A 15-Year Strategy for the City of Saint John Fire Department

POMAX CONSULTING

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Summary

Summary and Recommendations

About the Project

In 2019 – 2020 the consulting firm Ernst & Young (EY) was selected by the New Brunswick Department of Environment and Government to conduct an independent operational review of the City of Saint John. Key EY cost reduction recommendations pertaining to the fire department (stated as 'Opportunities' in the EY report) were

> *An independent assessment of fire services should be performed to further examine the right size of fire services.*

And

> *Reduce the number of permanent positions by 24 to 40 by either staffing only one engine/ladder truck from Station 1 or proceed with the closure of Stations 8 and 6 and allowing existing firefighters to operate tanker trucks.*

Due to the city's sustainability needs, and through recommendations in the EY 2020 report, Common Council resolved to close fire station 8 along with engine company 8 effective December 31, 2020. Council also decided to examine the city's fire service from a response, deployment, and risk mitigation perspective (as recommended by Ernst & Young) before making any further adjustments to the Saint John Fire Department. Subsequently, Pomax Consulting was selected to complete that examination.

The request for proposal describes the objectives of the study in three major parts:

1. The preparation and presentation of a fire service review.
2. The creation of a 15-year strategy for the Saint John Fire Department.
3. To design, develop, and deliver an implementation plan to achieve the best possible fire service while in accordance and aligned with the financial policies as adopted by the City of Saint John.

This report is presented in three parts addressing each of the major objectives.

The Project Deliverables

The deliverables include

- conducting a fire service review with the objective of creating a fifteen-year fire service strategy, including appropriate service level expectations for taxpayers; and
- incorporating a community risk assessment; benchmarking of National Fire Protection Association (NFPA) and other applicable standards; and adherence to the city's financial policies.

Project Scope

The scope of the project is to complete a fire service review which considers

- the city's financial position,
- a community risk profile,
- applicable National Fire Protection Association and related standards
- a 15-year fire service strategy and applicable fire service levels,

The focus of the review is that of a 15-year strategy, not status quo modification.

In addition to fulfilling the project scope, the consultant's aim is to explain the subject of fire and rescue services — which is much more complex than most people understand — to the public and elected officials so that decisions can be made based on a full understanding of the services being provided.

The full description of deliverables, scope, and objectives, as stated within the request for proposals, can be found in Appendix A.

Not a Master Plan

This document is not a master plan. It is not intended to define and allocate resources that are necessary to accomplish the strategy although there will be some crossover between the strategy and plan components of this document.

Conclusions

Our review of the fire department found that the service does an excellent job of response but requires heightened efforts to reduce the need for those responses. Fire prevention[1] and public education save many more lives than responding.

[1] For the purpose of this document, we define prevention as *the act or practice of keeping something from happening* (*"Prevention." Merriam-Webster.com Thesaurus, Merriam-Webster, https://www.merriam-webster.com/thesaurus/prevention. Accessed 30 Apr. 2023.).* That includes public education, home and business safety checks, standards and code enforcement, and any other efforts to forestall the occurrence of fires.

There are anywhere from 45 to 68 structure fires annually in Saint John, plus the fire department responds to another approximately

- 350 fires of other types,
- 3,000 medical incidents,
- 600 to 700 traffic collisions
- over 600 automatic alarms,
- and several hundred events of other types.

Although response data, which records the quickness of response, is maintained in a relational database, little local data which would inform the fire department and city whether response was, or is, required is kept in a format that is searchable. A searchable database encompassing response times, on-scene activity, and outcome information would enable fire service leaders to equate response types with public benefit.

We found that the City of Saint John has substantial opportunity to implement efficiency, effectiveness, and risk reduction initiatives that will improve community safety and hold the line on cost increases, and possibly decrease capital and operational costs without needing to close existing stations.

Recommended changes within the fire department that will result in increased effectiveness, improved public safety, efficiency, and cost savings include

- reevaluating, based on scientific study and more complete data, the type of calls to which the department responds,
- assessing the number of apparatus sent to calls and the circumstances and information which result in being dispatched,
- reconsidering the type of apparatus and equipment required based on evidence and need, rather than tradition,
- adopting, as a primary public safety principal expectation within the city, that other than when training, responding to incidents, or allocated breaks, fire staff will be engaged in education and prevention services,
- working with the consolidated communications centre to improve call screening and reduce response priorities or gather improved incident information,
- working with other departments such as building inspections and social services to reduce risk and improve the well-being of the public, and generally re-thinking the provision of fire services, because the current model is based on the historical model of experiencing a structure ‘fire-a-day’ in the community. That is no longer the case.

Strategy

We propose and describe, in Section 13, the following Vision, Purpose, and Strategy for the fire department:

Vision

Our vision is a city where risk to the public is in continuous decline, and livability and safety are enhanced.

Purpose

To protect the public by using precise, detailed data to inform prevention, public education, response requirements, and resource levels; ensure the cost of the department is aligned with the city's needs; reduce the frequency of emergency response; and ensure information provided to the public and city is objective, accurate, transparent, and in-depth.

Strategy Statement

To safeguard the public through education and prevention practices, achieve incident reduction and mitigation in partnership with public and private organizations, and use detailed data to determine where and how resources should be distributed.

Recommendations

The recommendations that follow align with the strategy statement shown above and in Section 13.4

Recommendation 1: Shift to a Fire Prevention Focus

This recommendation relates to '*safeguarding the public*' noted in the strategy statement and represents the core responsibility paradigm shift described in Section 5.3.1 (All Firefighters Should be Fire Prevention Officers, page 54).

The paradigm shift requires a change of perspective by fire services and firefighters as to their core responsibility which should be prevention, although the need for suppression and rescue continues.

The Saint John Fire Service will promote a culture of prevention and public education, throughout all divisions and levels of the department, as the primary method of saving lives, reducing injury, and protecting property. Preventing incidents from occurring is the best way to protect the public. Refocus the activity of all Saint John Fire Department staff onto prevention activity, while maintaining appropriate response capabilities.

Fire Prevention & Investigation should become part of an overall fire service prevention initiative, reporting to the Platoon Chiefs where specialists (currently, the Fire Prevention Officers) would assist the Platoon Chiefs with coordination of prevention activities by firefighters

while also addressing the more major fire risk issues in Saint John that require the intervention of a qualified investigator. Firefighters are 'risk aware' professionals by virtue of the role they play in suppression and that knowledge can be extended, in a coordinated manner, to the public and property owners. Section 5.3.1 outlines a number of activities that can be completed by suppression staff.

To support the shift to a fire prevention focus

- Provide training to firefighters to National Fire Protection Association 1031 "Standard for Professional Qualifications for Fire Inspector and Plan Examiner", 2014 Edition, Chapter 5 (Fire Inspector II), and 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).
- Require all new firefighters to have taken all courses associated with National Fire Protection Association 1031 "Standard for Professional Qualifications for Fire Inspector and Plan Examiner", 2014 Edition, Chapter 5 (Fire Inspector II), and 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) upon hire.

We suggest only successful completion of courses would be required, not certification for NFPA 1031 and 1035.

National Fire Protection Association NFPA 1031 and 1035 are expected to be combined as a single standard in 2024.

Recommendation 2: Risk Assessment

This recommendation relates to '*safeguarding the public*' noted in the strategy statement.

The request for proposal required completion of a community risk profile (Appendix F). In fact, the full report delivers an Integrated Risk Assessment Plan to the extent that data was available. The data, as discussed and presented, indicates that risk is in the uptown and urban areas. Exhibit 4 , Exhibit 5, and Appendix B demonstrate the majority of structure fires occur in urban areas and mainly Uptown.

Service levels should be based on an integrated risk assessment as suggested and defined in this document. Risk is dynamic and mitigation should be based on periodic risk assessments and adjusted to meet needs. This requires an assessment of all risks to life and injury to the community, resulting in a long-term plan to make the Fire and Rescue Service more responsive to locally identified needs. This means targeting resources to prevent incidents from happening, while also making sure resources are in the right location to best protect the community. An integrated risk assessment considers commercial, economic, social, environmental, and heritage concerns. We further recommend that the city

- invests in non-emergency service risk analysis courses, books, and periodicals for staff, to enable a wider understanding of the psychology of risk determination, and
- utilizes a risk determination model such as the Commission on Fire Accreditation International three-axis risk categorization or an integrated risk assessment as employed by the United Kingdom.
- should acknowledge, within PlanSJ, what the data indicates and reconsider the emphasis being placed on industrial risk which is not borne out by the data. Further, PlanSJ should place equal prominence on prevention, partnerships, and public education.

Recommendation 3: Governance and Organization

This recommendation relates to '*partnerships*' noted in the strategy statement.

- Create a project group, such as a Fire Services Governance Committee (Committee). The Committee should take the form of a project team with the sponsor being the Chief Administrative Officer or the city's Corporate Performance section.
- A governance structure of this nature signals the importance of refocusing the fire department to fire prevention and supports the fire chief through an extended, busy transitional period.
- The Committee would be responsible for oversight of Fire and Rescue Services and ensuring accountability for implementing recommendations adopted by the city from this review. The Committee would receive presentations from the Fire Chief, offer strategy guidance to the Chief, assist with reviewing plans supporting the strategy, purchases, resource deployment, and assist with information brought to Common Council.
- Chaired by a neutral senior city staff member, membership should include several senior leaders including from finance, corporate communications, human resources, and fleet services. The Fire Chief would report through this committee to the Chief Administrative Officer. There are many models in other jurisdictions where the Fire Chief reports to a Commissioner of Community Services or a Commissioner of Public Safety. This Committee and project team approach will support the Fire Service in creating partnerships to focus prevention efforts that meet the community's needs, while maintaining appropriate response.
- We envision that the Committee will continue to fulfill its mandate for a minimum of three years and, at the end of that period, review the fire service progress and recommend to the Chief Administrative Officer a revised organizational or reporting structure for the fire department that supports the path described in this document, or continuation of the committee.
- Further, we see this committee as being a focal point for determining the talent and job functions required within the fire service to ensure success of the recommended direction, and adjusting the aptitude, positions, and capabilities from time to time to assist success.

We recommend

- the vacant deputy's position be redeployed to fulfil another role, and implement the organizational structure depicted in Exhibit 10.

Recommendation 4: Performance Management
This recommendation relates to '*data'* noted in the strategy statement.

Adopt a fact informed, research-based business model upon which to base day-to-day operational requirements and mid to long term planning to meet the protection requirements of Saint John. This recommendation includes:

- Implementation of a records management system that is fully supported by a relational incident activity outcome database so that the fire service and the city can measure the benefit of response activity.
- Establish a small working group, supported by Information Technology, to include the fire service, finance, the fire department records management vendor, and the public safety communications centre, to configure the record management system to capture dispatch intake data, fire department on scene activity, and incident outcome information.
- Ensure that inspection and incident planning software, including the supporting hardware, allow prevention and public education records to be captured on site and uploaded in real time thus avoiding note taking and transferring information to a static (dumb) record management system.
- Implement improvements into Geographic Positioning System – Automatic Vehicle Locating vehicle movement reporting. This technology reports vehicle movement such as departing station, arriving incident, departing incident, and back at station automatically thereby avoiding missed activity time stamps or erroneous vehicle movement times.
- Repurpose an existing position within the city, if possible, to resource corporate database management and data analytics skills. Critical to the majority of recommendations is an analyst complement to work with the fire department, First Due record management system, and Information Technology to achieve an on-scene activity, and outcome information, database. If repurposing a position isn't possible, create a new position.

Recommendation 5: Response Models
This recommendation relates to '*data*' and '*partnerships*' noted in the strategy statement and '*operations'* findings within the report.

- Retain, and maintain, on-going advice of a medical director to reduce response to medical incidents only to those that include unconscious, unresponsive, and apneic which includes cardiac arrest or asphyxiation, or as requested by Ambulance New Brunswick's communication centre.
- Reduce response to traffic events only to those where a caller indicates people are trapped or as requested by Ambulance New Brunswick's communication centre.

    - No longer participate in New Brunswick 9-1-1 Operating Procedures Directive C-6 as described in Section 6.3.1.
- Reconfigure response to automatic alarms, such as smoke and carbon monoxide, to reduce the number of trucks responding. Determine the percentage of automatic alarms in the past five or more years that are positively associated with a fire (absent of secondary confirmation by a caller), or the number of carbon monoxide alarms where it was not confirmed that the building had been vacated. Alternatively, undertake a one year prospective analysis of alarm response outcomes and adjust response methods based on the findings.
- Cease funding the tanker and redeploy the 17,520 hours of staff time assigned to driving the tankers to other roles (see Recommendation 7 with respect to decommissioning the tankers).

Recommendation 6: Dispatch and Communications
This recommendation relates to '*partnerships*' noted in the strategy statement and 'o*perations'* findings within the report.

The Public Safety Answering Point and dispatch service plays an important but often unrecognized role in the deployment of fire service resources. Nurturing the partnership between fire and dispatch to improve processes and, thus, effectiveness and efficiency will enhance the time fire service has for the core prevention and education role. (Section 6.4, The Role of Dispatch in Effectiveness and Cost Containment).

- Establish a fire service dispatch agreement with the communications centre to encompass the recommendations in this report including gathering information to assist determining the information that should be captured from callers.
- Establish a fire service dispatch agreement with the communications centre to include accepting and recording real-time incident information by the dispatcher. This recommendation includes the dispatcher capturing information provided by the on-scene Incident Commander within the fire service record management system.
- Negotiate service delivery with the communication centre to assist and improve productivity and service levels.

Recommendation 7: Assets and Facilities
This recommendation relates to 'p*artnerships*' noted in the strategy statement and 'o*perations'* findings within the report.

There has been no evidence that the closure of station 8 at the end of 2020 has resulted in an unacceptable increased risk to the city or station 8's pre-2020 response area. Current risk can be reduced throughout the city by implementing the range of recommendations found in this document.

Fire trucks are large, carry a wide range of equipment, some of which is rarely used, and are very expensive. When it is time for replacement, determination of the type of rolling asset should be informed by a data rich business case explaining if there is value gained by spending a million dollars or more for a traditional fire truck, and why operational reconsideration; that is, a paradigm change in how reducing fire risk and firefighting frequency, can contribute to right-sizing the fleet.

- Dispose of station 8.
- Decommission the three reserve vehicles.
- Decommission the tanker trucks and redeploy the 17,520 hours of staff time assigned to driving the tankers to other roles (see Recommendation 5 with respect to tanker staff funding).
- Assess the purchase of SUVs or sedans based on a determination of whether the fire service is going to continue responding to medical incidents, traffic events, and automatic alarms at the same rate as present. SUVs or sedans can be staffed with one or two firefighters.
- Evaluate the equipment required to be carried on fire trucks and the size of trucks based on the use of data as described in this report.

Part 1: The Fire Service Review

1 Fire Service Review

The answers we need are everywhere. Just ask the data.

Sas (Statistical Analysis System)

1.1 Data Collection and Information Management

Exhibit 1 shows, at a very high level, what happens during an incident to which the fire department responds.

1. A call is placed to 9-1-1.
2. The fire department is dispatched.
3. Work takes place at the scene.
4. The vehicles and staff return to the station and prepare for the next incident.
5. But what isn't available is a record, in a relational database, of the activities performed at the incident.

Exhibit 1: Fire Service Incident Process

This means that information crucial to decision-making, efficiency, effectiveness, and the determination of strategy that reaches into all areas of fire and emergency services is not available in an easily searchable format or can be aggregated to examine trends and on scene activity.

Senior firefighters or captains create a narrative report, with varying degrees of completeness, but none of that information which can advise plans or decisions with respect to staff levels, training, mitigation, vehicle types, equipment required, level of response, support

requirements, other resource requirements, or even a determination of whether response to some incident types is necessary, is relational or easily searchable.

We suggest that there are three types of data, each with associated metrics, available to fire departments. Most fire departments, including Saint John, collect only one of the three which means that the municipality achieves limited perspective of the activity and value of their fire department. The three data types are:

1. Performance data
2. Process or activity data
3. Results data

Performance information (as in, 'how quick'?) is the data most commonly – or exclusively – gathered by fire services. These data involve measuring Event Phases such as time related to call taking, turnout, travel to an incident, time on scene, and back at station. A very few fire services accurately measure the time it takes to hook up hoses (if a fire), when agent (water or foam) is applied to a fire, rescues, tools and equipment used, and other process information.

Event Phases

Call Handling Time *– is the duration between the time of call and the point at which the station is alerted.*

Turnout Time *– is the duration between the time at which the station is alerted and the time the first vehicle departs, i.e. the time it takes for the firefighters to prepare to leave.*

Drive Time *– is the duration between the time the first vehicle leaves to the time at which the first vehicle arrives at the scene of the incident (not necessarily the same vehicle).(this is not necessarily the same time as arrival at the event; as examples, reaching someone who has fallen down an embankment or accessing a fire in a unit of a multi-story building will require additional time to arrive at the event);*

Time on Scene *– the elapsed time from when fire apparatus (the trucks) arrived at the scene until departing the scene;*

Paged to back at station *– the total from the time firefighters were alerted until they arrived back at the station after the event was complete.*

Performance data is most often associated with measurement against National Fire Protection Association[2] guidelines. Very few fire services assess the metrics of the service they provide.

To understand metrics, there is a good example in the March 2013 issue of Harvard Business Review titled "Know the Difference Between Your Data and Your Metrics" by Jeff Bladt and Bob Filbin. It tells the story of YouTube video success.

[2] The **National Fire Protection Association** (NFPA) publishes more than 300 consensus codes and standards intended to minimize the possibility and effects of fire and other risks. NFPA codes and standards, administered by more than 250 Technical Committees comprising approximately 8,000 volunteers, are adopted and used throughout the world.

How many views make a YouTube video a success? How about 1.5 million? That's how many views a video our organization, DoSomething.org, posted in 2011 got. It featured some well-known YouTube celebrities, who asked young people to donate their used sports equipment to youth in need. It was twice as popular as any video Dosomething.org had posted to date. Success! Then came the data report: only eight viewers had signed up to donate equipment, and zero actually donated.

Zero donations. From 1.5 million views. Suddenly, it was clear that for DoSomething.org, views did not equal success. In terms of donations, the video was a complete failure.

What happened? We were concerned with the wrong metric. A metric contains a single type of data, e.g., video views or equipment donations. A successful organization can only measure so many things well and what it measures ties to its definition of success.

To relate this example of data and metrics to fire departments and Saint John, while the promptness of turnout and travel to incidents are measured, the metrics to determine what difference that speed made, specifics of services performed, type of equipment used, and the results of the effort are not measured, in which case municipalities must rely on qualitative information and, often, anecdotes and compelling stories, to determine the resources the fire department requires to protect the public.

Fire departments traditionally measure how quickly things happen (see the Event Phases text box) but the 'So what?' part is rarely measured. For example; did the speed of the first three event phases make any difference to the outcome of the incident? If it did, or didn't, what difference does speed make in aggregate within similar incident types? And, because emergency responses represent a danger to the public, if speed doesn't make a difference, does it make sense to rush? [a],[b],[c]

If it does make a difference, what techniques can be implemented to assist with quick arrival? Are there better ways to 'respond' other than – or in addition to – rushing to incidents; for example, free public education in fire safety or first aid[3]? What technologies can be used to accomplish useful results? Footnote 3 is one example of many indicating that teaching the public to use automated external defibrillators and CPR results in a greater chance of survival than emergency

[3] A clinical paper published in the July 2021 journal Resuscitation titled *Effectiveness of public-access automated external defibrillators at Tokyo railroad stations* reported that among 280 eligible patients who had bystander-witnessed cardiac arrest and received defibrillation at railroad stations, 245 patients (87.5%) received defibrillation using public-access AEDs and 35 patients (12.5%) received defibrillation administered by emergency medical services (EMS). Favourable neurological outcomes at 1 month after cardiac arrest were significantly more common in the group that received defibrillation using public-access AEDs (50.2% vs. 8.6%) than in the group that received defibrillation by EMS. Over a 5-year period, favourable neurological outcomes at 1 month after cardiac arrest of 101.9 cases were calculated to be solely attributable to public-access AED use.

services (police, fire, EMS) rushing to an incident. The location of AEDs plays a part in access and use and patient survival. Public education is likely to save more lives than speedy response alone and it is an area within which fire staff can contribute[d].

So, while the historical and current practice of the Saint John Fire Department responding to those incident types that are considered emergencies will sometimes contribute to saving a life, implementing a practice of accessing research material, gathering useful data, and assessing metrics will help the department determine the best way to use its resources, ensure a greater chance of successful outcomes, and possibly prevent some incidents from occurring.

Accessing Data and Metrics

Data has to be easily accessed – within a few minutes. The practice of prior years where the fire department made a request for information via Information Technology and then received an answer at a later time does not lend itself to spontaneous inquiry, secondary inquiries, and operational problem solving. Accessing a database, and the associated metrics, should be intuitive and in a simple enough format so that creative inquiry is not stifled.

Our recommended approach to Saint John's 15-year fire services strategy is one of culture change where decisions are based on science and research, useful data, and objectivity. The existing lack of information leads to gut choices relating to important decisions and continues historical response-centric practices.

A lack of data, and metrics within that data, keeps the focus of the fire service and municipality on response times such as those within the National Fire Protection Association 1710 guidelines, and has led to behaviour which inadvertently undermines efficiency and public safety.

