spartan
Type:	Pumper	Type:	Rescue
Odometer (kms.):	149,231 kms	Odometer (kms.):	85,571 kms
Pump Capacity:	6,020 LPM @ 1,000 KPA	Pump Capacity:	N/A
Tank Capacity: (Water)	2,530 Litres	Tank Capacity: (Water)	N/A
Foam Capacity:	113 Litres	Foam Capacity:	N/A
Delivery Method:	Hale	Delivery Method:	N/A
Usage:	Front Line response for fires, alarms, MVC rescues and medical aid	Usage:	Front Line response

**Station 1**



Unit Number:	716	Unit Number:	Marine 1
Year/Make:	2018 E-One spartan	Year/Make:	Henley
Type:	Ladder	Type:	Rescue
Odometer (kms.):	45,727 kms	Odometer (kms.):	N/A
Pump Capacity:	8,047 LPM @ 1,000 KPA	Pump Capacity:	N/A
Tank Capacity: (Water)	1,150 Litres	Tank Capacity: (Water)	N/A
Foam Capacity:	N/A	Foam Capacity:	N/A
Delivery Method:	N/A	Delivery Method:	N/A
Usage:	Front Line response	Usage:	Water Rescue





Unit Number:	647	Unit Number:	N/A
Year/Make:	2010 Suzuki King Quad	Year/Make:	2002 Wells Cargo Custom Trailer
Type:	ATV (All-terrain Vehicle)	Type:	Air Unit
Usage:	Support	Usage:	Support



**Station 2**



Unit Number:	726	Unit Number:	721
Year/Make:	2018 E-One	Year/Make:	2014 Pierce
Type:	Ladder	Type:	Pumper
Odometer (kms.):	57, 193 kms	Odometer (kms.):	91,684 kms
Pump Capacity:	5,712 LPM @ 1,000 KPA	Pump Capacity:	6,053 LPM @ 1,000 KPA
Tank Capacity: (Water)	1,779 Litres	Tank Capacity: (Water)	2441 Litres
Foam Capacity:	N/A	Foam Capacity:	113 Litres
Delivery Method:	N/A	Delivery Method:	Husky
Usage:	Front Line response	Usage:	Front Line response

**Station 3**



Unit Number:	631	Unit Number:	635
Year/Make:	2007 Rosenbauer	Year/Make:	1998 Almonte
Type:	Pumper	Type:	Rescue
Odometer (kms.):	51,330 kms	Odometer (kms.):	62,353 kms
Pump Capacity:	6,038 LPM @ 1,000 KPA	Pump Capacity:	N/A
Tank Capacity: (Water)	7,176 Litres	Tank Capacity: (Water)	N/A
Foam Capacity:	113 Litres	Foam Capacity:	N/A
Delivery Method:	Foam Pro	Delivery Method:	N/A
Usage:	Front Line response	Usage:	Front Line response



Unit Number:	633	Unit Number:	Marine 3
Year/Make:	2010 Rosenbauer	Year/Make:	2022 King Fisher
Type:	Tanker	Type:	Rescue Boat
Odometer (kms.):	10,917 kms	Odometer (kms.):	N/A
Pump Capacity:	6,000 LPM @ 1,000 KPA	Pump Capacity:	N/A
Tank Capacity: (Water)	9,783 Litres	Tank Capacity: (Water)	N/A
Foam Capacity:	113 Litres	Foam Capacity:	N/A
Delivery Method:	Foam Pro	Delivery Method:	N/A
Usage:	Front Line response	Usage:	Water Rescue

**Station 4**



Unit Number:	641	Unit Number:	645
Year/Make:	2007 Rosenbauer	Year/Make:	2002 Thibault
Type:	Pumper	Type:	Rescue
Odometer (kms.):	67,606 kms	Odometer (kms.):	64,550 kms
Pump Capacity:	6,038 LPM @ 1,000 KPA	Pump Capacity:	N/A
Tank Capacity: (Water)	7,466 Litres	Tank Capacity: (Water)	N/A
Foam Capacity:	113 Litres	Foam Capacity:	N/A
Delivery Method:	Foam Pro	Delivery Method:	N/A
Usage:	Front Line response	Usage:	Front Line response