Risk, particularly relating to fire, should be reduced by way of education and prevention, and a culture that considers a fire to be a failure of those efforts should be established in the fire service over the next five to ten years. An all-hands effort to prevent fire needs to be part of the philosophy of the next group of hires.

2 What do the Statistics Indicate?

2.1 Understanding Emergency Response

Exhibit 2 demonstrates the stages of an incident response. An emergency process includes

1. detection or recognition of a fire or other emergency;
2. reporting the emergency by calling 9-1-1;
3. call handling, dispatching firefighters, and turnout (the duration required for the communications centre to obtain information from a caller, alert the fire department, and firefighters departing the station);
4. driving time (wheels start turning to wheels stop turning);
5. setup (the 'action' time); for example,
   a) the time it takes to travel from a fire truck [upon 'wheels stop turning'] to an incident such as an apartment or other location requiring vertical travel; or ground travel if firefighters have to move from the fire truck to the incident; for example, down railway tracks or to the back of a building; or
   b) the time it takes to access a victim, recognize the issue, and start definitive activity in a scenario other than fire; or
   c) the time it takes to prepare to investigate other incident types such as a smoke or carbon monoxide alarm; or
   d) the time it takes to connect to a hydrant, or water source, or foam.
6. harm limiting
   a) apply water or foam;
   b) care for victims.

Exhibit 2: Response Graphic

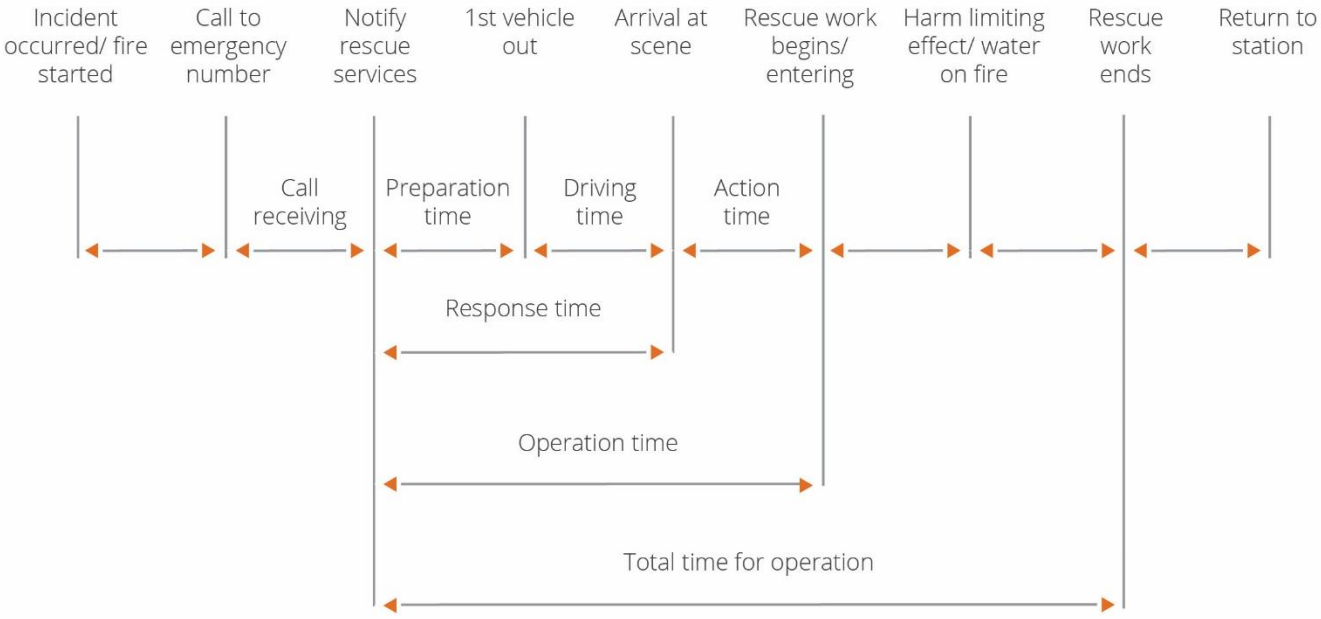
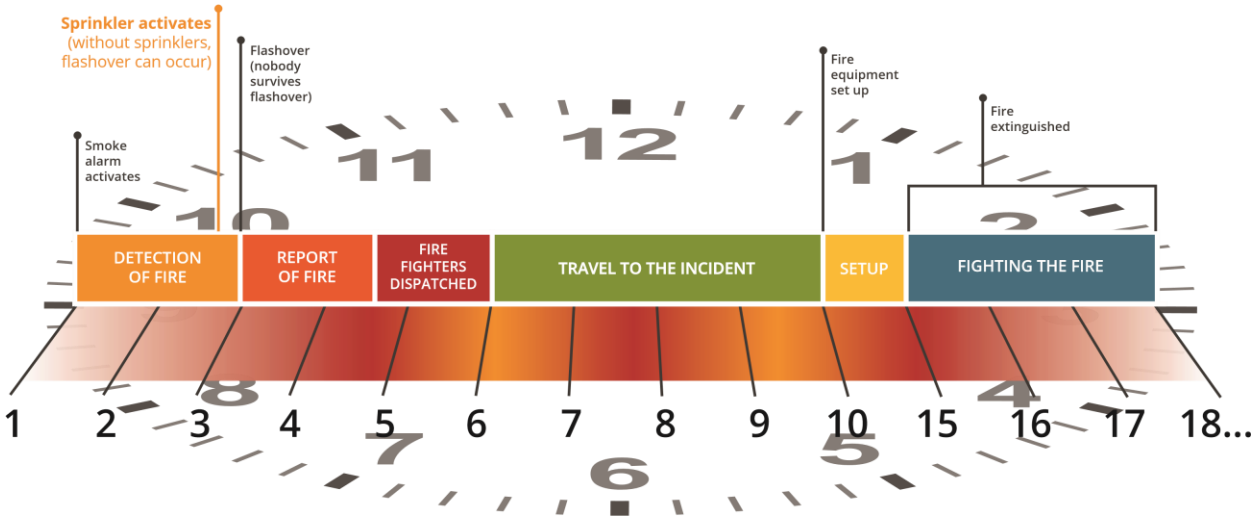


Exhibit 3: Fire Response Graphic shows the stages of a fire response

Exhibit 3: Fire Response Graphic



The 'setup' time between the 10 and 15-minute marks shown in Exhibit 3 is usually about 5 minutes. Inquest testimony from the Ontario Office of the Fire Marshal and Emergency Management indicates that it takes an average of five to seven minutes[4] to get agent (water or foam) on a fire after arriving at a scene, and we expect it to be similar in New Brunswick and Saint John. As Exhibit 3 shows, the duration from the time of fire detection to applying water or foam can be 15 minutes. This assumes a drive time of about four minutes. A change in the driving time will affect the duration of a fire before agent is applied. The common conclusion is to shorten the drive time, which could mean more stations and firefighters, but there are other techniques to reduce response time discussed within this report.

2.2 Saint John Incident Data

Upon receiving fire department response data files, we removed records which were not related to Saint John; for example, responses by other fire departments that were inadvertently included in the data received, and some police records. For the purpose of calculating response times to incidents we also removed records relating to vehicles for the fire chief, deputy chiefs, platoon chief, training, fire prevention, and other vehicle types that were not equipped to fight fires, perform rescues, or respond to other emergencies. The exclusion, based on vehicle type, was decided in concert with the fire department.

[4] The Ontario Fire Marshal's statistics include rural fires, so the application of water on a fire could take less time in an urban environment. Fire trucks also have onboard water which means that water can be pumped from a truck's reserve even before a hydrant is accessed.
We have seen setup times as low as 2 minutes during demonstrations, but those times were in a training site parking lot with a hydrant immediately available.

The tables and charts on the following pages indicate major categories and trends related to incidents to which the fire department responded.

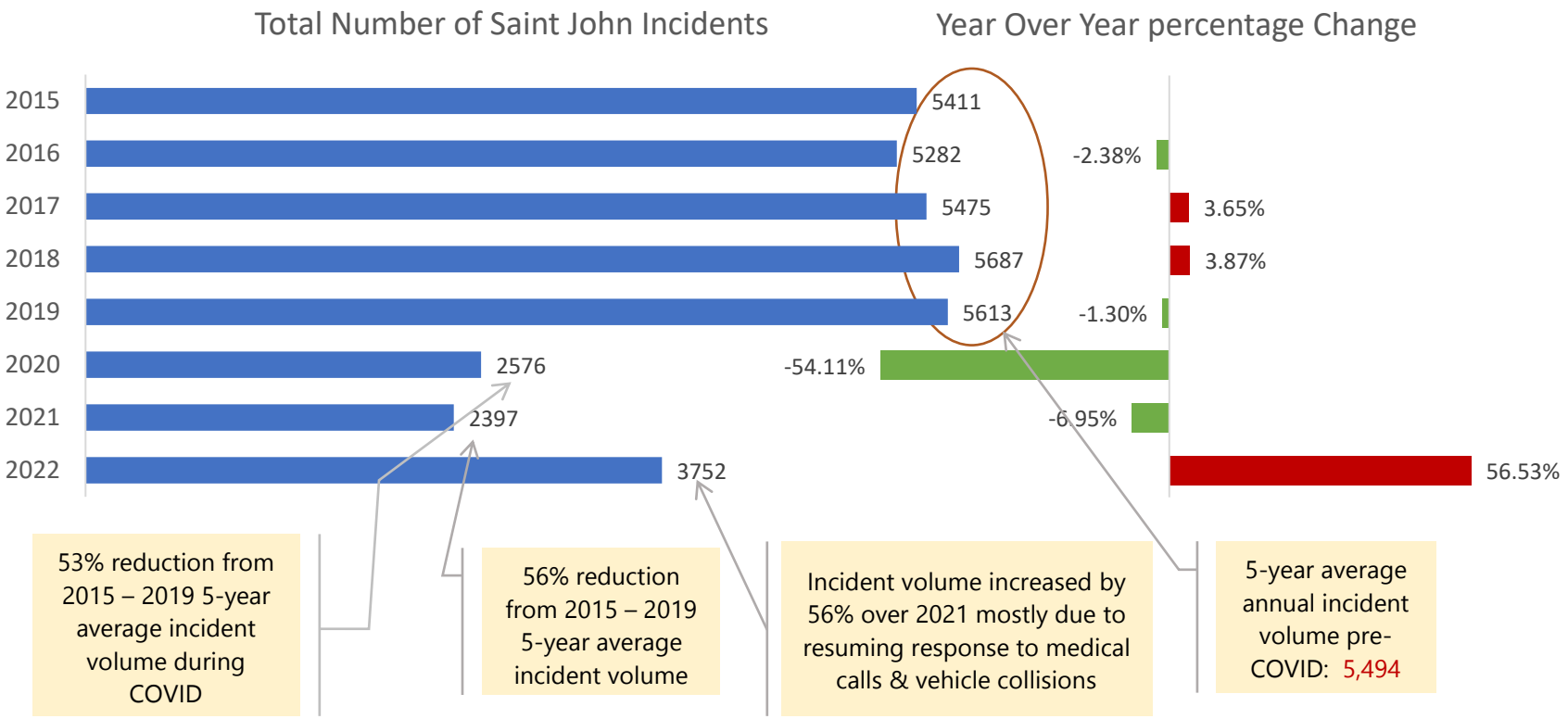
Some charts and tables are shown in thumbnail size within this section but full-size depictions, including station level information in some cases, can be found in Appendix B. Links to the full-size depictions are shown in parentheses.

2.2.1 Total Number of Incidents (Calls)

Chart 1 (page 8) illustrates the total number of incidents (all incidents) to which the fire department responded, in the City of Saint John, in each year from 2015 to 2022.

- The **average** annual incident volume for the five-year period 2015 – 2019 **pre-COVID** was 5,494.
- In 2020, the number of incidents decreased by 53% from the 2015 – 2019 annual average.
- In 2021, the number of incidents decreased by over 56% from the 2015 – 2019 annual average.
- The call volume (also known as incidents) decrease was, in part, due to a reduction in people's movement and traffic volume because of COVID.
- Because of COVID, a decision was made between the fire department and the fire department's ad hoc medical advisor to reduce firefighter's potential exposure to the virus by responding to the following critical incident types only, in addition to fires and rescues:
  - cardiac arrest and/or respiratory arrest
  - suicide attempt
  - drug overdose
  - industrial accident
  - catastrophic/fatal injury
  - drowning/scuba accident
  - motor vehicle accidents with injuries

Chart 1: Total Number of Saint John Incidents by Year

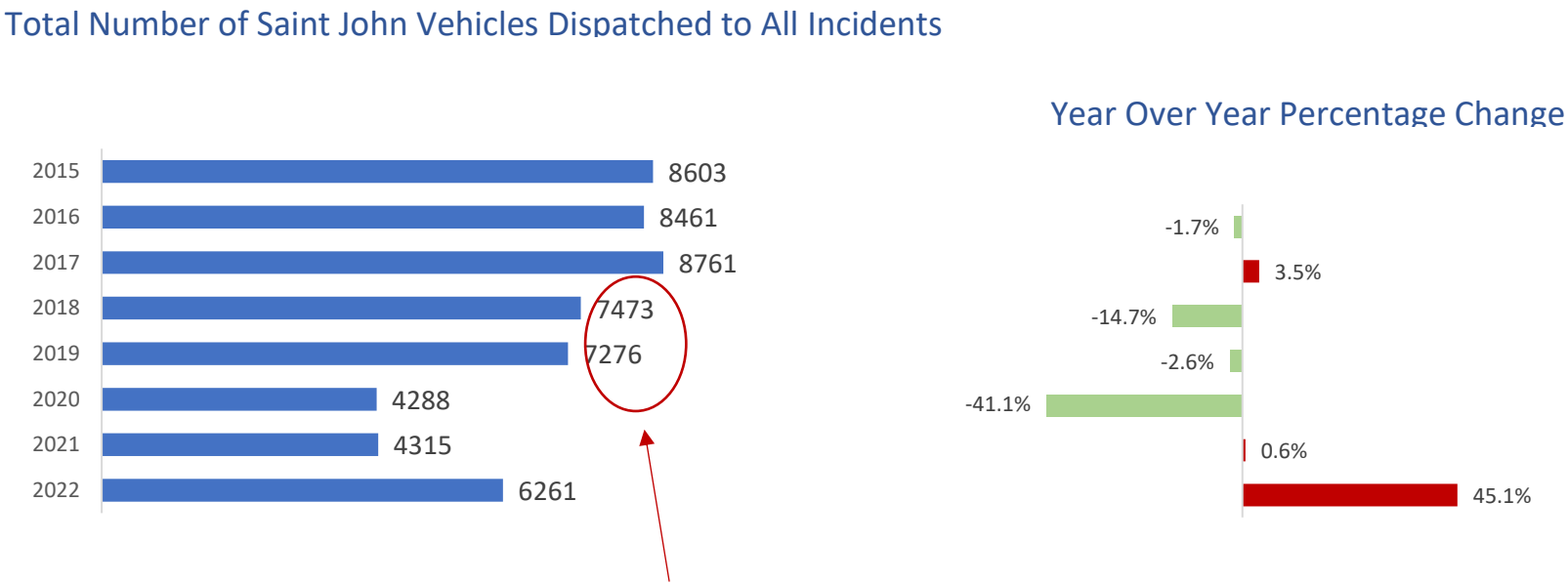


- In December of 2021, the fire department reintroduced chest pain and cardiac history to the criteria for dispatching a fire truck to medical incidents, with a commensurate increase in call volume.
- The fire department did not seek medical advice prior to reintroducing chest pain and cardiac history response.
- Increased post-COVID activity in 2022 plus the reintroduction of responses to a wider range of incidents resulted in 1,355 (56.3%) more calls than in 2021.
  - In 2021 Saint John Fire Department responded to 488 medical incidents; in 2022 the fire department responded to 1,586 medical incidents;
  - 1,098 of the 1,355 additional calls were due to medical incidents.

2.2.2 Total Number of Vehicles Dispatched to All Incidents

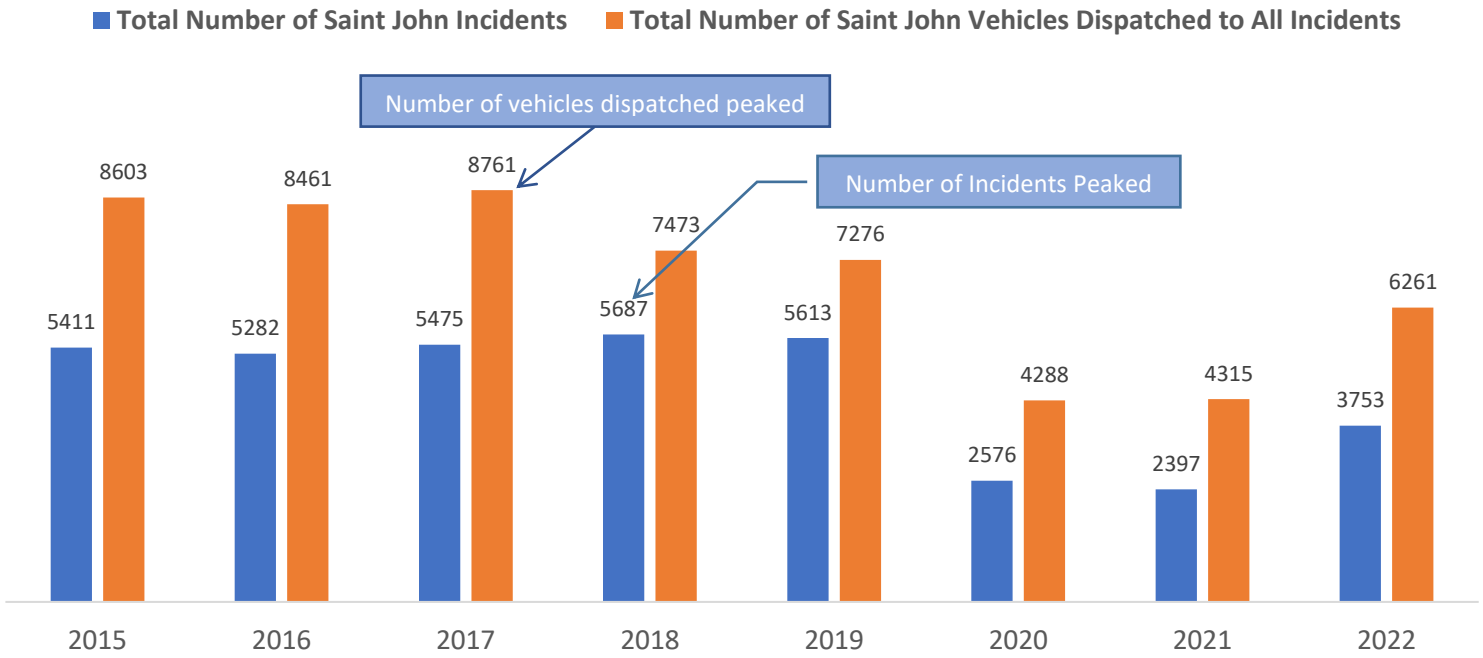
- The number of vehicles dispatched to the incidents shown in Chart 1 can be found in Chart 2 and Chart 3.
- The number of vehicles utilized peaked at 8,761 in 2017 and declined by almost 1,300 in 2018 and almost 1,500 in 2019 from 2017 peaks.

Chart 2: Total Number of Saint John Vehicles Dispatched to All Incidents



- The fire department indicates the reduction in vehicle use is partially attributable to a change in policy as to the number trucks sent to automatic alarms.
- Prior to 2018 four fire trucks, each staffed with four firefighters, and a command vehicle with one officer (total 17 staff) were dispatched to automatic alarms. Automatic alarms were assumed to be fires until otherwise determined. This was later revised to two trucks with four firefighters each (8 firefighters). The majority of automatic alarms are false although the data is not detailed enough to determine the percentage in Saint John.

Chart 3: Total Number of Saint John Incidents and Vehicles Dispatched 2015 – 2022



The following charts indicate the number of incidents by call type. Fire departments in New Brunswick report several elements of incidents to the New Brunswick Office of the Fire Marshal (OFM) based on 181 OFM incident types. For the purposes of this presentation, we provide information relevant to 13 major categories, which include the 181 incident types. Although we present 13 main categories, we have available the same analysis, as shown below, for each of the 181 types.

Chart 4: Average Number of Apparatus Sent to Each Incident

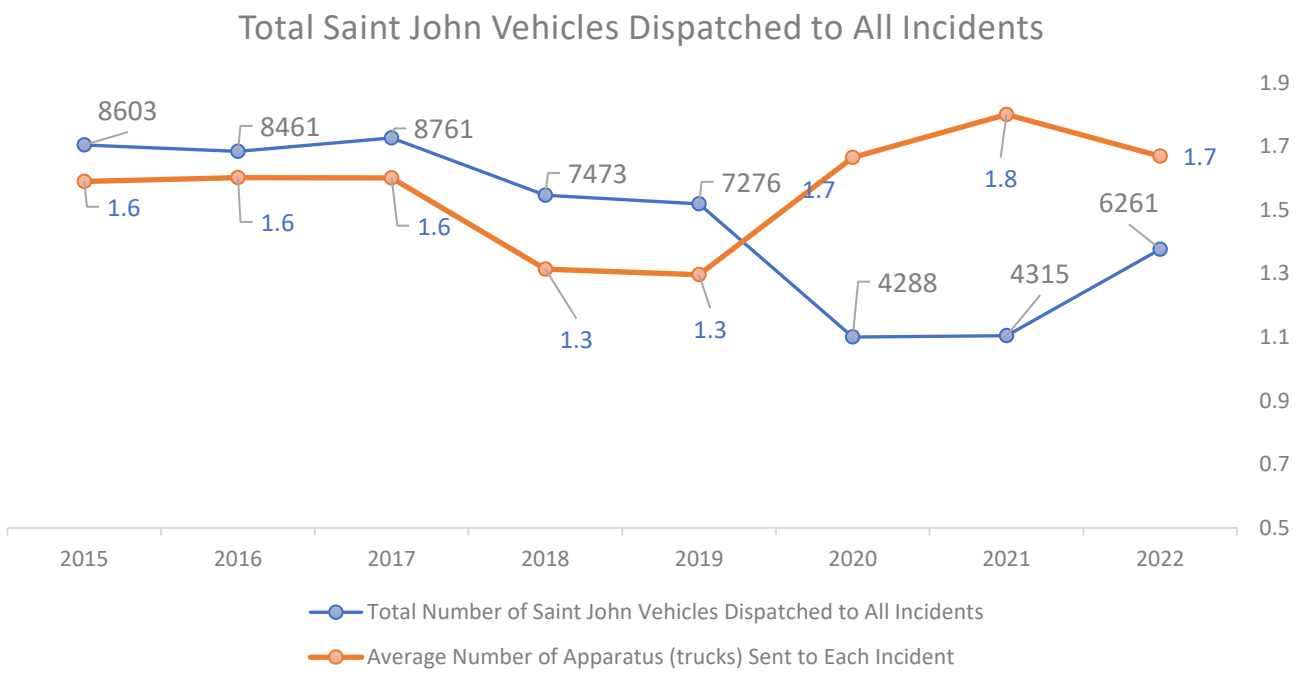
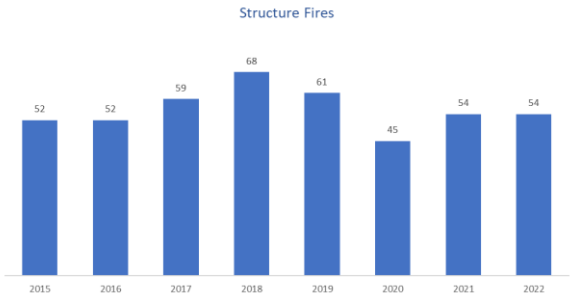


Chart 4 shows the total number of trucks that were sent to all events in the years indicated whereas the decimal number shows the average number of trucks sent to each incident (trucks sent annually divided by number of incidents annually).

Changes in the 'vehicles dispatched to events occurring ratio' offer opportunities to seek further information as to why the ratios altered.

2.2.3 Structure Fires

On average, structure fires have occurred from a high of 1.4 to 0.9 times weekly. There is an encouraging downward trend since a high of 68 fires in 2018. (Chart 14)

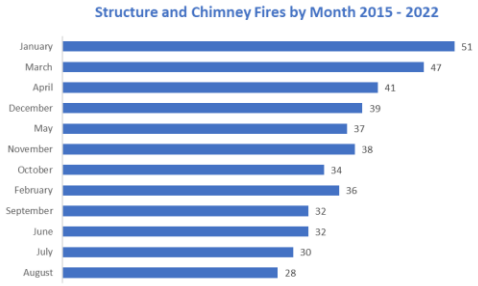


Structure fires include

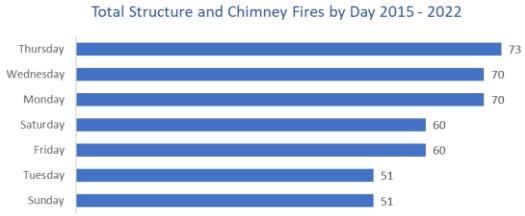
- structure fire - other
- building fire
- fires in structure other than a building
- chimney fire
- fire in mobile property used as a fixed structure, other
- fire in mobile home used as fixed residence
- fire in portable building, fixed location

2.2.3.1 When do Structure Fires Occur?

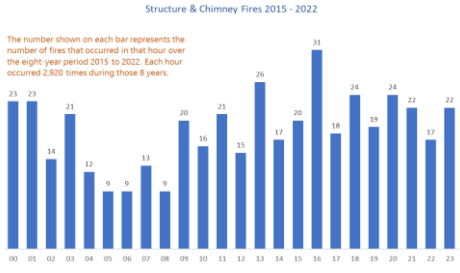
In the 8-year period 2015 – 2022, the predominant months for structure fires were January, March, and April, and the fewest in August, July, June, and September. (Chart 15)



The most structure fires occurred on Thursdays, Wednesdays, and Mondays and the fewest on Sundays and Tuesdays. (Chart 16)



- The greatest number of fires in the last eight years occurred at 1600 hours, or 4:00 PM.
- The fewest incidents occurred from 4:00 AM to 8:00 AM.
- Nine incidents took place in the hours of 5:00, 6:00, and 8:00 AM with an average of 1.1 fires a year in each hour (9 fires divided by 8 years= 1.1 fires in that hour). (Chart 17)

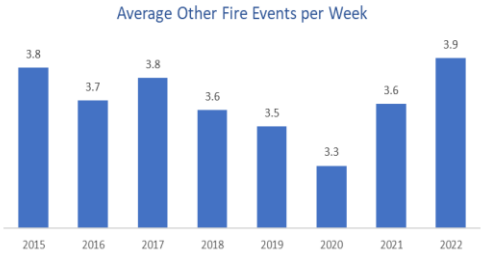


'Other Fires' encompass a wide range such as

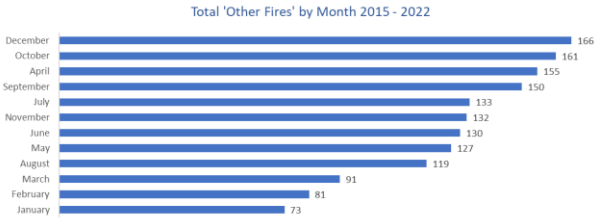
- cooking fire, confined to container,
- incinerator overload or malfunction, fire confined,
- fuel burner/boiler malfunction, fire confined,
- other appliance fire, confined to appliance,
- trash or rubbish fire, contained,
- fire in motor home, camper, recreational vehicle,
- fire in portable building, fixed location,
- outside rubbish fire, other,
- outside rubbish, trash, or waste fire,
- garbage dump or sanitary landfill fire,
- dumpster or other outside trash receptacle fire.

(Chart 18)

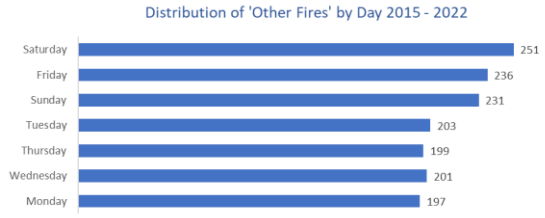
Based on an annual average, between 3.3 and 3.9 'Other Fire' events occur weekly.
(Chart 19)



More 'Other Fires' take place in May, August, July, and September and the fewest in January, February, and March.
(Chart 20)



'Other Fires' occurred most frequently on Saturdays, Fridays, and Sundays. Fewer took place on Mondays, Wednesdays, Thursdays, and Tuesdays. But there were still a lot of 'Other Fires'.
(Chart 21)

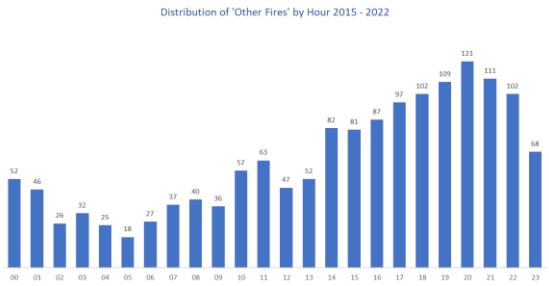


There is an opportunity for the fire service to determine the cause of 'Other Fires' frequency and put plans in place to reduce them through education and prevention.

Over 8 years there were 1518 'Other Fires'.

- 43% or 657 were outside trash, waste, or dumpster fires;
- 28% or 421 were minor cooking or other fires; and
- 15% or 226 were passenger vehicles.

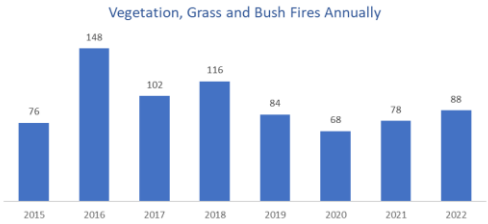
(Chart 22)



2.3 Vegetation, Grass, & Brush Fires

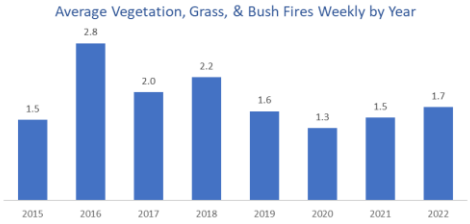
Vegetation, grass and brush fires include

- Natural vegetation fire, other,
- Forest, woods, or wildland fire,
- Brush or brush-and-grass mixture fire,
- Grass fire,
- Cultivated vegetation, crop fire, other,
- Cultivated grain or crop fire,
- Cultivated orchard or vineyard fire,
- Cultivated trees or nursery stock fire. (Chart 23)



Vegetation, grass, and bush fires have occurred, on average, ranging from a high of almost three times a week in 2016 to a low of 1.3 times weekly in 2020.

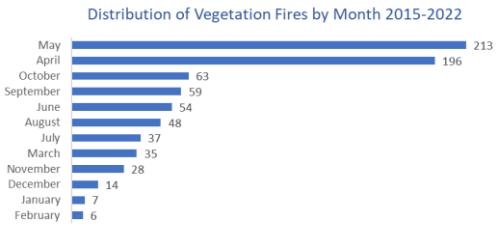
Over the past 8 years 82% of this category of fires have been brush or grass fires (51% grass, 31% brush). (Chart 24)



2.3.1 When do Vegetation, Grass, and Brush Fires Occur?

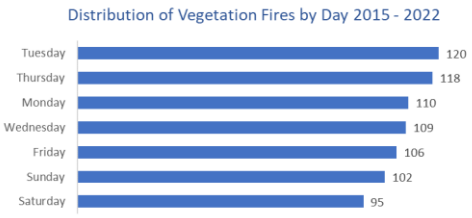
Over three times as many vegetation, grass, and bush fires happened in each of April and May, over the past eight years, than in any other month.

Of the total 760 fires of this kind in the past eight years, 442 occurred from 2015 – 2018 and 315 from 2019 to 2022; so, an improvement in frequency is taking place. (Chart 25)

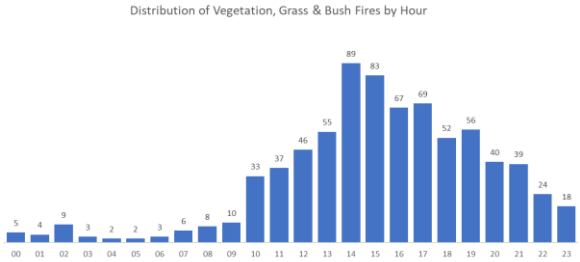


This knowledge offers an opportunity for prevention efforts once Saint John Fire Service has determined the cause for this distribution.

More vegetation fires have taken place on Tuesday, Thursday, Monday, and Wednesday, with a slight decline Friday and Sunday, but the fewest occur on Saturday. (Chart 26)



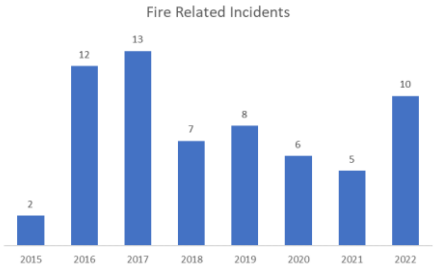
Data indicates that of the 760 vegetation, grass, and bush fires that occurred in the last 8 years, over 400 take place in April and May and, although there isn't a great variation in distribution by day, more happen Monday to Thursday, and between 2:00 and 7:00 PM.



The questions to answer are "Why is that?" and "What can be done to reduce the frequency"?
(Chart 27)

Fire related incidents are those that are initially thought to be fires but aren't. They include

- Overpressure rupture, explosion, overheat other,
- Overpressure rupture from steam, other,
- Overpressure rupture of steam pipe or pipeline,
- Overpressure rupture of steam boiler,
- Steam rupture of pressure or process vessel,
- Overpressure rupture from air or gas, other,
- Overpressure rupture of air or gas pipe/pipeline,
- Overpressure rupture of boiler from air or gas,
- Air or gas rupture of pressure or process vessel,
- Chemical reaction rupture of process vessel,
- Explosion (no fire), other,
- Munitions or bomb explosion (no fire),
- Blasting agent explosion (no fire),

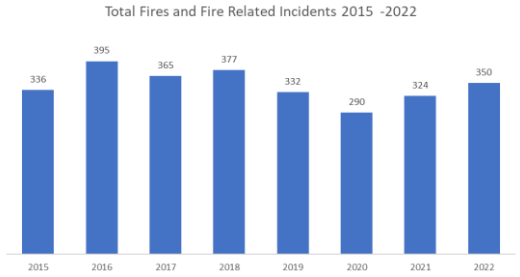


(Chart 28)

- Fireworks explosion (no fire),
- Dust explosion, (no fire),
- Excessive heat, scorch burns with no ignition.

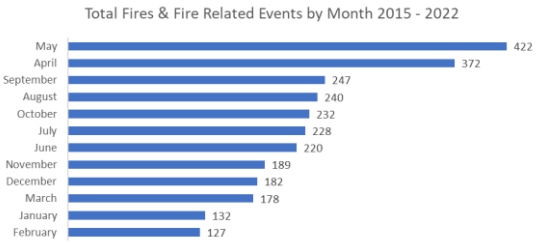
2.4 A Summary of Eight Years of Fire Responses in Saint John

The total of all fire and fire related events ranged from a high of 395 in 2016 to a (likely) COVID-19 related low of 290 in 2020. (Chart 29)

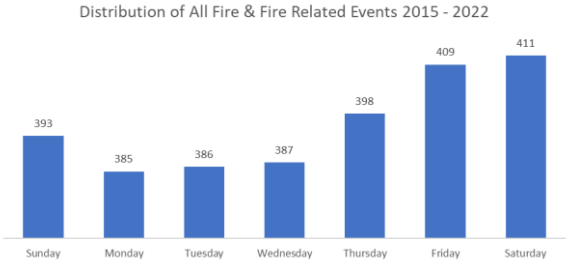


Over the past eight years the most fire and fire related events occurred in May and April mostly due to vegetation, grass, and bush fires which are concentrated in those months.

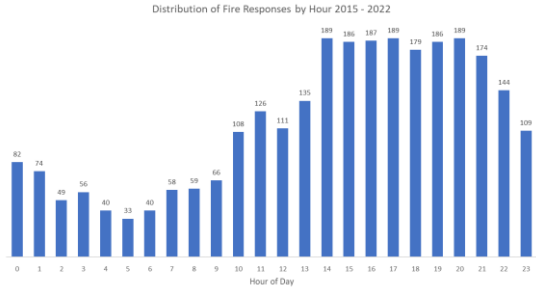
Following those highs are September, August, October, July, and June during which many occurrences are driven by outside trash fires. (Chart 30)



The high days for fires and fire related events are Thursdays, Fridays, Saturdays, and Sundays possibly due to outside trash fires which are most frequent on weekends. (Chart 31)



Fires and fire related events increase in frequency around 2:00 in the afternoon to about 10:00 in the evenings. This coincides with the high times for vegetation, grass, and bush fires (around 2:00 PM and outside trash fires (peaks around 8:00 PM). (Chart 32)



On average, Saint John Fire Service responds to approximately 6 fires of all types, each week. The greatest number of these are dumpster and vegetation fires.

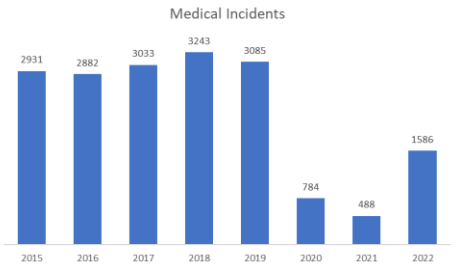
2.5 Medical Incidents

Medical incidents were briefly discussed earlier in Section 2.2.1.

Medical incidents include events categorized by the New Brunswick Fire Marshal as

- Medical assist, assist EMS crew,
- Emergency medical service, other,
- EMS call, excluding vehicle accident with injury,
- Electrocution or potential electrocution

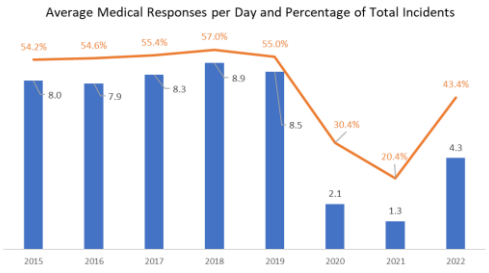
(Chart 33)



Responses to medical events peaked in 2018 at 3,243 events but declined by about 158 in 2019. They fell further in 2020 due to a medically advised decision to restrict firefighter response to only the most critical medical incidents to protect firefighters, to the extent possible, from COVID-19.

Incidents declined further by 296 in 2021 but have rebounded by 1093 – or an average of 3 calls a day – in 2022 due to a decision (without medical advice) to increase the types of medical incidents to which to respond.

Saint John Fire responded to an average of between eight and nine medical incidents a day until 2020 when medical responses dropped to two a day as part of risk management to protect fire staff from COVID.

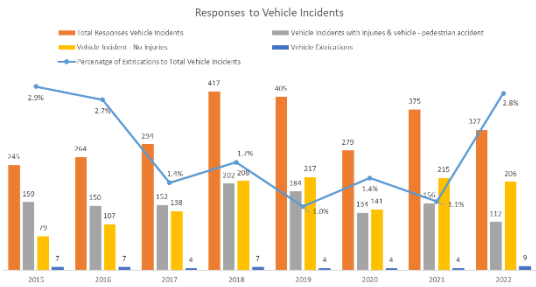


That dropped further to an average of 1.3 a day in 2021 but rose to 4.3 a day in 2022 for the reasons indicated previously. (Chart 34)

The average percentage of medical incidents per year, relative to overall incidents, ranged from a high of 57% in 2018 to a low average of 20.4% in 2021. In 2022, medical incidents rose to an average of 43.4% of all events.

2.6 Response to Vehicle Incidents

Responses to vehicle incidents include vehicle incidents with injuries; vehicle pedestrian accident; vehicle incidents without injuries, and vehicle extrications.



The frequency of Saint John fire response to vehicle incidents maintained an upward trend from 2015 (245 total responses) until 2018 (417 responses) with a slight decline to 405 in 2019. That dropped to 279 in 2020 (COVID influence) but rose again to 375 in 2021, declining to 327 in 2022. The important statistic to note is that the need for extrication has been only 3%, at the highest, of all vehicle responses, to lows of 1% in 2019. (

hart 35)

We are not able to determine what 'extrication' means; that is, was it accomplished with low effort, perhaps using prybars to open a jammed door, or did it take hydraulic rescue tools to free victims. Unfortunately, there are no records that can be readily searched to provide an answer about this or other activities performed by firefighters.

The information illustrated in

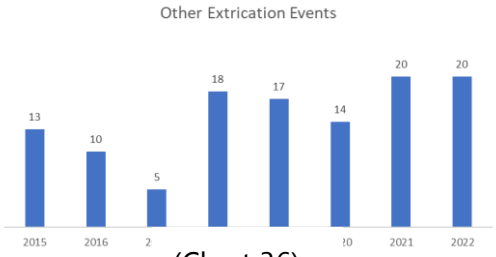
hart 35 also contributes to the questions

- Why are there so many responses to vehicle incidents when data indicates that fewer than 3% require extrication?
- What information was provided or gathered at the communications centre that would provide information about entrapment thus reducing multiple responses?
- Does the fire department have to respond to such a high number of vehicle incidents?
- Why are decisions as to whether the Saint John fire department is required at incidents being made by the fire department and dispatch centre rather than the paramedic service?

2.7 Other Extrication Events

Other Extrication Events include:

- Extrication, rescue, other (32 occurrences in eight years);
- Extrication of victims from building or structure (11 occurrences in eight years); and
- Removal of victim(s) from stalled elevator (74 occurrences in eight years).



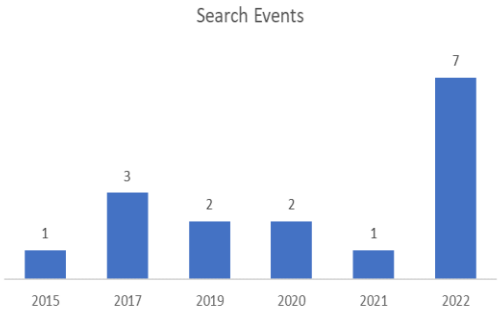
(Chart 36)

2.8 Search Events

Search events include

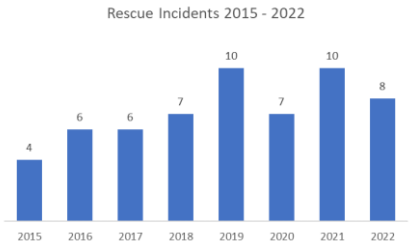
- searches for a person – land, water, underground, other.