Unit Number:	643	Unit Number:	644
Year/Make:	2010 Rosenbauer	Year/Make:	2017 Thibault
Type:	Tanker	Type:	Tanker
Odometer (kms.):	43,046 kms	Odometer (kms.):	15,430 kms
Pump Capacity:	3,974 LPM @ 1,000 KPA	Pump Capacity:	4,732 LPM @ 1,000 KPA
Tank Capacity: (Water)	3,823 Litres	Tank Capacity: (Water)	8,202 Litres
Foam Capacity:	113 Litres	Foam Capacity:	N/A
Delivery Method:	Rosenbauer	Delivery Method:	N/A
Usage:	Front Line response	Usage:	Front Line response

**Station 5**



Unit Number:	651
Year/Make:	2013 Rosenbauer
Type:	Pumper/Tanker
Odometer (kms.):	20,337 kms
Pump Capacity:	5,078 LPM @ 1,000 KPA
Tank Capacity: (Water)	5,688 Litres
Foam Capacity:	113 Litres
Delivery Method:	Rosenbauer
Usage:	Front Line response



**Light Vehicles**



Unit Number:	761
Year/Make:	2019 Ford
Type:	F150
Odometer (kms.):	38,667 kms
Usage:	Fire Prevention

Unit Number:	762
Year/Make:	2019 Ford
Type:	F150
Odometer (kms.):	68,140 kms
Usage:	Fire prevention



Unit Number:	763
Year/Make:	2011 Chevrolet
Type:	Silverado
Odometer (kms.):	107,826 kms
Usage:	Fire Prevention

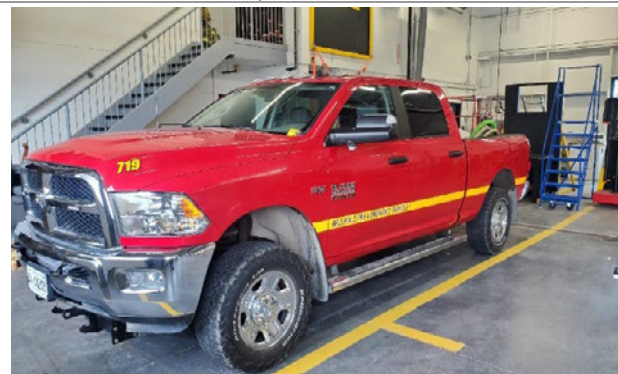
Unit Number:	764
Year/Make:	2011 Chevrolet
Type:	Silverado
Odometer (kms.):	110,833 kms
Usage:	Fire Prevention

**Light Vehicles**



Unit Number:	765
Year/Make:	2011 Chevrolet
Type:	Silverado
Odometer (kms.):	145,945 kms
Usage:	Fire Prevention

Unit Number:	771
Year/Make:	2013 Ford
Type:	F150
Odometer (kms.):	142,238 kms
Usage:	Training



Unit Number:	Pickup 1
Year/Make:	2016 Chevrolet
Type:	Silverado
Odometer (kms.):	181,792 kms
Usage:	Light Duty Support

Unit Number:	719
Year/Make:	2018 Dodge
Type:	Ram 3500
Odometer (kms.):	13,317 kms
Usage:	Light duty support



**Light Vehicles**



Unit Number:	Pickup 3	Unit Number:	Pickup 2
Year/Make:	2016 Chevrolet	Year/Make:	2019 Ford
Type:	Silverado	Type:	F150
Odometer (kms.):	121,735 kms	Odometer (kms.):	107,254 kms
Usage:	Light Duty Support	Usage:	Light Duty Support



Unit Number:	659
Year/Make:	2022/Ford
Type:	F250
Odometer (kms.):	3,522 kms
Pump Capacity:	N/A
Tank Capacity: (Water)	N/A
Foam Capacity:	N/A
Delivery Method:	N/A
Usage:	Light Duty Support

**Reserve Vehicles**



Unit Number:	712	Unit Number:	722
Year/Make:	2003 Smeal	Year/Make:	1991 E-One
Type:	Pumper	Type:	Pumper
Odometer (kms.):	183,124 kms	Odometer (kms.):	
Pump Capacity:	8000 lpm @1000 KPA	Pump Capacity:	
Tank Capacity: (Water)	1,892 Litres	Tank Capacity: (Water)	
Foam Capacity:	113 Litres	Foam Capacity:	
Delivery Method:	Foam Pro	Delivery Method:	
Usage:	Reserve Unit	Usage:	<b>Out-of-Service</b>



## APPENDIX F

# NATIONAL FIRE PROTECTION ASSOCIATION TRAINING STANDARDS FOR FIRE PROTECTION SERVICES

The following list of NFPA standards is offered as a general guideline for NFPA training standards aligned with most fire department positions.