Fortunately, only a few searches happen each year although a peak of 7 took place in 2022. (Chart 37)

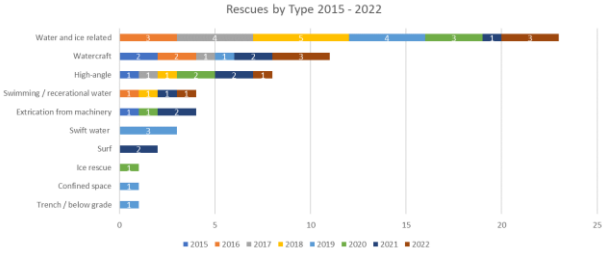


2.9 Rescue Incidents

Incidents categorized as rescues are shown by number of rescues by year in Chart 38 and by type in Chart 39 .



Some types of rescues did not occur in all years



2.10 Automatic Alarms and Alarm Malfunctions

Chart 40 demonstrates the volume of automatic alarms and the reasons that they occurred. A total of almost 5,000 false alarms occurred over 8 years. Of course, alarms are not false or accidental until confirmed as such, but there is a strong pattern indicating that alarms are almost always false.

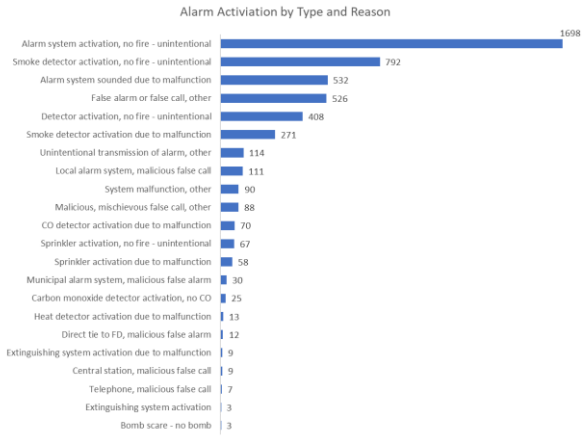


Chart 41 indicates the number of automatic alarm events that have occurred in each of the past eight years; that is, an average of 1.5 to 1.9 a day totaling almost 5,000 automatic alarms from 2015 to 2022.

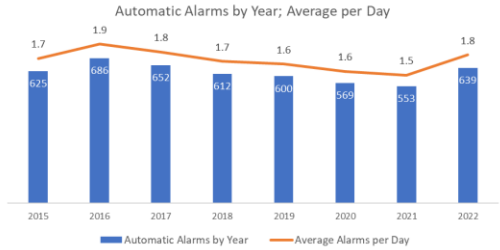


Chart 42 shows which months registered the greatest number of automatic alarms during the eight years of data examined.

There is insufficient information in the data to determine why automatic alarms occur in this distribution.

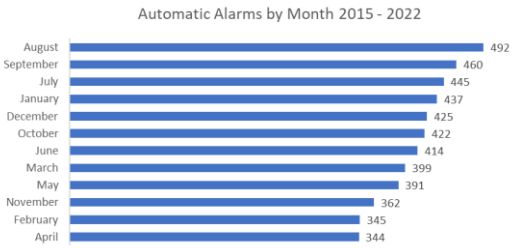
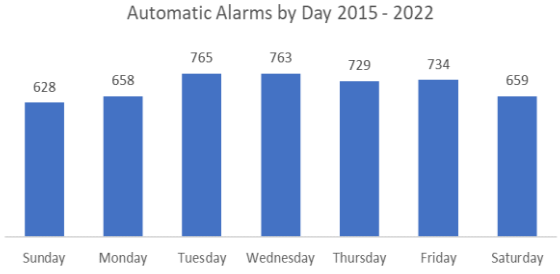


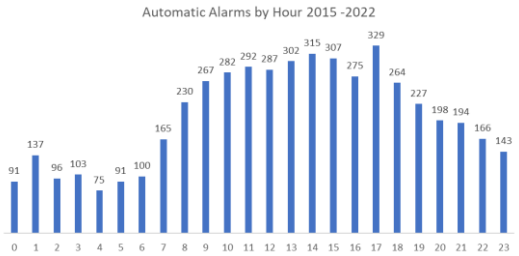
Chart 43 demonstrates the distribution of alarm activation by day. Slightly more occur Tuesday to Friday than Saturday, Sunday, or Monday.



There was insufficient information to explain why.

Chart 44 demonstrates the distribution of automatic alarms by hour. The majority of alarms occur when people are more active and have the tendency to set off alarms accidentally

Experience in other projects indicates that alarm maintenance contributes to unintentional alarms.



2.11 Other Incident Types

Chart 45 indicates the number of events categorized by the Office of the Fire Marshal as 'Other Incident Types'. The volume of incidents, by type, indicates the total for an eight-year period.

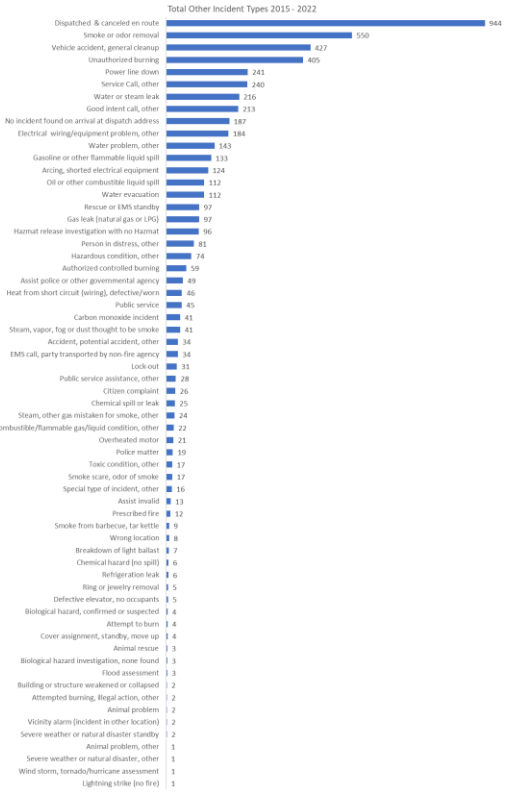
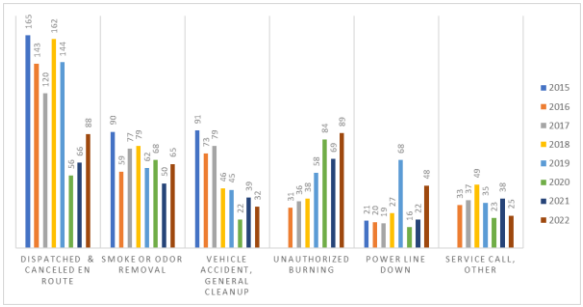


Chart 46 shows the most frequently occurring Incident Types by year.



There is a downward trend in some of the categories, particularly Dispatched and Cancelled En Route, which could mean better screening protocols at the dispatch centre, or a policy not to cancel responding vehicles, or, more likely, the COVID influence in 2020 and 2021 where fewer responses resulted in fewer cancellations.

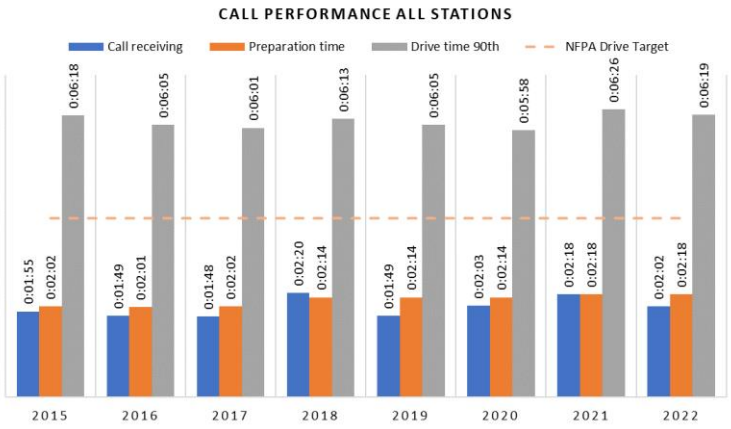
During the same period Unauthorized Burning incidents increased.

2.12 Incident Response Performance

The information in this section details the response performance of the whole fire department and by individual fire station. The content, and the charts, may be tedious for some readers but it is important to follow because, as we observed in the opening pages of this document, "…the subject of fire and rescue services … is much more complex than most people understand". Plus, these charts will be an important reference and support structure for the discussion of several operational and organizational discussions in Sections 4 through 7 and the recommended strategy.

Chart 47 through Chart 54 in Appendix B show performance of the first three stages of an incident process; that is, call receiving and dispatch, preparation time, and driving time (please see Exhibit 2: Response Graphic for further information). These are shown in the first three bars of the charts and are calculated at the 90th percentile which means that 90% of all incidents are responded to in the times shown, 10% take longer. As an example, the information shown for **2015** in Chart 47 (and the chart thumbnail below) indicates

- call receiving and firefighter alerting by the Saint John communication centre took one-minute and 55 seconds at the 90th percentile;
- preparation by firefighters to leave the station took two-minutes and two seconds at the 90th percentile; and
- drive time to incidents took six-minutes and 18 seconds at the 90th percentile.



Therefore, in 2015, 90 percent of all incidents were responded to within (0:01:55 + 0:02:02 + 0:06:18 =) 10 minutes and 15 seconds. That duration doesn't include the time to evaluate the incident, determine equipment needed, hook up to a fire hydrant or tanker truck, or other activities. Some individual incidents took longer than the 90th percentile shown in 2015, the majority took less time. But even a three-minute travel time, combined with approximately two minutes for call taking and two minutes for turnout totals seven minutes – and that doesn't include the approximately three to five minutes to get water on a fire or access other equipment. Therefore, emergency intervention can take 10 to 12 minutes even in a best-case scenario.

Chart 47 to Chart 54 show call performance for all stations as well as the National Fire Protection Association driving time target of 4:00 minutes.

Some other information of which to be aware when reviewing the charts:

- The National Fire Protection Association (NFPA) standard for Call Handling is 64 to 90 seconds, 90 percent of the time. The historical call handling time by the Saint John joint services communication centre is 110 to 120 seconds;
- The NFPA standard for Turnout is 80 seconds, 90 percent of the time. Historical turnout time for Saint John fire is approximately 120 seconds. Turnout is sometimes affected by station design.
- The National Fire Protection Association standard for drive time target is 240 seconds or less for the first engine company at a suppression incident (fire), and 360 seconds for the second company, both at 90 percent of the time.
- Saint John Fire Department exceeds the NFPA travel time standard by approximately 120 seconds or more based on response to both urban and less populated areas of the city. Urban areas are served more quickly and the NFPA drive time target is often met in the Uptown area.

The department-wide 90th percentile drive time has not changed significantly since 2015. Driving time will be affected by the locations of fires and other emergency incidents.

Chart 48 to Chart 54 in Appendix B offer the same information as shown in Chart 47, but by station, so that readers can see the variance in performance between stations and compared to overall fire department performance.

- **Station 1's** performance for Drive Time is in the range of 26 to 147 seconds less (faster) than the aggregate of stations. This is likely because it principally serves as a first responding

station to a mostly urban area. Other than in 2020, station 1's Drive Time was close to, or under, the NFPA standard of first arriving apparatus in 240 seconds or less.

- **Station 2's** performance for Drive Time is in the range of almost the same to 122 seconds longer than the aggregate of all stations. This is likely because it serves less densely populated urban and rural areas as a first responding station and has longer distances to cover than Uptown stations.
- **Station 4's** performance for Drive Time is in the range of almost the same to 123 seconds longer than the aggregate of all stations. Like station 2 it also serves a less densely populated area.
- Over the 2015 to 2022 period, **station 5's** Drive Time performance was up to 135 seconds better than the overall service performance, except for 2020 to 2022 when Drive Time was 13 to 22 seconds better than the overall fire department's time. We can't come to a determination as to why performance changed in 2020 – 2022. We don't believe that closing station 8 is a factor because it closed at the end of 2020 and driving time increased in 2020 while the station was still operational.
- **Station 6's** Drive time is from 54 seconds to 92 seconds quicker than overall service performance.
- **Station 7** is the outlier with respect to performance when compared to historical fire department-wide response and NFPA drive time. Station 7 exceeds the fire department-wide drive time performance by 152 to 280 seconds – depending on the year except for 2020 where times were almost identical to the service-wide times.

  Station 7 covers a large rural area and it's possible – but we can't prove – that, during peak COVID, a reduction in responses to medical incidents, vehicle collisions, and other events which offer some flexibility in determining the criticality for response, reduced travel and overall response times.
- Data for **station 8** extends to the end of 2020 at which point it was closed. Station 8 performed the same or up to 78 seconds better than department-wide levels.

2.13 Striving to Meet National Fire Protection Association Drive Time Guidelines

Most North American fire departments strive to meet suggested standards laid out in National Fire Protection Association 1710 (for full-time fire services) and 1720 (combined fire services and volunteers). The two sections most frequently referenced by the fire service are the articles dealing with driving time and number of firefighters at a fire. Both sections have a significant impact on physical assets and human resources. NFPA 1710 indicates that the driving time for the first arriving fire company at a fire suppression incident should be four minutes, the second

company six minutes or less, and an initial full alarm assignment[5] in 8 minutes or less, all measured at being achieved 90% of the time.

The NFPA standards also recognize that jurisdictions might establish other response targets. Section 4.1.1 calls for authorities to maintain a written statement or policy that establishes

1. Existence of the fire department
2. Services the fire department is required to provide
3. Basic organizational structure
4. Expected number of fire department members
5. Functions that fire department members are expected to perform.

Such information is usually captured in a fire department establishing and regulating bylaw.

Section 4.1.2 states that

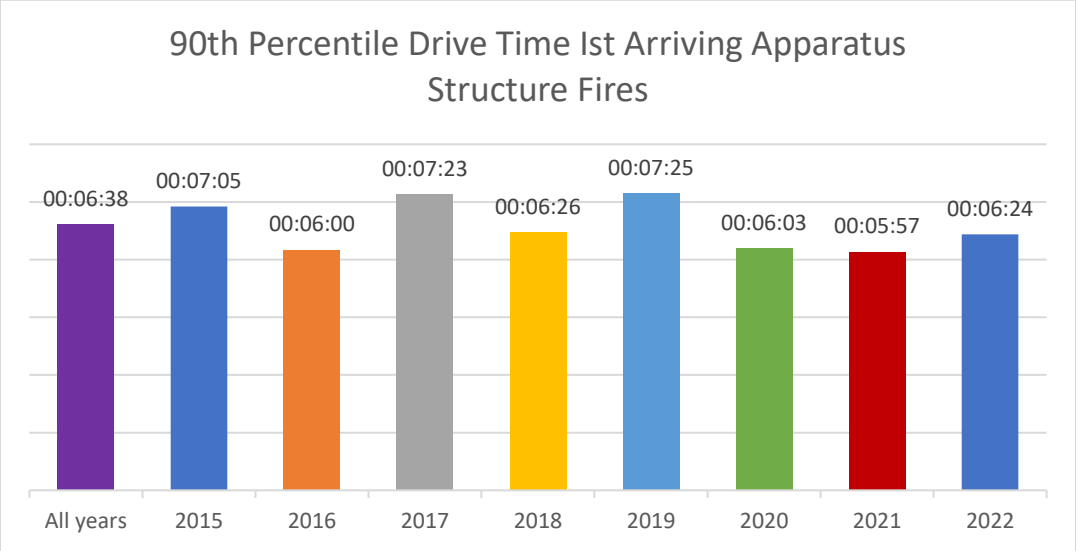
> *The fire department organizational statement shall provide service delivery objectives, including specific time objectives for each major service component [i.e., fire suppression, emergency medical services (EMS), special operations, aircraft rescue and fire fighting, marine rescue and fire fighting, and/or wildland fire fighting] and objectives for the percentage of responses that meet the time objectives.*

Hence, even though National Fire Protection Association criteria are often prescriptive, they also recognize that other considerations may cause authorities to establish other geographic or municipal performance and resource objectives.

- In 2022 the Saint John Fire Department's 90th percentile driving time for the first arriving vehicle to structure fires, measured on a city-wide basis – was 6 minutes and 24 seconds, two minutes and 24 seconds longer than the 1710 standard.
- In 2021 the 90th percentile driving time was 5 minutes and 57 seconds, one minute and 57 seconds greater than the National Fire Protection Association standard although 27 seconds less than in 2022. But in 2022 there were several more fires in station 7's area (more rural) than in 2021 protracting the city-wide driving time.

[5] An initial full alarm assignment is defined in Section 3.3.40 of the National Fire Protection Association 1710 edition as "Those personnel, equipment, and resources ordinarily dispatched upon notification of a structure fire".

Chart 5: 90th Percentile Driving Time to Structure Fires

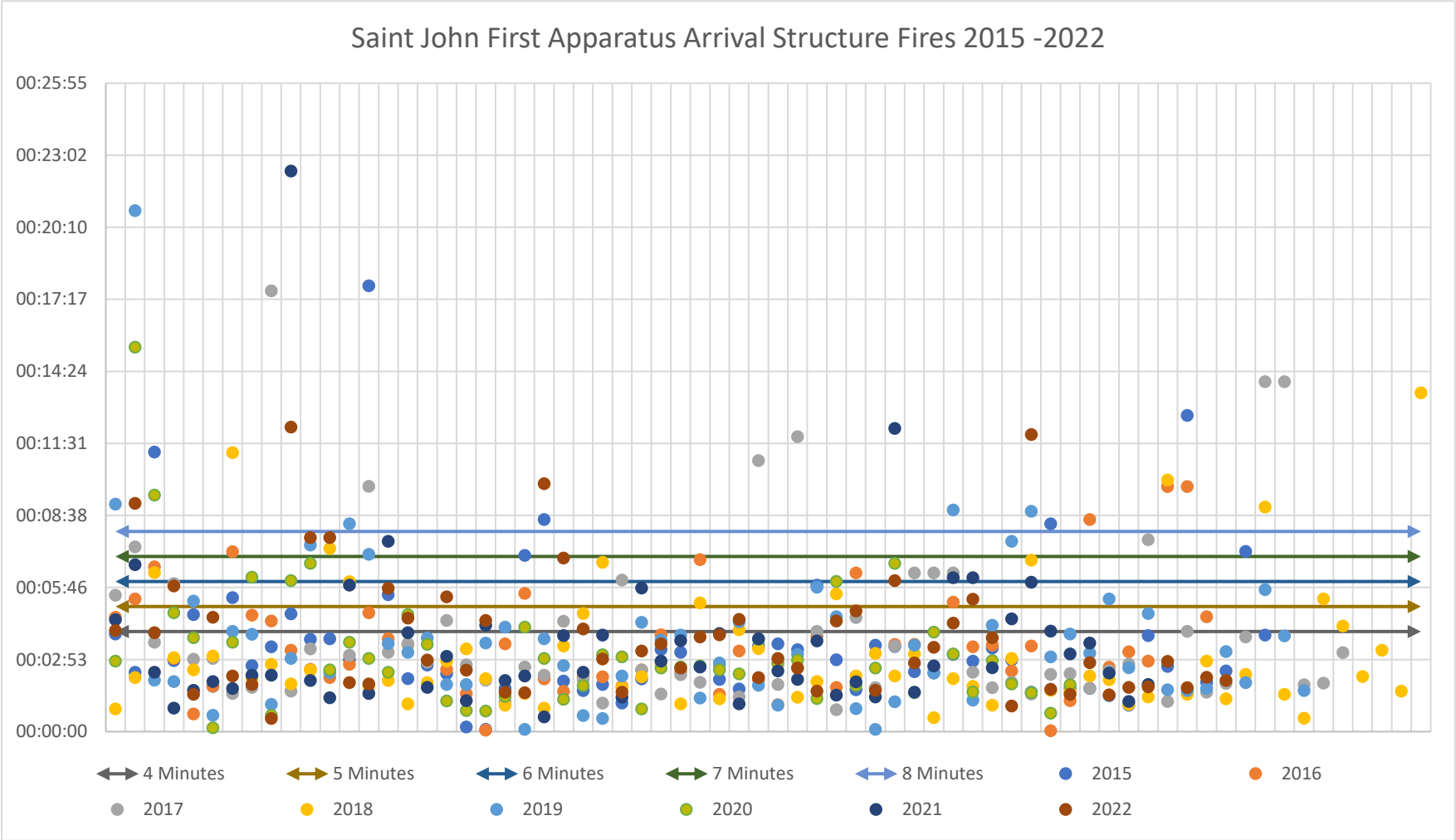


A more specific way of assessing apparatus response is to examine the arrival distribution of 1st, 2nd, 3rd, and 4th trucks, individually, for all structure fires by year, including examining the outlier times to determine if they should be included in the percentile calculations for each truck arrival.

Chart 6 shows the actual driving times for the first arriving truck to structure fires from 2015 to 2022. Some incidents show that the first truck driving time ranged from 11 minutes to over 22 minutes. Considering the geography of Saint John, occasional driving times of 11 minutes may occur but others of 15 minutes or more should be manually checked to determine the circumstances.

Driving time distribution charts for the 1st, 2nd, 3rd, and 4th fire truck can be found in Appendix C.

Chart 6: Arrival Time Distribution 1st Apparatus - Fires



Records relating to very short or long driving times should be manually checked to determine if incidents were actually responded to in the times indicated.

Driving times and other response standards are addressed in Section 7, *Response Time and Addressing 90th Percentile Guidelines*.

2.14 Where do Fires Occur?

2.14.1 Structure Fires

As part of this project Pomax created 49 Drive Time and structure fire location maps for each year from 2015 to 2022 that included several fire station configurations. Exhibit 4 is one example and shows structure fire locations in 2022 with 4-minute travel time contours around each of the existing fire stations. Appendix D shows structure fires for the period 2015 to 2022 inclusive.

Exhibit 5 shows structure fire events for the eight years 2015 to 2022. The concentration of fires in the Uptown area is obvious.

As Exhibit 4, Exhibit 5, and Appendix D demonstrate, the majority of structure fires occur in urban areas and mainly Uptown. The distribution of fire stations, particularly stations 1, 5, and 6 offer good response to the concentration of structure fires.

Exhibit 4: Structure Fires 2021

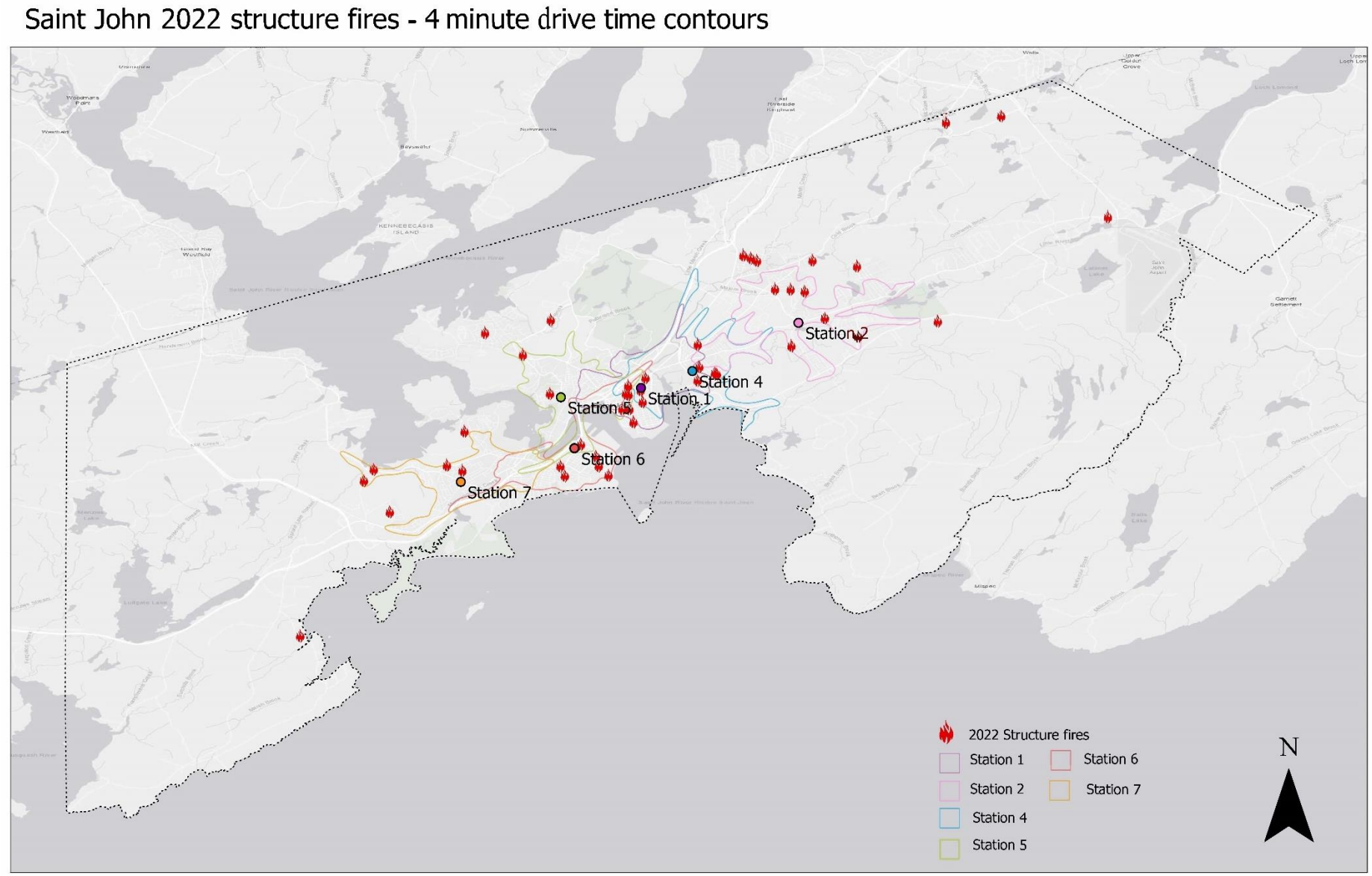
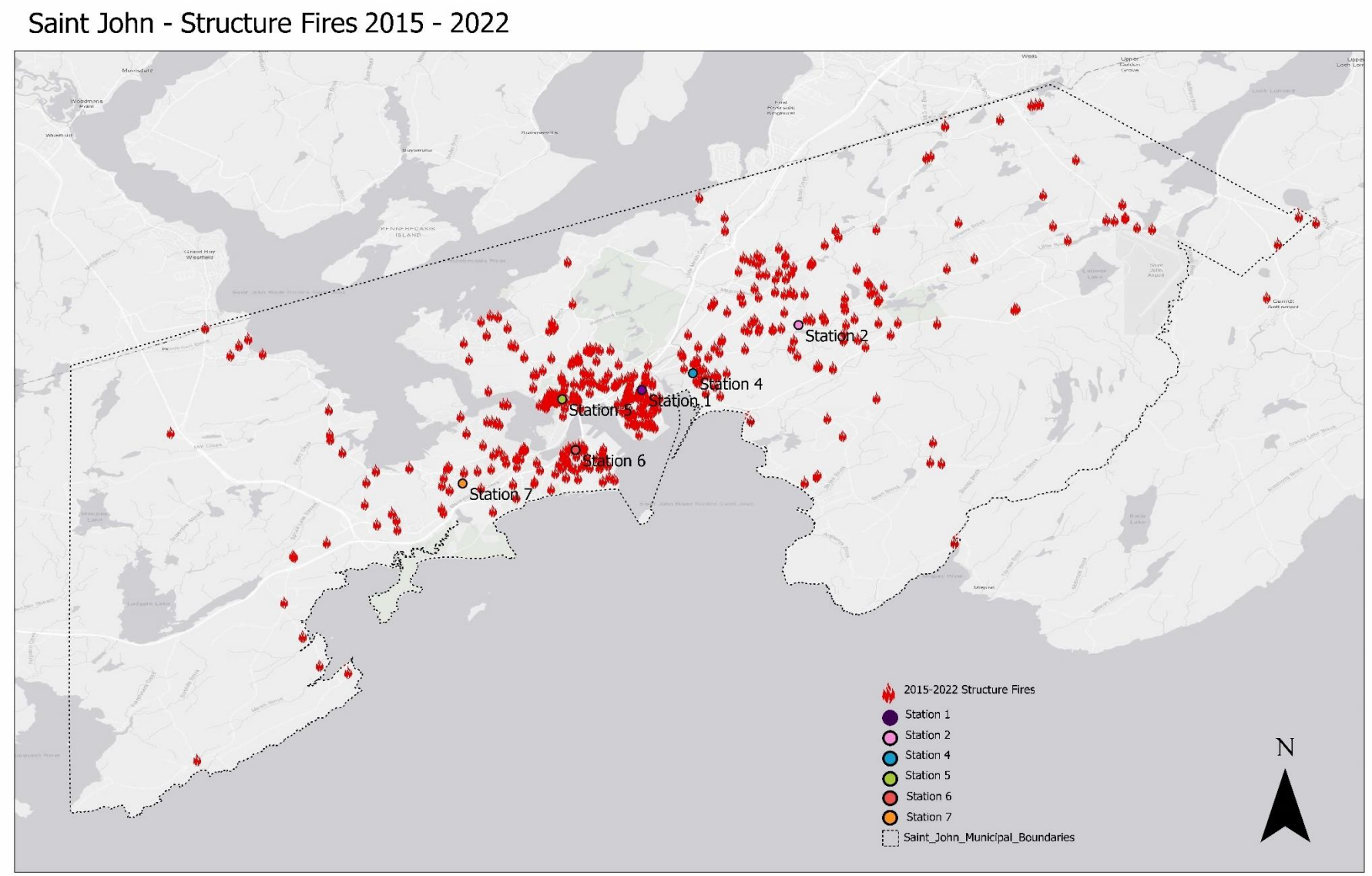


Exhibit 5: Saint John 2015 - 2022 Structure Fires



2.14.2 Structure Fire Patterns

We reviewed the 414 structure and chimney fires that occurred in the city from 2015 to 2021[6] to see if we could discern any patterns and discovered that the majority occurred in residential or light commercial buildings. We were not able to determine the number that were in multi-unit buildings vs. single- or two-family homes vs. light commercial but that information could be found by the Saint John Fire Department, either retrospectively or as part of future information gathering, and would assist in highlighting the types of buildings and use that should receive the benefit of fire inspections and public education.

We used portions of the city's property database to identify the year that buildings, which experienced a fire, were constructed. Two-hundred and ninety-four of the locations had year-built information in the property base and we discovered that the two peaks of fires occurred in buildings constructed in the decades of 1900 – 1910 and the 1970s. It would be speculative to offer ideas as to why these concentrations have occurred, but it is something into which the fire department should delve to see if possible common causes can assist prevention and education activity.

Chart 7 (Page 33) shows structure fires based on the decade built.

Table 1: Structure Fires by Decade Built (page 33) provides the same information in a tabular format.

[6] Data for 2022 was received after the structure fires by building decade was completed. Due to the time-consuming manual nature of the exercise and the obvious results shown in Chart 7, 2022 information was not included.

Chart 7: Structure Fires by Building Decade

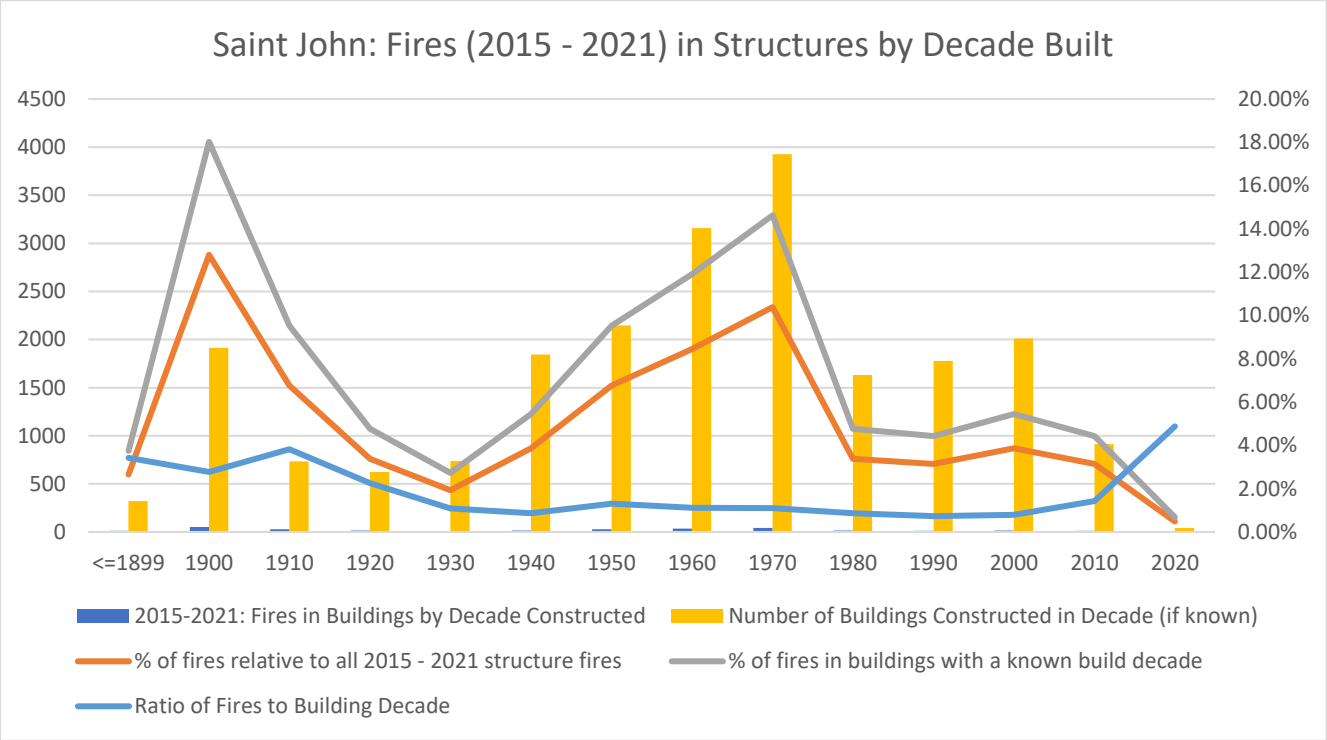


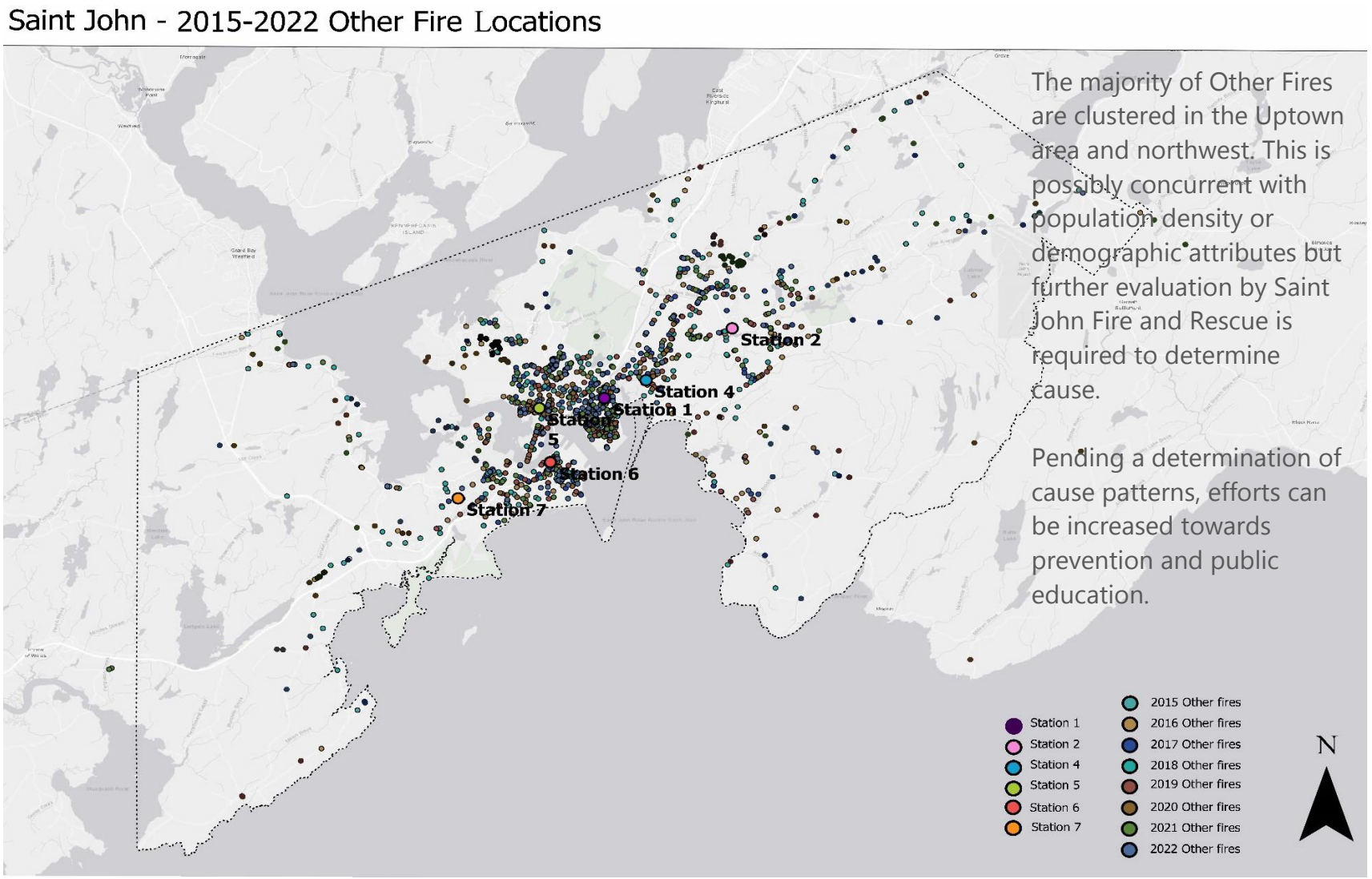
Table 1: Structure Fires by Decade Built

	<=1899	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990	2000	2010	2020
Number of Buildings Constructed in Decade (if known)	321	1913	732	622	738	1844	2147	3157	3927	1633	1778	2011	914	41
2015-2021: Fires in Buildings by Decade Constructed	11	53	28	14	8	16	28	35	43	14	13	16	13	2
% of fires relative to all 2015 - 2021 structure fires	2.66%	12.80%	6.76%	3.38%	1.93%	3.86%	6.76%	8.45%	10.39%	3.38%	3.14%	3.86%	3.14%	0.48%
% of fires in buildings with a known build decade	3.7%	18.0%	9.5%	4.8%	2.7%	5.4%	9.5%	11.9%	14.6%	4.8%	4.4%	5.4%	4.4%	0.7%
Ratio of Fires to Building Decade	3.4%	2.8%	3.8%	2.3%	1.1%	0.9%	1.3%	1.1%	1.1%	0.9%	0.7%	0.8%	1.4%	4.9%

2.14.3 Locations of Other Fires

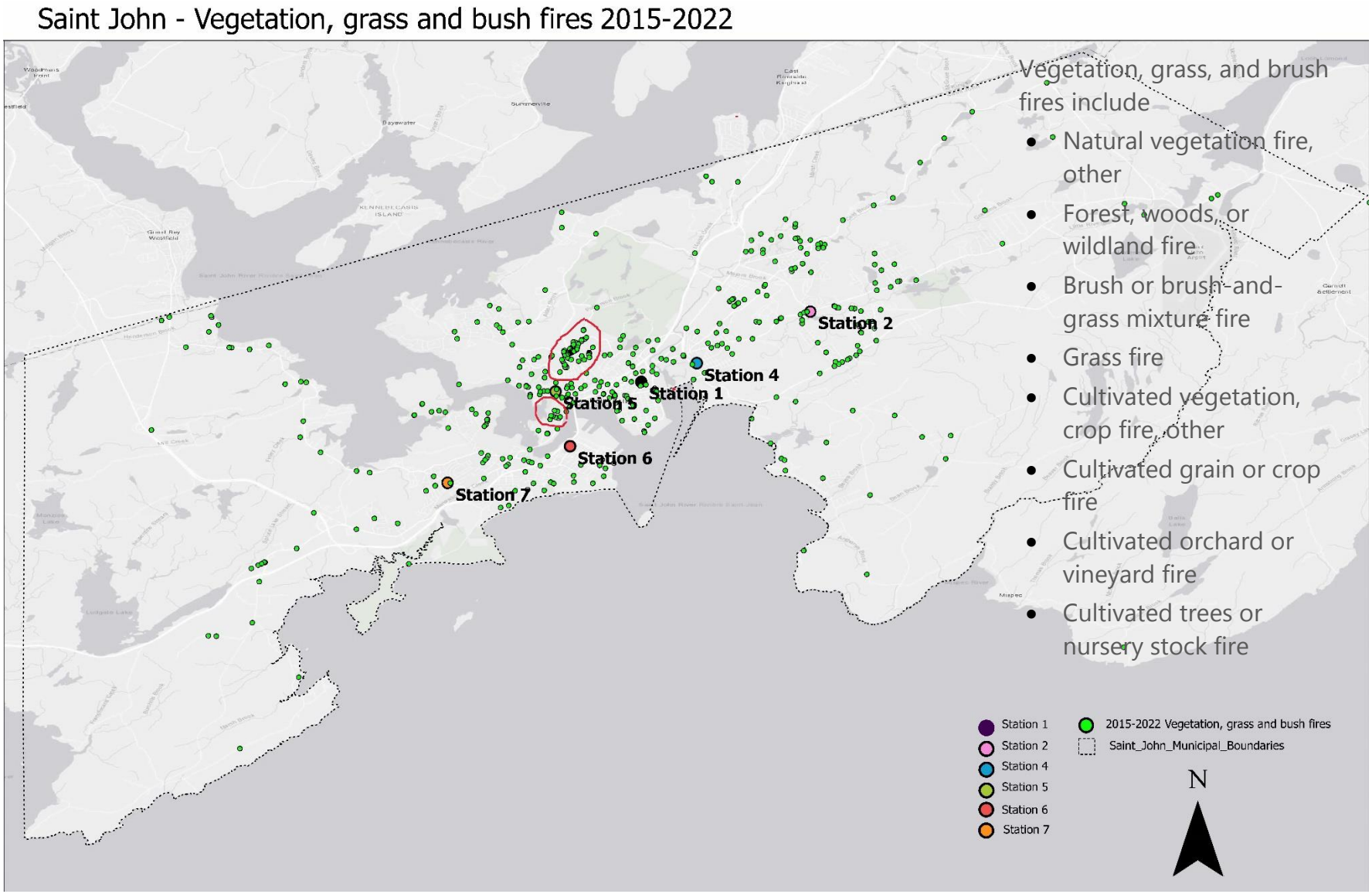
Approximately 180 to 190 non-structure 'Other Fire' incidents occur each year such as cooking fires confined to a container (e.g. pot on stove), outside storage, grass fires, rubbish container, passenger vehicles, etc.