### Deputy Fire Chief and Fire Chief

- NFPA 472 (1072) DG Operations
- NFPA 1001 Firefighter (Level 2)
- NFPA 1002 Pump Operator
- NFPA 1051
- National Fire Protection Association 1021 Fire Officer (Level 2)
- NFPA 1041 Instructor (Level 2)
- NFPA 1403 Standard on Live Fire Training Evolutions
- NFPA 1521 Incident Safety Officer
- ICS 300/400 preferred.

### Captain

- NFPA 472 DG Operations
- NFPA 1001 Firefighter (Level 2)
- NFPA 1002 Pump Operator
- NFPA 1051
- NFPA 1006 Vehicle Extrication
- Water and Ice Rescue
- Boat Operator
- National Fire Protection Association 1021 Fire Officer (Level 1)
- NFPA 1041 Instructor (Level 1)
- NFPA 1403 Standard on Live Fire Training Evolutions
- NFPA 1521 Incident Safety Officer
- ICS 200/300 preferred.

### Senior Firefighter

- NFPA 472 DG Operations
- NFPA 1001 Firefighter (Level 2)
- NFPA 1002 Pump Operator
- NFPA 1006 Vehicle Extrication
- NFPA 1051
- National Fire Protection Association 1021 Fire Officer (Level 1)
- NFPA 1041 Instructor (Level 1)



- *Water and Ice Rescue*
- *Boat Operator*
- *ICS 200*

*Firefighter*

- *NFPA 472 DG Operations*
- *NFPA 1001 Firefighter (Level 2)*
- *NFPA 1002 Driver/Pump Operator*
- *NFPA 1051*
- *NFPA 1006 Vehicle Extrication*
- *Water and Ice Rescue*
- *Boat Operator*
- *ICS 100/200 preferred.*

*Apparatus Operator*

- *NFPA 472 DG Operations*
- *NFPA 1001 Firefighter (Level 2)*
- *NFPA 1002 Driver/Pump Operator*
- *NFPA 1002 Aerial Operator*
- *NFPA 1051*
- *NFPA 1006 Vehicle Extrication*
- *Water and Ice Rescue*
- *Boat Operator*
- *ICS 100/200 preferred.*

*Training Officer*

- *NFPA 1041 Instructor (Level 2)*
- *All Qualifications required to instruct firefighters and recruits.*
- *NFPA 1403 Standard on Live Fire Training Evolutions*
- *ICS 200/300 preferred.*

*Safety Officer (if separately designated)*

- *NFPA 1521 Incident Safety Officer*
- *NFPA 1051*
- *NFPA 1403 Standard on Live Fire Training Evolutions*
- *ICS 200/300 preferred.*

*Fire Prevention Officer*

- *NFPA 1730 Standard on Organization and Deployment of Fire Prevention Inspection and Code Enforcement, Plan Review, Investigation, and Public Education Operations*