Exhibit 6: Locations of Other Fires (non-structure) 2015- 2022



2.14.4 Location of Vegetation, Grass, and Bush Fires

Exhibit 7: Vegetation, Grass, and Bush Fires 2015 - 2022



The two areas circled in red in Exhibit 7 indicate a concentration of vegetation and similar fires. The fire department is aware of these problem areas and the possible reasons. Later in this report we offer suggestions to reduce the frequency of these and other fire events.

2.15 How Busy is the Fire and Rescue Service?

We see, from time to time, media information indicating elevated fire department activity levels. We measured the fire service's activity levels in part because our recommendations might result in additional duties for firefighters, so it is prudent to ensure resources are available.

We measured activity three ways by

1. asking senior fire staff to outline firefighter daily activity breakdown so we could understand the duties firefighters have to fulfill on each shift, such as training, in addition to responding to incidents;
2. calculating the minutes occupied over the past eight years from the time firefighters were alerted to respond to an incident until the time they left the incident; and
3. estimating core service requirements in relation to discretionary (non-core) service requirements.

2.15.1 Firefighter Activity Other Than Responding to Incidents

Firefighters work 24-hour shifts and are expected to accomplish certain responsibilities in addition to incident response, while on duty. Activities and hours committed to non-response assignments will vary depending on interruption by core and non-core incident volume.

The daily minutes shown in Table 2, column 3 are based on the outline referenced in bullet 1, above, and are multiplied by 365 days resulting in the minutes spent in a year (column 4). There are 525,600 minutes in a year. The annual percentage of time for daily duties is shown in column 5. Activities and timing in Table 2 are a representation which might vary because of incident response or other factors.

Table 2: Regular Shift Activities for Firefighters

1	2	3	4	5
Time of Day	**Duty**	**Daily Minutes**	**Annual Minutes**	**Annual Percentage by Activity**
0600 – 0800	Unassigned – possibly breakfast	120	43,800	8.3%
0800 – 0930	Apparatus and equipment check, coordination meeting - memo review, plans for the shift, road closure, operational changes/briefs, training schedule, housekeeping break	90	32,850	6.3%
0930 – 1145	Training - in station development and maintenance training by station officer or with Training Officer - job performance requirements checkoffs – (there are a number of job performance requirements checkoffs assigned each month)	135	49,275	9.4%
1145 – 1200	May conduct pre-incident planning surveys and coverage area familiarization depending on training activity.	15	5,475	1.0%
1200 – 1300	Lunch	60	21,900	4.2%

1	2	3	4	5
Time of Day	**Duty**	**Daily Minutes**	**Annual Minutes**	**Annual Percentage by Activity**
1300 – 1630	Training - in station maintenance training by station officer or training with Training Officer	210	76,650	14.6%
1630 - 2300	Varies depending on situation but is not a structured time	390	142,350	27.1%
2300 - 0600	Can retire to the dormitory	420	153,300	29.2%
	Total Annual Minutes		525,600	100%

Breaking down the on-duty time into categories by percentage results in the following.

Table 3: Shift Activities by Percentage

Rest time including dormitory time	29.2%
Total training Time per Day	24.0%
Total unassigned Time per Day	36.5%
Total unassigned and Rest Time	65.6%

We need to remain aware, though, that the breakdown of the 525,600 minutes shown in Table 2, above, represents one staffed fire truck. There are six or seven trucks on duty 24-hours a day and possibly two tank trucks with one firefighter assigned to each depending on sick time and other absences, meaning that if 7 trucks are staffed 24 hours a day each year, the available minutes annually would be 3,153,600 minutes or 52,560 truck hours and 245,280 staffed hours (365 days x 24 hours x 7 trucks x 4 firefighters per truck).

2.15.2 Firefighter Activity Responding to Incidents

We counted the minutes that all trucks – and therefore firefighters – were occupied over the past eight years from the time they were alerted to respond to an incident until the time they left the incident. The result doesn't show the time to clean equipment or restock after returning to the fire station (if necessary).

Table 4 shows the minutes that every fire truck was engaged each year, which takes into account multiple trucks sent to fires or other incidents.

Table 4: Minutes Per Year Trucks Were Actively Engaged in Response and Incidents

	2015	2016	2017	2018	2019	2020	2021	2022
Structure or chimney fires	45051	48141	62273	60264	35930	29750	36356	33677
Other fires	10508	10955	10378	9749	9171	9532	11105	8657
Vegetation, grass, bush fires	1690	6772	3908	8654	2644	2206	3160	2808
Fire related	153	549	615	457	682	380	69	808
Medical incidents	40481	36804	40059	41836	39627	11388	8034	21544
Vehicle incidents	5553	4884	5995	6953	6846	5306	5409	3648
Vehicle incidents no injury	3503	3531	4211	5966	7128	4187	7124	6217

	2015	2016	2017	2018	2019	2020	2021	2022
Vehicle extrication	606	542	573	887	105	251	531	705
Other extrication	532	1095	183	1269	985	775	1024	1055
Search	61	0	536	489	588	1290	1122	3015
Rescue	1001	1423	722	2643	2531	1029	2221	1989
Alarm & malfunction	26459	27122	27098	12438	11396	14766	19173	15634
Other incidents	28838	23946	25097	30029	27718	19643	18881	19524
Total Incident Time	**164438**	**165763**	**181648**	**181634**	**145352**	**100503**	**114208**	**119281**

- There are 3,153,600 vehicle minutes in a year based on 6 trucks being available (allowing for absences), more if seven trucks are available. As an example, in Table 4, in 2022, trucks were engaged in incidents 119,281 minutes out of 3,153,600 minutes in a year (1,980 hours out of 52,560 hours or 4% of available time).
    - Table 5 presents the same information as in Table 4 but formatted as percentages. The highest truck engagement categories, by percentage, are indicated by red font. Structure and chimney fires have historically resulted in the greatest occupation of vehicles and staff, although still less than 2% of available time. Multiple trucks (usually four and Platoon Chief) are dispatched to fires, so trucks and staff are engaged a greater amount of time compared to other, more frequent, event types where only one or two trucks are usually dispatched.
    - Medical incidents are the second highest time engagement by call type. Even though there are many more medical events than fires, usually only one vehicle is sent to a medical incident. Please note the reduction of medical incidents by percentage in 2020 and 2021 due to COVID influence.
    - The third highest use of vehicle and firefighter time is due to alarms and malfunction. The percentage expended on alarms and malfunctions declined in 2018, which is when Saint John revised its response protocols to alarms from four trucks and a Platoon Chief to two trucks.

Table 5: Firefighter Activity by Percentage Based on Incident Type

	2015	2016	2017	2018	2019	2020	2021	2022
Structure or chimney fires	1.43%	1.53%	1.97%	1.91%	1.14%	0.94%	1.15%	1.07%
Other fires	0.33%	0.35%	0.33%	0.31%	0.29%	0.30%	0.35%	0.27%
Vegetation, grass, bush fires	0.05%	0.21%	0.12%	0.27%	0.08%	0.07%	0.10%	0.09%
Fire related	0.00%	0.02%	0.02%	0.01%	0.02%	0.01%	0.00%	0.03%
Medical incidents	1.28%	1.17%	1.27%	1.33%	1.26%	0.36%	0.25%	0.68%
Vehicle incidents	0.18%	0.15%	0.19%	0.22%	0.22%	0.17%	0.17%	0.12%
Vehicle incidents no injury	0.11%	0.11%	0.13%	0.19%	0.23%	0.13%	0.23%	0.20%
Vehicle extrication	0.02%	0.02%	0.02%	0.03%	0.00%	0.01%	0.02%	0.02%
Other extrication	0.02%	0.03%	0.01%	0.04%	0.03%	0.02%	0.03%	0.03%
Search	0.00%	0.00%	0.02%	0.02%	0.02%	0.04%	0.04%	0.10%

	2015	2016	2017	2018	2019	2020	2021	2022
Rescue	0.03%	0.05%	0.02%	0.08%	0.08%	0.03%	0.07%	0.06%
Alarm & malfunction	0.84%	0.86%	0.86%	0.39%	0.36%	0.47%	0.61%	0.50%
Other incidents	0.91%	0.76%	0.80%	0.95%	0.88%	0.62%	0.60%	0.62%
Total Incident Time	5.2%	5.3%	5.8%	5.8%	4.6%	3.2%	3.6%	3.8%

2.15.3 Staffing for Peak Activity

On-scene time within the Saint John fire service is low at less than 5% of all time available, but that is not unusual for many fire services. Fire services staff for peak load and what can be called the 'what if?' or resilience factor; that is, the possibility of something adverse happening while multiple trucks and staff are in use, for example, at a fire, and another emergency incident occurs. Fire departments pose the question "What if another call comes in while we are tied up at an emergency"? The basis is that additional trucks and staff would be needed to respond in such a circumstance. (Please see Section 2.15.4)

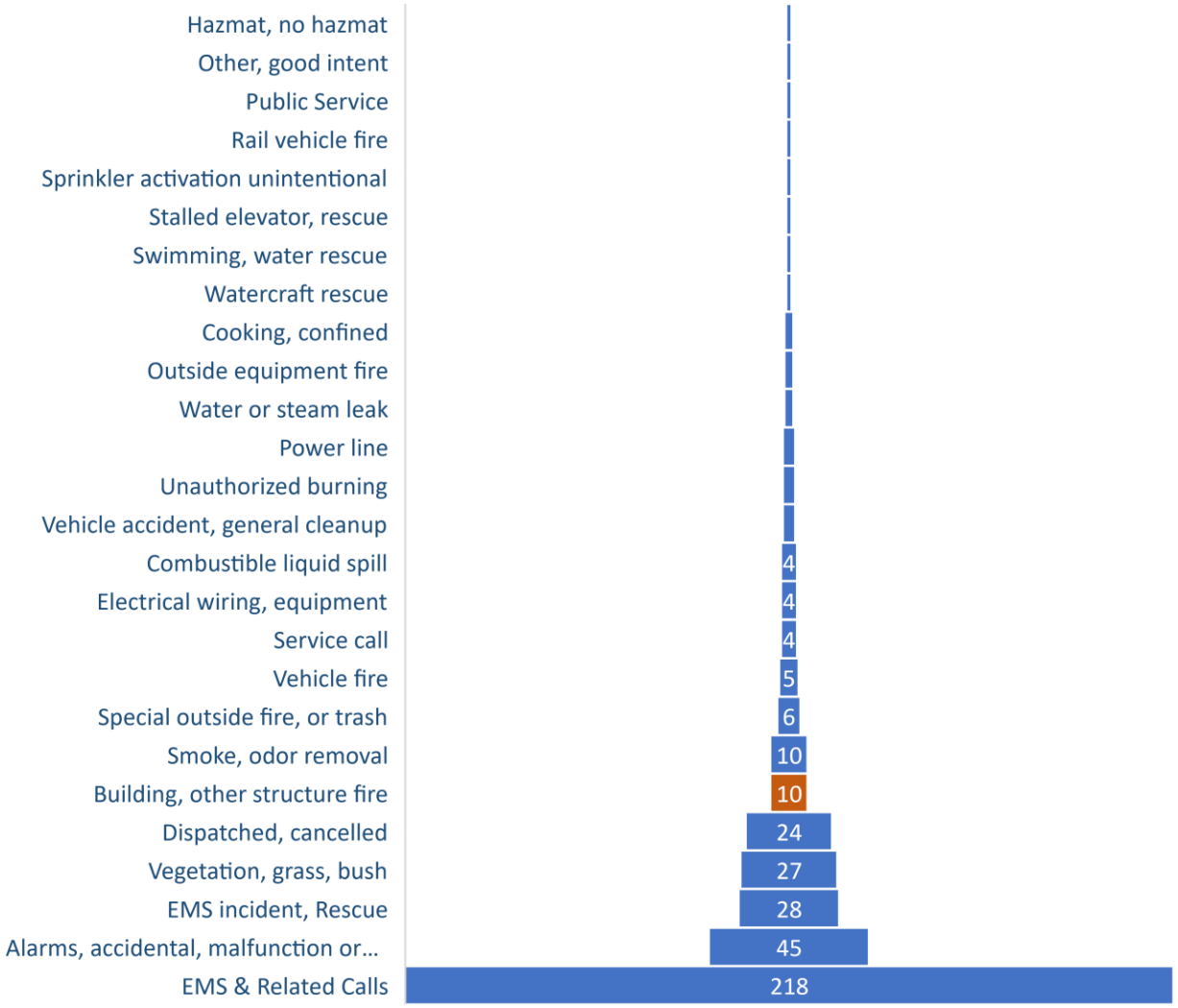
Therefore, staffing is designed to accommodate usual or 'normal' peak activity. In the case of Saint john, that is seven fire trucks, eight prior to 2021.

Therefore, traditional staffing is designed to accommodate usual or 'normal' peak activity plus a residual factor in case of other incidents. In the case of Saint john, that is seven fire trucks, eight prior to 2021.

Determining 'normal peak activity', plus the need for residual capacity, is part of risk analysis (section 4). Periods of peak activity happen about 60 times a year in Saint John when structure and other fires occur, and multiple vehicles are deployed.

2.15.4 Concurrent Incidents

As part of a risk analysis, and to contribute to staffing analysis, we ascertained the number of times in each of the past eight years where a call for assistance was received by the dispatch centre – for any call type – while a fire incident was ongoing. We also determined the type of call that was received while the fire event was taking place. Our primary intent was to find the frequency that a structure fire was in progress when a second call was received, and the frequency of a structure fire event occurring while another structure fire was in progress.



For this exercise, we considered all fire types that would usually receive a multi-truck response such as

- buildings,
- vegetation, grass, and bush,
- chimneys and flu,
- fire in mobile properties or portable buildings used in a fixed location,
- fires in a structure other than a building, and
- rail vehicle fire.

Outside waste or trash fires and passenger vehicle fires were not included because they can often be handled by one or two trucks.

2.15.4.1 What did we discover?

Over the eight-year period examined, there were 409 other incidents for which a call for assistance was received while one of the six fire types shown in the bullets above was ongoing. So, on average, a second call was received about 51 times a year when one of the fire types was taking place. But there were some years when concurrent calls happened 70 times whereas, in 2020 and 2021, concurrent calls took place only 19 and 28 times respectively, 36 in 2022.

Of the 409 instances over eight years

- 218 were EMS related calls,
- 45 were alarm malfunctions,
- 28 were EMS rescues,
- 27 were vegetation fires,
- 24 were dispatched and cancelled,
- 10 were structure fires (these are the ones of most concern as to whether adequate resources were available),
- the balance occurred between one and 10 times over the eight-year period.

From a risk perspective,

- the 218 EMS incidents were likely of little danger to the patients, and not a core part of fire service duties. The response time issue; that is, the popular misconception that seconds count, is largely considered settled science — it matters only in cardiac/respiratory arrest and asphyxia. [e] [f]
    - The 45 alarm malfunctions do not represent a risk because they were false alarms. We understand that some may ask "What if they weren't?" – but they were, and that is the process of risk analysis: to determine what data informs us with respect to probability rather than possibility.
    - 28 of the concurrent incidents were EMS rescues; probably vehicle entrapment, possibly requiring hydraulic extrication equipment but there is not enough detail in the records to tell the city whether there was a risk to victims or the extent of risk.
    - The 27 vegetation fires (grass, bush) could become serious but, initially, probably not a threat to buildings or people. Once again though, information to determine public risk, how many trucks and staff were needed to supress the fires, if there was a delay, or the extent to which, or if, a delay compounded the situation is only available in narrative form in officers' notes and not readily accessible in a relational table or data base.
    - 24 events were dispatched and cancelled. The risk here is more about using resources unnecessarily, gathering information at the dispatch centre, whether the department was dispatched based on policy rather than incident-specific information, and whether the apparatus dispatched were readily available or had to be reassigned from the fire to which they assigned.

    - The 10 structure fires were the most concern from a risk perspective because structure fires are usually the most resource intensive call type. On the surface, experiencing concurrent structure fires 10 times could seem like a significant risk consideration, but that was over an eight-year period or an average of 1.4 a year. There is also no way of knowing, except for a mostly manual search of records, whether all apparatus were still in use on the initial fire when the second call was received, or if there was a delay, and whether any delay resulted in serious adverse effect.
- Such an occurrence one or twice a year might be a risk the city deems to be worth taking, particularly if there are concerted efforts to prevent fires and drive down the incidence.
- The other concurrent incident types took place from one to 10 times in eight years.

3 Apparatus and Assets

Apparatus and asset replacement are primary considerations for fire services. Fire trucks and other vehicles are part of the work environment for a firefighter, and they cost a lot of money to purchase, maintain, and fuel. They also last 15 to 20 years. So, a $900,000 truck that lasts 15 years costs $60,000 a year plus maintenance and fuel. If a typical heavy truck lasts 20 years, the cost is $45,000, although expected increases in maintenance will add to that annual amount in the last few years of use. A 1.4-million-dollar ladder truck is about $56,000 a year. We acknowledge that these are expensive work environments. We have seen recent quotes in excess of $2 million for a platform truck.

Diesel fuel for the fleet ranges from $38,000 to $99,000 annually, depending on fuel prices. The $38,000 figure was during COVID when mileage and call volume was low. Gasoline for light vehicles ranged from $16,000 to $30,000 annually.

Lifetime maintenance costs for the heavy truck fleet is almost $2.1 million dollars at the time of this report (Chart 9).

Chart 9: Heavy Truck Lifetime Maintenance

Description	Vehicle Class Code	Purchase Price	Lifetime Maintenance Cost
2020 E-ONE TYPHOON PUMPER	Heavy Pumper/Rescue Truck	$671,979	$3,146
2013 PIERCE SABER PUMPER	Heavy Pumper/Rescue Truck	$380,390	$114,973
2006 E-ONE PUMPER	Heavy Pumper/Rescue Truck	$322,219	$162,777
2006 E-ONE PUMPER	Heavy Pumper/Rescue Truck	$437,384	$160,176
2015 E-ONE TYPHOON PUMPER	Heavy Pumper/Rescue Truck	$506,600	$61,617
2004 E-ONE RESCUE PUMPER	Heavy Pumper/Rescue Truck	$360,079	$327,269
1993 SPARTAN PUMPER	Heavy Pumper/Rescue Truck	$58,000	$149,329
2008 E-ONE BRONTO AERIAL	Heavy Ladder Truck	$1,122,617	$395,621
2006 AERIAL E-ONE HP 100 QUINT	Heavy Ladder Truck	$525,000	$21,278
2003 E-ONE AERIAL LADDER	Heavy Ladder Truck	$551,168	$434,871
2001 FREIGHTLINER TANKER	Heavy Tanker Truck	$203,463	$183,408
2007 INT. E-ONE TANKER	Heavy Tanker Truck	$214,609	$63,733
	Total Maintenance		**$2,078,199**

Some ask why these trucks can't be kept longer than 15 or 20 years since the mileage is often low and they are well maintained. Trucking firms keep heavy trucks for hundreds of thousands of kilometres, so why do fire trucks have to be replaced every 15 to 20 years?

One of the guidelines recognized by fire services is National Fire Protection Association 1901-16, which recommends the 15-to-20-year replacement timelines and recognizes other factors that must be taken into account. In Canada, Underwriters Laboratory of Canada (ULC) standard ULC-S515 is similar to the NFPA standard, and its development process is almost identical to that of the NFPA.

From Annex D of NFPA 1901-16

> *It is generally accepted that fire apparatus, like all types of mechanical devices, have a finite life. The length of that life depends on many factors including vehicle mileage and engine hours, quality of the preventative maintenance program, quality of the driver training program, whether the fire apparatus was used within the design parameters, whether the apparatus was manufactured on a custom or commercial chassis, quality of workmanship by the original manufacturer, quality of the components used, and availability of replacement parts, to name a few.*
>
> *In the fire service, there are fire apparatus with 8 to 10 years of service that are simply worn out. There are also fire apparatus that were manufactured with quality components, that have excellent maintenance, and that have responded to a minimum number of incidents that are still in serviceable condition after 20 years. Most would agree that the care of fire apparatus while being used and the quality and timeliness of maintenance are perhaps the most significant factors in determining how well a fire apparatus ages.*

Possibly more, or as, important than the mechanical age of the truck are safety considerations that have been implemented during a 15-to-20-year period. Critical enhancements in design, safety, and technology should play a key role in the evaluation of an apparatus' life cycle (NFPA 1901-16 Annex D).

Table 6 identifies the year, mileage, pump capacity, and water or foam on board the fire trucks. Chart 10 shows the serviceable life remaining based on the guideline in National Fire Protection Association 1901.

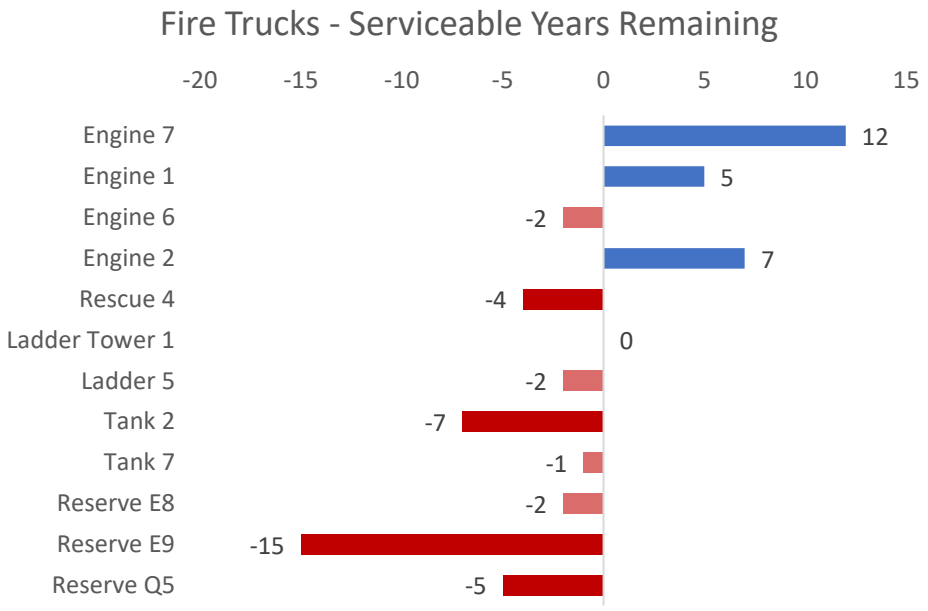
The Saint John fire department fleet is older and needs to be refurbished, but consideration should be given to the kind of asset that Saint John needs relative to the types of fires it fights, access to some street layouts especially in the uptown area, and compact footprint of the area it serves in older portions of Saint John where fires are concentrated.

In particular, replacing the tankers with a different truck type – or not replacing them – should be evaluated because of the cost of staffing an asset that isn't frequently or efficiently used, which is in part attributable to a high rate of absenteeism. Tanker 7 is new enough that it could be sold at a reasonable price or donated to a low call volume volunteer department thereby providing service to another part of the province for several years.

Table 6: Saint John Fire Truck Assets

Truck Number	Odometer	Miles / Kilometers	Year	Apparatus Designation	Pump Capacity	Water On Board	Foam Vol. & Type	Unit Measurement
Engine 7	21,403	Km	2020	E7	1250	1000	50 A&B	Litres
Engine 1	77,243	Km	2013	E1	800	50	50 A&B	Imperial /US Gallons Pump
Engine 6	88,184	Km	2006	E6	1500	880	20	Litres
Reserve E8	56,763	Km	2006	E8	1500	880	20	Litres
Engine 2	82,963	Km	2015	E2	1250	1000	30	Litres
Rescue 4	396,694	Km	2004	R4	1250	425	25	US Gallons
Reserve E9	10,025 Hours		1993	E9	1250	750	No	US Gallons
Ladder Tower 1	97,588	Km	2008	LT1	1850	300	No	Litres
Ladder 5	116,373	Km	2006	L5	1500	480	20	Imperial /US Gallons Pump
Reserve Q5	168,743	Km	2003	Q5	1700	400	20	Litres
Tank 2	105,335	Km	2001	T2	420	1500	No	US Gallons
Tank 7	70,412	Km	2007	T7	508	1500	No	Litres

Chart 10: Heavy Truck Serviceable Life Remaining



4 Risk Assessment

A requirement of the request for proposal is for the consultant to conduct a community risk assessment. A summary of the risk assessment, similar to the National Fire Protection Association 1300 Standard on Community Risk Assessment can be found in Appendix F. The full assessment has been provided to the city in digital form because of the size and layout of many tables.

Although the National Fire Protection Association risk assessment references the use of data to determine risk, in almost all cases fire department risk exercises are qualitative rather than quantitative due to the difficulty of accessing and assessing outcome data as we have discussed several times in this report. The result is that participants in the exercise use best knowledge to determine risk, and assign risk based on a numerical scale, but often without evidence that what they believe, is accurate. Risk analyses are often based on two axes – probability of an incident and consequence of an occurrence – and often considered from the perspective of worst case. Therefore, risk decisions often end up being based on possibility, and overestimated, rather than data informed probability.

The Center for Public Safety Excellence and the Commission on Fire Accreditation International[7], in its publication "Quality Improvement for the Fire and Emergency Services" suggests a three-axis risk categorization process which includes probability, community consequence, and impact on the agency (emergency service). We submit that a fourth category should be included, that of public risk at the individual or small group level.

Risk is dynamic which suggests that a simple two-axis risk assessment that may not be data informed is not an acceptable way to determine response requirements and resource allocation for Saint John. Risk is impacted by multiple factors including those of planning and incident prevention activity.

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[7] **About the Center for Public Safety Excellence**
The Center for Public Safety Excellence (CPSE) is a not-for-profit corporation that progressively focusses on fire and emergency services organizations globally through processes of accreditation, credentialing, and education. This is accomplished through the use of quality improvement models and education. The Center for Public Safety Excellence's intent is to instill long-lasting processes and resources to benefit communities and personnel.

The concept for fire service accreditation began in 1986 when the International Association of Fire Chiefs and the International City/County Management Association met to develop the concepts and design for continuous improvement within the fire service industry. In 1996 the Commission on Fire Accreditation International was established to award accreditation to fire and emergency services agencies and to pursue scientific research and education in the public interest. In 2006, the Center for Public Safety Excellence was created to conduct the corporate role to enhance the Commission on Fire Accreditation International and the commission on Professional Credentialing.

Further, risk is commonly highly misunderstood, subjective, and conceptual. Risk is choice and risk is defined by choosing the extent we wish to mitigate the potential or probability of an adverse incident. Risk decisions are often based on qualitative decisions[8] (or feelings) whereas they should be based on quantitative analysis first and then the level of risk with which an organization is comfortable can be qualitatively influenced by feelings (as in, "We're willing to take that risk" or "That feels too risky").

Data which clearly quantifies probability, community consequence, agency impact, and possibly public (individual or small group) effect will often show risk as being much lower than what is frequently believed to be true. In the absence of data, risk is often explained qualitatively based on anecdotes, most of which will not withstand scrutiny. Data, especially outcome information, is crucial to defining objective probability, consequence, and impact.

Throughout this exercise Pomax has endeavored to base risk determinations on data, and the data tells us that the greatest risk to the community is in structure fires, followed by other fires, both of which represent opportunities for reduction.

We aren't suggesting that the potential for industrial incidents – which Saint John Fire Department expresses to be a major concern – shouldn't be prepared for but the probability is low, and resource concentration should be aimed at resolving fires in the community.

PlanSJ, the city's municipal plan[9], includes the statements:

> *The City provides police and fire services through the Saint John Police Force and Saint John Fire Department. Appropriate preparation and training for fire and police services, particularly in a City with a large heavy industrial base and historic building stock, are required to protect and manage emergencies in our community. Continuing to provide effective command of emergency situations with rapid response times requires a comprehensive approach to ensure stations are well positioned and emergency management personnel are appropriately trained.*

Council shall:
Policy MS-56

> *Provide police, fire, and emergency management services to residents and businesses in the City, as required to meet community needs, with particular emphasis on the risks involved with managing large scale industrial emergencies.*

Text colour emphasis in the quotes above are that of the consultants.

[8] The Feeling of Risk: New Perspectives on Risk Perception: Slovic et al
[9] PlanSJ, Section 9.9 Protective Services, Policy MS-56

While we don't wish to diminish the need to prepare for large scale emergencies, statistical evidence clearly shows that the most frequent and direct risk to the public is that of fire in the residential setting.

We also note that the statements above from PlanSJ has a tone of emergency preparation and response but doesn't acknowledge the advantages of prevention, partnerships, and public education.

We recommend that PlanSJ should acknowledge what the data indicates and reconsider the emphasis being placed on industrial risk which is not borne out by the data. Further, PlanSJ should place equal prominence on prevention, partnerships, and public education.

Pomax's approach throughout this report has been one of integrated risk assessment (a standard approach to service delivery determination in the United Kingdom) which means we don't rely on any single guideline, specification, or approach (for example, observing NFPA standards only), no matter how credible it is thought to be, in determining conclusions and recommendations.

Integrated Risk Management Planning, as found in the United Kingdom, entails improving public safety, reducing the number of emergency incidents and, thereby, saving lives. It is an assessment of all risks to life and injury to the community, resulting in a long-term plan to make the fire and rescue service more responsive to locally identified needs. This includes targeting resources to prevent incidents from happening, while also making sure resources are in the right location to best protect the community and taking into account commercial, economic, social, environmental, and heritage concerns.

4.1 Fire Underwriters Survey

The request for proposals mentions Fire Underwriters Survey only from the perspective of stating that a consultant study completed in 2009 offered an analysis of impacts on insurance underwriters' ratings for various fire response reduction and addition scenarios. We offer the following comments, not because it is a requirement of the RFP, but because Fire Underwriters Survey is often raised as a reason for adjusting fire resources and we thought it reasonable to address the subject.

Many municipalities are interested in how the Fire Underwriters' Survey and ratings might translate to lower or higher insurance premiums for homeowners and businesses. The proximity to a station and the type of equipment, fire prevention and education activity, and dispatch centre capabilities are all part of Fire Underwriters Survey grading.

The Fire Underwriters Survey is one of the most misunderstood entities in the fire industry. Pomax has been trying to find objective evidence of the impact of Fire Underwriters ratings on

insurance costs since 2011. We have interviewed large insurance companies like State Farm (before it was purchased by Desjardins) to ask whether they use Fire Underwriters Ratings and were told that State Farm has its own underwriters and doesn't use Fire Underwriters; we have interviewed large commercial brokers such as Prolink which stated that if they use Fire Underwriters (the executive we interviewed wasn't sure) it is one of many factors considered in setting insurance rates; and we have interviewed representatives of the Fire Underwriters organization who were refreshingly honest in indicating that their business is to rate buildings or municipalities and sell that information to insurance companies or 'member companies' as they expressed it.

Opta (the company that owns Fire Underwriters) indicates that the insurance companies that subscribe to FUS information use the product to

- identify opportunities for writing new business,
- achieve a financially manageable concentration of property risks,
- review loss experience in various rating territories,
- price policies, offer coverages, and establish deductibles for individual properties.

Fire Underwriters stated, during our interview and within their online presence, that the actual cost of insurance, as experienced by individual policy holders, is determined by each insurance company's underwriting plans, and is affected by a number of considerations such as

- location of the risk with respect to distance from recognized water supplies (hydrants, etc.), and distance from the responding fire station,
- claims history – such as fire, wind, hail, crime, and water damage claims (as they relate to policyholder and/or geographic area),
- independent broker's insurance markets and their loss experience for that business demographic,
- types of coverage such as basic fire; comprehensive "all risks"; etc.,
- type of construction; exposures; etc.,
- types of occupancies; contents; etc.,
- applicable policy deductible and/or policy sub-limits,
- age of risk building and code compliance with respect to building, fire, and electrical codes,
- alarm systems,
- specialized content coverage such as fine arts, scheduled articles, jewelry, etc.,
- loss control inspection findings,
- exposures to natural hazards such as earthquake, wind, snow, and flood, and,
- prevailing property insurance market conditions.

In conclusion, we are aware, as a result of direct conversation with FUS representatives in the past few years, that a minor change in classification is likely to have little effect on individual insurance costs particularly considering that "Many insurers will subsequently group these classifications into "town grades" or neighbourhood grades of protected, semi protected, and

unprotected categories" We have not been able to determine the impact on property owners due to ratings changes.

Our conclusion is that Fire Underwriters Survey ratings might have an influence on fire insurance costs, but fire insurance is a small part of individual business or personal lines of insurance, and Pomax has been unable to find evidence of a direct relationship between Fire Underwriters Survey ratings and insurance cost.

For a second opinion, the following text is an excerpt from a 2021 KPMG study of Edmonton Fire Service (public document).

INSURANCE

Changes in variables such as staffing levels, number of fire stations, and the size of a fire fleet could lead to changes in property insurance rates for citizens due to lower ratings from the Fire Underwriters Survey (FUS). However, this risk is low as FUS ratings are applied infrequently and a municipality is given time to put measures in place before a potential rating change is published. The impact of these ratings on insurance rates offered by individual companies is also not clear.

- EFRS fire services can impact the insurance industry and the insurance rates that property owners pay. In Canada, the FUS assesses, evaluates, and grades the quality of municipal fire defences and communicates this through a 10-point grading system. Insurance companies use these classifications to understand property risks and price property insurance policies accordingly. Each company interprets the FUS scores independently, however; it is not possible to estimate the impact of a rating downgrade.
- The FUS most recently assigned the City the following Public Fire Protection Classifications (1 is the highest or best protection score and 10 is lowest):
  - Class 2 for hydrant protected areas
  - Class 9 for non-hydrant protected areas
  - If the FUS calculates a Public Fire Protection Classification that is a downgrade, they will notify the community. However, at that stage, FUS will not publish the information to the insurance industry to use for premium calculations. FUS will identify for the community the features that affect the classification. If the community then wishes to maintain its current classification, it will be given a reasonable timeframe (up to a maximum of 12 months) to implement and report on an agreeable action plan. During that time, the previous classification will remain as published.
  - Evidence suggests that a change in FUS rating is to some extent a consultative process; it may be possible to engage with the FUS in advance of changes to assess potential impacts as well.
  - No recent examples were identified of Edmonton or comparator municipalities experiencing a downgrade in FUS classification.

5 Fire Prevention and Public Education

> Front-line service encompasses everything that leads to a reduction in incidents, casualties, and fatalities and has to include a major focus on the role of fire prevention and protection work, often overlooked when the media, or fire and rescue authorities themselves, fall into the trap of counting the front-line solely in terms of operational firefighters.
>
> ***Facing the Future:***
> *Findings from the review of efficiencies and operations in fire and rescue authorities in England*
> Sir Ken Knight CBE QFSM FIFireE

We aren't suggesting, by quoting Sir Ken Knight in the text box above, that Saint John has fallen into the trap of "counting the front-line solely in terms of operational firefighters". We're confident that it views the role of firefighters and the prevention division as being equally important to protecting the public. But the prevention and education division is besieged with the duties they are supposed to fulfill, particularly that of mandated inspections and follow up inspections to make sure that fire code rectifications that had been ordered, are completed.

5.1 Potential Prevention and Awareness Resources

The prevention and education division could receive substantial help from the suppression division. Firefighters are capable of checking accessory apartments and high rise buildings for fire safety including doors being closed, compliance dates on fire extinguishers, standpipes and hoses, exit and safety requirements in small multi-family or converted student housing, door to door visits to offer to check and replace smoke alarms which has been demonstrated to reduce the frequency and severity of fire incidents [g][h][i], distribute fire safety awareness material, follow up orders, and create what is known in fire services as 'pre incident plans[10]' which is a process of recording building details such as where to park a fire truck in an emergency, floor plans, hydrant locations, hazardous materials on site, and so on. These plans can be completed for every occupancy in the city even though that is a multi-year task.

The resources available within the firefighting ranks to assist fire prevention and public education are considerable. Sections 2.15.1 and 2.15.2 describe the responsibilities of

[10] Pre-incident planning is a process of compiling an operational risk database of buildings such as floor plans, utilities, hazardous materials and other features https://www.eso.com/blog/building-a-fire-preplans-program/

firefighters when not responding to incidents, and the time usually required for responding to incidents. The substantial positive balance of available time could be used to complement prevention activities.

As an example, there are approximately 34,000 private dwellings[11] in Saint John according to StatCan. If firefighter crews spent an average of 2 hours a day, every private dwelling in Saint John could be accessed once a year to advise of fire safety and risk, increase awareness, and offer to undertake fire safety checks.

Table 7: Potential for Suppression Staff Visits to Private Dwellings

Suppression Staff Visits to Private Dwellings in Saint John	
Total private dwellings	34,000
Time for each dwelling visit in minutes	12
Number of minutes to visit all dwellings annually	408,000
Useable days in a year (365-18)	347
Average number of minutes per day required to visit all dwellings annually	1,176
Average number of minutes per day per fire station required to visit all dwellings annually	235
Average number of hours per day per fire station required to visit all dwellings annually	3.92
Average number of hours per day per fire station team required to visit all dwellings annually	1.96

The last row in Table 7 assumes there are four firefighters on duty who can split into teams of two and visit opposite sides of a street or apartment hallways, or other dwellings in multi-residence buildings.

Increasing the daily average time firefighters participate in visits to three hours could result in all buildings in Saint John being visited annually.

5.2 Prevention and Education Technology

The prevention and education division could benefit from staffing and technology assistance with respect to data gathering. Saint John fire has purchased, in the last year, a new record management system which can track permits and inspections, but from what we understand, it doesn't include software or hardware to support the inspection process, on site, and in real time. This means that although Saint John can keep records, someone has to manually enter the record of activity – essentially requiring that manual notes be kept during the inspection and manually entered a second time into the records. This is a waste of staff time, and the cost should be assessed in comparison to having hardware and software to do the inspection/ investigation recording on site. For example, if 10% of five prevention officers' time can be shifted from records administration to being 'on the street' that's similar to adding almost .5 of a complement. If 20% of time can be recovered, that's one full time equivalent.

[11] Private dwelling refers to a separate set of living quarters with a private entrance either from outside the building or from a common hall, lobby, vestibule or stairway inside the building.

5.3 The Division has Inadequate Complement

There is a backlog of multiple inspections and re-inspections that will never be caught up under the current circumstances and method of conducting inspection, prevention, and public education.

Fire is mostly preventable and social in nature. Fire is not inevitable. If the frequency of fires is driven down through aggressive inspection and awareness activity, the useful life of some suppression equipment can be extended, and long-term costs will be lower. Some will disagree with the last statement but the lower the incidence of fire, the lower the risk, and the lower the risk, the more leeway and options there are for meeting that risk.

5.3.1 All Firefighters Should be Fire Prevention Officers

Suppression isn't a good way of protecting the public. Hoping to rescue a person trapped by fire is occasionally successful but mostly not; prevention is a better plan. All firefighters should be prevention officers. That is not to suggest all firefighters should be certified fire prevention or public education officers as required by NFPA 1031 and 1035, but all firefighters could take or be provided the appropriate courses to understand new responsibilities for protecting the public.

A study by the University of Saskatchewan and Regina Fire and Protective Services[12] titled *Incidence, Circumstances and Risk Factors of Residential Careless Cooking Fires in The City of Regina* noted the need for

> *a firefighting paradigm shift from a narrow "reactive" model for fire safety to an 'interactive" model that acknowledges the important role of human involvement in fire causation, escalation and spread, and addresses the high vulnerability of particular groups to fire hazards.*

The paradigm shift requires a change of perspective by fire services and firefighters as to their core responsibility which should be prevention, although the need for suppression and rescue continues.

5.3.2 Suppression Staff in the Public Eye

Each year Saint John experiences 80 or more grass fires, 190 'other' fires (such as dumpsters), and 600 automatic alarms. Those can be mitigated by the presence, visibility, and involvement of suppression staff.

[12] https://www.uregina.ca/arts/assets/docs/pdf/Cooking%20Fires%20Report%202017.pdf

Suppression staff can be present at locations and times that are known to have a high number of grass fires, engage with those who may be inadvertently starting them, become involved with the neighbourhoods that have the highest incidence, all in an effort to reduce responses.

Suppression staff can also monitor for dumpster fires or activity that may start them. Again, it is an opportunity to talk to vulnerable groups about fire safety or, just by firefighter presence, create safety awareness.

Finally, suppression staff can visit businesses and track workers maintaining alarm systems to discuss avoiding unnecessary responses. This also provides an opportunity to view other aspects of fire safety in a dwelling or business and offer fire safety ideas.

The key to reducing responses and improving safety is the robust collection and analysis of data to provide a clear picture of the types and locations of fire occurrences where an increased engagement of the firefighters with the public would make a difference. The fire department should develop policies and procedures to ensure that fire crews are highly visible in the community, at appropriate hours, and engaging with the public. For example, this increased engagement with the public could take the form of regular crew “tours” through their coverage areas. Such tours would provide the opportunity to deliver fire safety awareness and education and familiarize crews with potential problem locations such as derelict buildings and frequent fire occurrences like dumpsters and the grass fire issue. This policy of firefighter engagement with the public should be included in the shift activity schedule for the suppression division.

Fire prevention and education and suppression should operate as a complementary integrated unit to ensure resources are available to prevent, in a process of continuous improvement, fire and other emergency incidents.

6 Incident Response and Vehicle Deployment

6.1 Medical Response

A large portion of fire service activity, including in Saint John, is due to medical response. In many fire services more than 50% of activity is medically related (in Saint John approximately 55% except for 30.4% in 2020 and 20.4% in 2021[COVID], returning to 43.4% in 2022). The next large category is alarms, and another category is response to vehicle collisions. Fires of all types and near fires are usually less than 20% of most fire department activity, including in Saint John.