*Fire Investigator (if separately designated)*

*NFPA 1033 Standard for Professional Qualifications for Fire Investigator*



Item	Column 1 Fire protection service	Column 2 Minimum Certification Standard	Column 3 Compliance Deadline
1.	Firefighter Exterior Attack: Fire suppression operations from the exterior of the building only.	<p>The following job performance requirements of NFPA 1001, “Standard for Fire Fighter Professional Qualifications”, 2019 Edition, Chapter 4 (Firefighter I) and Chapter 5 (Firefighter II):</p> <p>4.1, 4.2, 4.3.1, 4.3.2, 4.3.3, 4.3.6, 4.3.7, 4.3.8, 4.3.10 (A1-A9, B1-B3, B4 (exterior stairway), B5-B10), 4.3.15, 4.3.16, 4.3.17, 4.3.18, 4.3.19, 4.3.20, 4.3.21, 4.5</p> <p>5.1, 5.2, 5.3.1, 5.3.2 (A1-A4), 5.3.3, 5.3.4, 5.4.2, 5.5.3, 5.5.4, 5.5.5</p>	July 1, 2026
2.	Firefighter Exterior Attack and auto extrication: Fire suppression operations from the exterior of the building only and auto extrication rescue.	<p>All job performance requirements in item 1 and the following job performance requirements of NFPA 1001, “Standard for Fire Fighter Professional Qualifications”, 2019 Edition, Chapter 5 (Firefighter II):</p> <p>5.4.1</p>	July 1, 2026
3.	Firefighter Exterior Attack and hazardous materials response: Fire suppression operations from the exterior of the building only and Operations-level hazardous materials response.	<p>All job performance requirements in item 1, all job performance requirements of NFPA 1072, “Standard for Hazardous Materials/Weapons of Mass Destruction Emergency Response Personnel Professional Qualifications”, 2017 Edition, Chapter 5 (Operations) and the following job performance requirements of Chapter 6 (Operations Mission Specific):</p> <p>6.2 and 6.6</p>	July 1, 2026



Item	Column 1 Fire protection service	Column 2 Minimum Certification Standard	Column 3 Compliance Deadline
4.	Firefighter Exterior Attack, auto extrication and hazardous materials response: Fire suppression operations from the exterior of the building only, automobile extrication rescue and Operations-level hazardous materials response.	All job performance requirements in items 1, 2 and 3.	July 1, 2026
5.	Firefighter Interior Attack: Fire suppression operations that enter the interior of the building and can perform rescue.	All job performance requirements in item 1 and the following job performance requirements of NFPA 1001, "Standard for Fire Fighter Professional Qualifications", 2019 Edition, Chapter 4 (Firefighter I) and Chapter 5 (Firefighter II):  4.3.4, 4.3.9, 4.3.10 (A10-A11, B4 (interior stairway), B11), 4.3.11, 4.3.12, 4.3.13, 4.3.14  5.3.2 (A5-A9, B1-B6)	July 1, 2026
6.	Firefighter Interior Attack and auto extrication: Fire suppression operations that enter the interior of the building and can perform rescue and automobile extrication rescue.	All job performance requirements in item 5 and the following job performance requirements of NFPA 1001, "Standard for Fire Fighter Professional Qualifications", 2019 Edition, Chapter 5 (Firefighter II):  5.4.1	July 1, 2026





Item	Column 1 Fire protection service	Column 2 Minimum Certification Standard	Column 3 Compliance Deadline
7.	Firefighter Interior Attack and hazardous materials response: Fire suppression operations that enter the interior of the building and Operations-level hazardous materials response.	All job performance requirements in item 5, all job performance requirements of NFPA 1072, “Standard for Hazardous Materials/Weapons of Mass Destruction Emergency Response Personnel Professional Qualifications”, 2017 Edition, Chapter 5 (Operations) and the following job performance requirements of Chapter 6 (Operations Mission Specific): 6.2 and 6.6	July 1, 2026
8.	Firefighter Interior Attack, auto extrication and hazardous materials response: Fire suppression operations that enter the interior of the building and can perform rescue, automobile extrication rescue and Operations- level hazardous materials response (full-service firefighter).	All job performance requirements of NFPA 1001, “Standard for Fire Fighter Professional Qualifications”, 2019 Edition, Chapter 5 (Firefighter II).	July 1, 2026
9.	Team Lead Exterior Attack: Supervision of firefighters that provide fire suppression operations from the exterior of the building only.	All job performance requirements in item 1 and the following job performance requirements of NFPA 1021, “Standard for Fire Officer Professional Qualifications”, 2020 edition, Chapter 4 (Fire Officer I):  4.1.1, 4.2.1, 4.2.2, 4.2.3, 4.2.4, 4.4.1, 4.4.2, 4.4.4, 4.4.5, 4.5.3, 4.6, 4.7.1, 4.7.3	July 1, 2026



Item	Column 1 Fire protection service	Column 2 Minimum Certification Standard	Column 3 Compliance Deadline
10.	Team Lead Exterior Attack and auto extrication: Supervision of firefighters that provide fire suppression operations from the exterior of the building only or that provide auto extrication rescue.	All job performance requirements in item 2 and the following job performance requirements of NFPA 1021, "Standard for Fire Officer Professional Qualifications", 2020 edition, Chapter 4 (Fire Officer I):  4.1.1, 4.2.1, 4.2.2, 4.2.3, 4.2.4, 4.4.1, 4.4.2, 4.4.4, 4.4.5, 4.5.3, 4.6, 4.7.1, 4.7.3	July 1, 2026
11.	Team Lead Exterior Attack and hazardous materials response: Supervision of firefighters that provide fire suppression operations from the exterior of the building only or that provide Operations- level hazardous materials response.	All job performance requirements in item 3 and the following job performance requirements of NFPA 1021, "Standard for Fire Officer Professional Qualifications", 2020 edition, Chapter 4 (Fire Officer I):  4.1.1, 4.2.1, 4.2.2, 4.2.3, 4.2.4, 4.4.1, 4.4.2, 4.4.4, 4.4.5, 4.5.3, 4.6, 4.7.1, 4.7.3	July 1, 2026
12.	Team Lead Exterior Attack, auto extrication and hazardous materials: Supervision of firefighters that provide fire suppression operations from the exterior of the building only or that provide automobile extrication rescue or Operations-level hazardous materials response.	All job performance requirements in item 4, and the following job performance requirements of NFPA 1021, "Standard for Fire Officer Professional Qualifications", 2020 edition, Chapter 4 (Fire Officer I):  4.1.1, 4.2.1, 4.2.2, 4.2.3, 4.2.4, 4.4.1, 4.4.2, 4.4.4, 4.4.5, 4.5.3, 4.6, 4.7.1, 4.7.3	July 1, 2026



Item	Column 1 Fire protection service	Column 2 Minimum Certification Standard	Column 3 Compliance Deadline
13.	Team Lead Interior Attack: Supervision of firefighters that provide fire suppression operations from the interior of the building and can perform rescue.	All job performance requirements in item 5 and the following job performance requirements of NFPA 1021, "Standard for Fire Officer Professional Qualifications", 2020 edition, Chapter 4 (Fire Officer I):  4.1.1, 4.2.1, 4.2.2, 4.2.3, 4.2.4, 4.4.1, 4.4.2, 4.4.4, 4.4.5, 4.5.3, 4.6, 4.7.1, 4.7.3	July 1, 2026
14.	Team Lead Interior Attack and auto extrication: Supervision of firefighters that provide fire suppression operations from the interior of the building and can perform rescue or that provide automobile extrication rescue.	All job performance requirements in item 6 and the following job performance requirements of NFPA 1021, "Standard for Fire Officer Professional Qualifications", 2020 edition, Chapter 4 (Fire Officer I):  4.1.1, 4.2.1, 4.2.2, 4.2.3, 4.2.4, 4.4.1, 4.4.2, 4.4.4, 4.4.5, 4.5.3, 4.6, 4.7.1, 4.7.3	July 1, 2026
15.	Team Lead Interior Attack and hazardous materials response: Supervision of firefighters that provide fire suppression operations from the interior of the building and can perform rescue or that provide Operations-level hazardous materials response.	All job performance requirements in item 7 and the following job performance requirements of NFPA 1021, "Standard for Fire Officer Professional Qualifications", 2020 edition, Chapter 4 (Fire Officer I):  4.1.1, 4.2.1, 4.2.2, 4.2.3, 4.2.4, 4.4.1, 4.4.2, 4.4.4, 4.4.5, 4.5.3, 4.6, 4.7.1, 4.7.3	July 1, 2026



Item	Column 1 Fire protection service	Column 2 Minimum Certification Standard	Column 3 Compliance Deadline
16.	Team Lead Interior Attack, auto extrication and hazardous materials response: Supervision of firefighters that provide fire suppression operations from the interior of the building and can perform rescue or that provide automobile extrication rescue or Operations-level hazardous materials response (full-service fire officer).	All job performance requirements of NFPA 1021 “Standard for Fire Officer Professional Qualifications”, 2020 edition, Chapter 4 (Fire Officer I).	July 1, 2026
17.	Pump Operations: Operation of a pumper apparatus without driving the apparatus, or where the apparatus does not require a class D licence.	All job performance requirements of NFPA 1002, “Standard for Fire Apparatus Driver/Operator Professional Qualifications”, 2017 Edition, Chapter 5 (Apparatus Equipped with Fire Pump), without pre-requisites in Chapter 4.	July 1, 2026
18.	Pump Operations: driver: Driving and operating a pumper apparatus that requires a class D licence.	All job performance requirements in NFPA 1002 “Standard for Fire Apparatus Driver/Operator Professional Qualifications”, 2017 Edition, Chapter 5 (Apparatus Equipped with Fire Pump).	July 1, 2026
19.	Fire Prevention/Inspection Level I: conducting fire and life safety inspections.	All job performance requirements of NFPA 1031, “Standard for Professional Qualifications for Fire Inspector and Plan Examiner”, 2014 Edition, Chapter 4 (Fire Inspector I).	July 1, 2026
20.	Fire Prevention/Inspection Level II: conducting fire and life safety inspections including in facilities that store, handle, or use flammable/combustible liquids.	All job performance requirements in item 19 and NFPA 1031, “Standard for Professional Qualifications for Fire Inspector and Plan Examiner”, 2014 Edition, Chapter 5 (Fire Inspector II).	July 1, 2026



Item	Column 1 Fire protection service	Column 2 Minimum Certification Standard	Column 3 Compliance Deadline
21.	Fire Investigator: conducting fire cause and origin investigations.	All job performance requirements of NFPA 1033, "Professional Qualifications for Fire Investigator", 2014 Edition, Chapter 4 (Fire Investigator).	July 1, 2026
22.	Fire and Life Safety Educator: providing fire and life safety education.	All job performance requirements of NFPA 1035, "Standard on Fire and Life Safety Educator, Public Information Officer, Youth Firesetter Intervention Specialist, and Youth Firesetter Program Manager Professional Qualifications", 2015 Edition, Chapter 4 (Fire and Life Safety Educator I).	July 1, 2026
23.	Training Officer Level I: providing training and education to other fire personnel.	All job performance requirements of NFPA 1041, "Standard for Fire and Emergency Services Instructor Professional Qualifications", 2019 Edition, Chapter 4 (Fire and Emergency Services Instructor I).	July 1, 2026
24.	Training Officer Level II: providing training and education to other fire personnel including lead instructor roles at live fire and above or below grades technical rescue practical training.	All job performance requirements in item 23 and NFPA 1041, "Standard for Fire and Emergency Services Instructor Professional Qualifications", 2019 Edition, Chapter 5 (Fire and Emergency Services Instructor II).	July 1, 2026
25.	Emergency Communicators Level I: taking emergency calls.	All job performance requirements of NFPA 1061, "Standard for Public Safety Telecommunications Personnel Professional Qualifications", 2018 Edition, Chapter 4 (Public Safety Telecommunicator I).	July 1, 2026
26.	Emergency Communicators Level II: taking emergency calls and dispatching emergency vehicles.	All job performance requirements in item 25 and NFPA 1061, "Standard for Public Safety Telecommunications Personnel Professional Qualifications", 2018 Edition, Chapter 5 (Public Safety Telecommunicator II).	July 1, 2026



Item	Column 1 Fire protection service	Column 2 Minimum Certification Standard	Column 3 Compliance Deadline
27.	Incident Safety Officers: undertaking the primary role of incident safety officer at emergency calls.	All job performance requirements of NFPA 1521, “Standard for Fire Department Safety Officer Professional Qualifications”, 2020 Edition, Chapter 5 (Incident Safety Officer).	July 1, 2026
28.	Hazardous Materials Response — Operations Mission Specific Level: responding to emergencies involving hazardous materials at the Operations Mission Specific Level.	All job performance requirements of NFPA 1072, “Standard for Hazardous Materials/Weapons of Mass Destruction Emergency Response Personnel Professional Qualifications”, 2017 Edition, Chapter 6 (Operations Mission Specific)	July 1, 2026
29.	Hazardous Materials Response — Technician Level: responding to emergencies involving hazardous materials at the Technician Level.	All job performance requirements of NFPA 1072, “Standard for Hazardous Materials/Weapons of Mass Destruction Emergency Response Personnel Professional Qualifications”, 2017 Edition, Chapter 7 (Hazardous Materials Technician).	July 1, 2026
30.	Rope Rescue — Operations: rope rescue at the Operations Level.	The following job performance requirements of NFPA 1006, “Standard for Technical Rescue Personnel Professional Qualifications”, 2021 Edition, Chapter 5 (Rope Rescue) (Operations):  5.2	July 1, 2028
31.	Rope Rescue — Technician: rope rescue at the Technician Level.	The following job performance requirements of NFPA 1006, “Standard for Technical Rescue Personnel Professional Qualifications”, 2021 Edition, Chapter 5 (Rope Rescue) (Technician):  5.3	July 1, 2028





Item	Column 1 Fire protection service	Column 2 Minimum Certification Standard	Column 3 Compliance Deadline
32.	Structural Collapse — Operations: structural collapse rescue at the Operations Level.	The following job performance requirements of NFPA 1006, “Standard for Technical Rescue Personnel Professional Qualifications”, 2021 Edition, Chapter 6 (Structural Collapse Rescue) (Operations):  6.2	July 1, 2028
33.	Structural Collapse — Technician: structural collapse rescue at the Technician Level.	The following job performance requirements of NFPA 1006, “Standard for Technical Rescue Personnel Professional Qualifications”, 2021 Edition, Chapter 6 (Structural Collapse Rescue) (Technician):  6.3	July 1, 2028
34.	Confined Space — Operations: confined space rescue at the Operations Level.	The following job performance requirements of NFPA 1006, “Standard for Technical Rescue Personnel Professional Qualifications”, 2021 Edition, Chapter 7 (Confined Space Rescue) (Operations):  7.2	July 1, 2028
35.	Confined Space — Technician: confined space rescue at the Technician Level.	The following job performance requirements of NFPA 1006, “Standard for Technical Rescue Personnel Professional Qualifications”, 2021 Edition, Chapter 7 (Confined Space Rescue) (Technician):  7.3	July 1, 2028



Item	Column 1 Fire protection service	Column 2 Minimum Certification Standard	Column 3 Compliance Deadline
36.	Trench Rescue — Operations: trench rescue at the Operations Level.	The following job performance requirements of NFPA 1006, “Standard for Technical Rescue Personnel Professional Qualifications”, 2021 Edition, Chapter 12 (Trench Rescue) (Operations):  12.2	July 1, 2028
37.	Trench Rescue — Technician: trench rescue at the Technician Level.	The following job performance requirements of NFPA 1006, “Standard for Technical Rescue Personnel Professional Qualifications”, 2021 Edition, Chapter 12 (Trench Rescue) (Technician):  12.3	July 1, 2028
38.	Surface Water Rescue — Operations: surface water rescue at the Operations Level.	The following job performance requirements of NFPA 1006, “Standard for Technical Rescue Personnel Professional Qualifications”, 2021 Edition, Chapter 17 (Surface Water Rescue) (Operations):  17.2	July 1, 2028
39.	Surface Water Rescue — Technician: surface water rescue at the Technician Level.	The following job performance requirements of NFPA 1006, “Standard for Technical Rescue Personnel Professional Qualifications”, 2021 Edition, Chapter 17 (Surface Water Rescue) (Technician):  17.3	July 1, 2028



Item	Column 1 Fire protection service	Column 2 Minimum Certification Standard	Column 3 Compliance Deadline
40.	Swift Water Rescue — Operations: swift water rescue at the Operations Level.	The following job performance requirements of NFPA 1006, “Standard for Technical Rescue Personnel Professional Qualifications”, 2021 Edition, Chapter 18 (Swiftwater Rescue) (Operations):  18.2	July 1, 2028
41.	Swift Water Rescue — Technician: swift water rescue at the Technician Level.	The following job performance requirements of NFPA 1006, “Standard for Technical Rescue Personnel Professional Qualifications”, 2021 Edition, Chapter 18 (Swiftwater Rescue) (Technician):  18.3	July 1, 2028
42.	Ice Water Rescue — Operations: ice water rescue at the Operations Level.	The following job performance requirements of NFPA 1006, “Standard for Technical Rescue Personnel Professional Qualifications”, 2021 Edition, Chapter 20 (Ice Rescue) (Operations):  20.2	July 1, 2028
43.	Ice Water Rescue — Technician: ice water rescue at the Technician Level.	The following job performance requirements of NFPA 1006, “Standard for Technical Rescue Personnel Professional Qualifications”, 2021 Edition, Chapter 20 (Ice Rescue) (Technician):  20.3	July 1, 2028