When responding to medical incidents fire services become part of the pre-hospital emergency services system. Therefore, the responding department should be considered and evaluated as part of the pre-hospital system rather than the fire services system. Re-identification was categorized as Critical Issue A within the Center for Public Safety Excellence white paper on 21st Century Fire and Emergency Services:

> *Initiative 1: Celebrate the heritage of the fire and emergency services while recognizing that services provided have evolved and will continue to experience significant changes over the next 30 years.*

A recent paper[13] published in the journal Pre-Hospital Emergency Care examined several million medical responses, mostly in the United States, to determine how often potential life-saving interventions are performed.

The background of this study is described as

> *Emergency Medical Services (EMS) often respond to 911 calls using red lights and sirens (RLS). RLS is associated with increased collisions and increased injuries to EMS personnel. While some patients might benefit from time savings, there is little evidence to guide targeted RLS response strategies. Objective: To describe the frequency and nature of 911 calls that result in potentially life-saving interventions (PLSI) during the call.*

In other words, part of the objective was to determine if speed made a difference to outcome.

The stated result of the study was

Results:

> *There were 5,977,612 calls from 1,187 agencies included in the analysis. The majority (85.8%) of calls utilized red lights and sirens, yet few (6.9%) resulted in PLSI (potential life-saving interventions). When stratified by call nature, cardiac arrest calls had the highest frequency PLSI (45.0%); followed by diabetic problems (37.0%). Glucose was the most frequently given*

[13] Jeffrey L. Jarvis, Vaughn Hamilton, Mike Taigman & Lawrence H. Brown (2021) Using Red Lights and Sirens for Emergency Ambulance Response: How Often Are Potentially Life-Saving Interventions Performed?, Prehospital Emergency Care, 25:4, 549-555, DOI: 10.1080/10903127.2020.1797963

PLSI, n=69,036. When including multiple administrations to the same patient, epinephrine was given most commonly PLSI, n=157,282 administrations.

The conclusion of the study was

Conclusion: *In this large national dataset, RLS responses were very common (86%) yet potentially life-saving interventions were infrequent (6.9%). These data suggest a methodology to help EMS leaders craft targeted RLS response strategies.*

Another research article published in Prehospital and Disaster Medicine[14] titled *Utilization of Warning Lights and Siren Based on Hospital Time-Critical Interventions*[15] examined a small group of incidents (112 incidents) to determine if time saved travelling to and from medical incidents using lights and sirens was critical. It found that the average difference in time with versus without lights and siren was - 2.62 minutes and "*Of the 112 charts evaluated, five patients (4.5%) received time-critical hospital interventions. No patients received time-critical interventions within the time saved by utilizing lights and siren. Longer distances did not result in time saved with lights and siren".*

A publication by the U.S. Department of Transportation, National Highway Traffic Safety Administration, Office of Emergency Medical Services titled Lights and Siren Use by Emergency Medical Services: Above All Do No Harm states:

Several studies have consistently shown that the use of L&S, on average, shortens response and transport intervals by 1.7 minutes to 3.6 minutes and transport times by 0.7 minutes to 3.8 minutes. These time savings have been realized in urban, suburban, and rural settings. Most authors have suggested that the time saved only impacts patient outcome in rare situations.

EMS agency administrators, managers and medical directors should understand the likely time saved by L&S response and transport in their area and apply this to decisions related to L&S response and transport policies for the system.

It further states:

The Association between L&S Driving and Crash Risk

[14] Prehospital and disaster medicine: the official journal of the National Association of EMS Physicians and the World Association for Emergency and Disaster Medicine in association with the Acute Care Foundation

[15] Utilization of Warning Lights and Siren Based on Hospital Time-Critical Interventions, Andreia Marques-Baptista, MD; Pamela Ohman-Strickland, PhD; Kimberly T. Baldino, BS, EMT-B; Michael Prasto, MS; Mark A. Merlin, DO, EMT-P, FACEP.

There is clearly an increased risk of EMS vehicle crashes or collisions when operating with L&S. L&S attract attention to the EMS vehicle and are used to request the right-of-way. With due regard, the EMS vehicle operator may then take privileges permitted by law for the purpose of arriving at the scene or hospital in less time due to L&S use. But no matter how effective L&S are in drawing attention to the EMS vehicle, any collision with a vehicle that is proceeding through an intersection against a signal increases the risk over normal driving.

Clawson[16] described the "maximal response disease" of sending multiple vehicles, all with L&S, to medical calls that do not justify this response. He estimated that as many as 12,000 EMS vehicle crashes occurred every year in the U.S. in the 1980s and that there are approximately four "wake effect" collisions involving other vehicles for every crash involving an emergency vehicle. (Clawson 1987, Clawson 1997).

A report[17] in Pediatric Quality and Safety Journal describes that thousands of vehicle accidents occur each year because of lights and siren usage which is associated with increased risk of crashes resulting in more severe injuries and fatalities. The intent of the study experiment was to determine the reduction in use of lights and siren by a critical transport team by virtue of having to record and justify every use. The study notes that

The risk of lights and sirens usage has been well documented with increased risk of ambulance crashes and fatalities. Several studies in the EMS literature have evaluated the time saved due to the use of lights and sirens with a range between 43.5 seconds and 3.63 minutes. Many studies have shown that the time saved is not clinically significant for the patient.

At the outset of this study, light and siren use was recorded at 75.8% but in the three to five years following the implementation of a lights and siren accountability process lights and siren usage was maintained at or below 20% with no negative clinical impact on patients.

In a Joint Statement on Lights & Siren Vehicle Operations on Emergency Medical Services Responses[18] in the publication Prehospital Emergency Care, the sponsoring organizations state:

For EMS, the purpose of using L&S [lights and siren] *is to improve patient outcomes by decreasing the time to care at the scene or to arrival at a hospital for additional care, but only a small percentage of medical emergencies have better outcomes from L&S use. Over a*

[16] Jeff Clawson, MD, inventor of Medical Priority Dispatch, a tool to determine and triage the urgency of needed responses and sending only those resources required based on the nature of illness or injury, thus preventing 'maximal response disease' (the response of multiple emergency vehicles unnecessarily).

[17] Decreasing Usage of Lights and Sirens in an Urban Environment: A Quality Improvement Project Laura Westley, BSN, MSM, C-NPT; Janice Nokes, RN, BSN, C-NPT; Ranna A. Rozenfeld, MD, FAAP, FCCM

[18] Douglas F. Kupas, Matt Zavadsky, Brooke Burton, Shawn Baird, Jeff J. Clawson, Chip Decker, Peter I. Dworsky, Bruce Evans, David Finger, Jeffrey M. Goodloe, Brian LaCroix, Gary G. Ludwig, Michael McEvoy, David K. Tan, Kyle L. Thornton, Kevin Smith & Bryan R. Wilson (2022) Joint Statement on Lights & Siren Vehicle Operations on Emergency Medical Services Responses, Prehospital Emergency Care, 26:3, 459-461, DOI: 10.1080/10903127.2022.2044417, https://doi.org/10.1080/10903127.2022.2044417

dozen studies show that the average time saved with L&S response or transport ranges from 42 seconds to 3.8 minutes. Alternatively, L&S response increases the chance of an EMS vehicle crash by 50% and almost triples the chance of crash during patient transport (10). Emergency vehicle crashes cause delays to care and injuries to patients, EMS practitioners, and the public.

In most settings, L&S response or transport saves less than a few minutes during an emergency medical response, and there are few time-sensitive medical emergencies where an immediate intervention or treatment in those minutes is lifesaving. These time-sensitive emergencies can usually be identified through utilization of high-quality dispatcher call prioritization using approved EMD [emergency medical dispatch] *protocols. For many medical calls, a prompt response by EMS practitioners without L&S provides high-quality patient care without the risk of L&S-related crashes. EMS care is part of the much broader spectrum of acute health care, and efficiencies in the emergency department, operative, and hospital phases of care can compensate for any minutes lost with non-L&S response or transport.*

Sponsors of this Position Statement are

Academy of International Mobile Healthcare Integration
American Ambulance Association
American College of Emergency Physicians Center for Patient Safety
International Academies of Emergency Dispatch
International Association of EMS Chiefs
International Association of Fire Chiefs
National Association of EMS Physicians
National Association of Emergency Medical Technicians
National Association of State EMS Officials
National EMS Management Association
National EMS Quality Alliance
National Volunteer Fire Council
Paramedic Chiefs of Canada

As we noted above, when responding to medical incidents, fire services become part of the pre-hospital emergency services system. So, while the studies quoted above refer to EMS lights and siren response rather than fire response, fire becomes a proxy for EMS and part of the prehospital emergency medical services system. The discoveries and statements within these and many other reports are applicable to fire when acting as part of the prehospital emergency medical services system.

One of the Actions included in the Center for Public Safety Excellence white paper on 21st Century Fire and Emergency Services Critical Issue A is to "*Set agency goals and strategies to reduce the number of 911 emergency calls, which reduces risk to the community and the first responder".*

Response to medical calls by fire services is a result of four things

1. The influence of American models of fire services where fire departments operate ambulance services, often as a revenue source because of different billing and funding models in the USA.
2. Heritage beliefs of fire and medical services, dating back to the 1970s and before, that seconds count in medical calls, and fire can respond faster. In fact, there are few medical instances where seconds count other than in cardiac/respiratory arrest and asphyxia, and in those cases response by emergency services is the least effective way of service delivery[19]. [j] [d]
3. The need by many firefighters to want to help and, due to the history and culture of fire services, they see response as a form of help even though the utility of that response isn't measured.
4. The belief that activity, and being busy, is value. Response is a noticeable activity and therefore considered valuable[k].

There is much more information relating to the reasons and history of fire services being sent to many medical incidents, including the role that the Saint John Public Safety Communications Centre and New Brunswick 9-1-1 inadvertently play in overuse of fire services. But the question that is important is "Why are we telling you this"?

We are telling you this because there are much more effective ways to protect the public other than medical response and we describe those in Section 5, Fire Prevention and Public Education.

Medical response is not a core part of fire and rescue services, but fire response to medical incidents contributes to risk in the city, it doesn't decrease risk. Risk increases because

- fire resources are occupied on medical and vehicle collision incidents which may delay response to core fire incidents,
- large trucks are driven in emergency mode unnecessarily,
- firefighters who should be involved in prevention activities are occupied responding to incidents that rarely require their assistance.

[19] Except for cardiac arrest, there is little or no scientific evidence suggesting a causal relationship between response interval and improved patient outcomes. There is little evidence linking improved response intervals to improved survival in critical trauma, and there is no literature suggesting that rapid response intervals improve outcome for noncritical patients.

Saint John's fire service and city council have chosen for the city to take on the role of medical first response yet the paucity of adequate information to make informed decisions about this activity means that time is being taken from more effective safety initiatives.

Whereas response to medical incidents makes up 50% or more of most fire department activity, including Saint John, the City of Ottawa Fire Services' response to medical incidents makes up only about 17% of activity. This was first identified by KPMG in a report named "Review of Edmonton Fire and Rescue Services". Pomax confirmed this estimate with Ottawa's Chief of Emergency Medical Services in the last week of July 2023. Ottawa Fire Services responds only to incidents where a patient is unconscious, unresponsive, or apneic, or EMS asks for assistance due to a delay in ambulance availability.

6.1.1 If we save one life …

In discussions respecting fire service response to medical incidents and traffic accidents reasoning such as "if we save only one life, it will be worth it" is offered as a rationale for continuing the practice. The literature shows that it is highly unlikely that a high number of responses to medical incidents, as currently occurs in Saint John, will result in improvements in clinical outcome. In those incident types where response time may make a difference (unconscious, unresponsive, or apneic) Saint John fire should continue to be dispatched but as determined with adequate medical guidance.

There is substantial literature, as identified in this report, which indicates that prevention activity through home visits is likely to have a positive impact on reduction in fires and the severity of fires which means resources should be applied to prevention activity. Lives are more likely to be saved through fire prevention.

6.1.2 Comfort for the patient

Other reasoning we hear for attending medical incidents is that the arrival of firefighters is a source of comfort for patients, family, and bystanders even if a life isn't saved. This is true in some cases particularly when someone is alone, or family and bystanders are substantially concerned. There are several considerations if Common Council determines that the fire service should attend to provide comfort or relieve anxiety.

- How does the dispatch service determine when those circumstances occur, and should it be the 9-1-1 centre, the fire service, or Ambulance New Brunswick that decides when that is appropriate? Currently it is the 9-1-1 center that determines deployment of fire to medical incidents.
- If time is not a factor, as shown in the several papers above, should fire respond to incidents that are not life threatening using lights and sirens considering that studies show that use of

lights and siren saves only from less than a minute to three or four minutes in an area the size of Saint John, but substantially increases crash risk and possibly 'wake crashes'?

- Is it necessary to dispatch four firefighters in a heavy truck to a non-life threatening incident or would one or two firefighters in an SUV, not using lights or sirens, be sufficient?
  - In a study of the Tulsa fire department done by the centre for public safety management on behalf of the International City/County Management Association, the consultants indicated that the City of Shreveport, Louisiana had determined that the cost of maintenance of an SUV was 15% of the cost of maintenance of a heavy truck and the capital cost was between 7% and 10% of a fire truck.
  - The former Fire Chief of the City of Shreveport is now the Chief in the City of Plano, Texas. He estimates that the implementation of SUVs for medical first response in Plano, an initiative that has been underway for several years, will double the useful life of fire trucks – currently only five years – to 10 years.

6.1.3 Medical Direction Related to Fire Medical Response

At the time of writing this report Saint John fire was not availing itself of medical direction as to which medically related incidents it should attend. Those decisions are made by the fire department. And while they are based on best intentions, such responses, except in the case of cardiac and respiratory arrest, are mostly unproductive except for the social aspect of calming patients and bystanders. While some may think that is desirable, a community with over 400 fires annually of all types should reduce public risk through robust fire prevention activity. At the very least, Saint John should be making decisions as to which medical calls its fire department should respond based on advice of a medical director and working with Ambulance New Brunswick. There have been indications from the fire service that engaging Ambulance New Brunswick is sometimes challenging but efforts should continue even if it has to rise to the level of discussion between the city and province.

6.1.4 Is there a value to Fire Response to Medical Calls? Which Ones?

There is ample evidence in literature[l] that Saint John fire could go to substantially fewer medical incidents without compromising the health of patients, but there are two factors which, locally, contribute to emergency medical first response by fire.

The first contributor is related to the primary recommendation of this fire master plan and the foundation for the strategy which we address in Section 13 ; that is, the lack of information – specifically easily useable outcome data – surrounding the need for, and productivity of, the activities of the fire service, in general, and specifically to medical response.

The second contributor is the ability of the fire service to self-determine the incident types to which it wishes to respond without conducting a value assessment. Up to 50% of Saint John Fire Department activity is related to medical response. Peer reviewed studies suggest that even if

Saint John continues to respond to unconscious, unresponsive, and apneic patients, medical responses could be reduced by 60% from current, and other responses might be accomplished without the use of lights and sirens.

The Saint John 10-Year Strategic Plan within the 'Accountable' Objectives and Actions indicates an intent to 'Deliver excellence in financial stewardship' including implementing an internal auditing program and an assessment management system. There is an opportunity for the city to use those methods in a continuous effort to increase the public value of the fire services system.

6.2 Recommendations About Fire Response to Medical Incidents

- Our recommendation is that the city should retain the guidance of a medical director for decisions relating to medical response.
- A second recommendation is that decisions as to medical response should be informed by detailed information about every call, captured at the time of the incident, including accurate arrival times of the fire truck and paramedic services.
- There are few time sensitive medical incidents. We recommend if council determines that the fire department should respond for the purpose of comforting patients, bystanders, and family, most can take place in non-emergency mode.
- We recommend, in concert with the bullet above, that one or, at most, two firefighters can respond using a smaller vehicle[20]. The reference to a small vehicle does not suggest the need for a large SUV or Ford F-250 or 350.
- Depending on the extent to which council wishes to participate in medical response we recommend future considerations of compact cars or small SUVs for the purpose. Vehicles do not have to be large because the equipment needed would be limited, such as an automated defibrillator and medical responder first aid equipment. One, or two at maximum, firefighters could respond to occasional medical, and possibly other, events in a response vehicle.
- We have heard reasoning that firefighters should respond in a team of four because if there is a fire call while attending events such as medical incidents, then four firefighters would be available to respond together. Please note the following considerations:
    i. Section 2.15.4 examines simultaneous incidents. They are infrequent. Occurrence of a fire incident – particularly structure fires – concurrent with another call is even

[20] Greater Sudbury's Paramedic Services have incorporated Teslas for their Community Paramedicine Program.
https://driving.ca/features/feature-story/how-the-tesla-model-3-is-helping-northern-ontario-paramedics-shift-to-electric
https://www.cbc.ca/news/canada/nova-scotia/bridgewater-police-say-new-electric-cruiser-performing-better-than-expected-1.6549637

more infrequent. Therefore the need to always be prepared with four firefighters to respond to a fire is not supported by data.

ii. Firefighters do not have to arrive at a fire scene in the same vehicle. They can arrive in separate vehicles although the less time it takes to assemble adequate firefighters, the better.

iii. Once with a patient it is unlikely that firefighters can leave, even in the event of a fire incident, until another responsible person (paramedics) arrives to accept responsibility for the patient. So four firefighters would be detained at a medical call rather than two.

6.3 Fire Service Attendance at Traffic Incidents

Similar influences that have led to a high number of fire responses to medical calls have resulted in increased responses to vehicle collisions. Several decades ago, fire services responded to vehicle collisions usually only when entrapment was reported such as those 46 occasions over 8 years reported in the data in Section 2.6. In the United States, as municipalities, through their fire departments, assumed responsibility for ambulance services in the late 1970s and 80s, fire departments started to send a fire truck with every ambulance response, in part because fire departments sometimes employed paramedics, and ambulance services often had less skilled emergency medical technicians. When ambulances were dispatched to vehicle collisions that might include injuries, a fire truck was also sent. That still happens in many cities in the United States[21] and some places in Canada. But in the United States, response to traffic accidents can be a revenue driver because fire departments charge insurance companies for the service. That also happens in some parts of Canada where Departments of Transportation or insurance companies are invoiced for fire service attendance.

Many reasons have been brought forward as to the benefits of fire service at collisions. These include

- an early response in case of possible entrapment,
- possibility of a fire resulting from the collision,
- the need to isolate a battery (cut the cables or disconnect a battery) to prevent supplemental restraint systems (airbags) from deploying, if they didn't as a result of the initial collision, and injuring someone who might still be in the vehicle,
- clean up spilled fluids and hazards (coolant, gasoline, other fuel),
- assist paramedics,
- block the roadway to protect workers.

[21] A major focus for chief Crowley, besides staffing up and addressing the mental health of her firefighters, is improving resource deployment. Instead of sending an engine and an ambulance to every call, saving those resources for when they're needed the most so they can get to the calls as fast as possible. Josh Haskell, ABC News, Los Angeles. youtube.com/watch?v=NOvvSgigols

Most fire department administrators and firefighters support the practice of dispatching fire to vehicle collisions particularly on highways. But studies have failed to show objective data supporting the practice. [m],[n],[o].

Entrapment and the need for extrication is rare as can be seen by the few times Saint John Fire has had to provide that service in the eight-year study period. As well, research has shown that the public over-reports entrapment and it is unusual for extrication, if required, not to be called for by bystanders in the immediate aftermath of a collision.

Vehicle fires have also declined by 60% in 2018 from 1980, and the rates of fires per billion miles driven and fire deaths per 100 billion miles driven, were 81 percent and 65 percent lower, respectively according to a National Fire Protection Association study in the USA. Firefighters sometimes point to the risk of battery fires from electric vehicles, but manufacturers have been installing, for several years, isolation switches in cars which activate upon collision and cut off an automobile's electrical system. Roll Over Sensors provide similar protection in the case of a vehicle upset.

Unexpected deployment of airbags was a concern in the 1980s and 1990s but are rare now. A study into late and failure of airbag deployment in rear end collisions measured 'late' airbag deployment in milliseconds, not minutes or tens of minutes which would be the time span after an incident in which fire trucks would arrive[p],[q].

A United States Occupational Safety and Health Administration Hazard Information Bulletin[22] from 33 years ago (1990)[r] stated,

- An undeployed air bag is not likely to deploy after a crash. Moreover, most incidents will not require rescue workers to work in what would be the deployment path of the air bag; so, rescue operations could begin without delay. When someone is pinned directly behind an air bag, special procedures should be followed.
- To defeat electrically activated systems the battery cables must be cut. This begins the deactivation period for backup power systems. For some vehicles deactivation will occur in a matter of seconds, others take a few minutes. Until deactivation is complete, the steering wheel should not be displaced or cut. Moreover, heat should not be applied in the steering wheel hub area and the air bag module itself should not be cut.
- Incident with an Undeployed Air Bag
  - An undeployed air bag is unlikely to deploy after a crash. Most incidents will not require rescuers to work in what would be the deployment path of the air bag; therefore, rescue operation can begin without delay.
- Question 12: If the air bag did not deploy in the crash, is it likely to deploy after the crash?

[22] Hazard Information Bulletins provide relevant information regarding unrecognized or misunderstood safety and health hazards, and/or inadequacies of materials, devices, techniques, and engineering controls.

- Answer. No, the sensor devices used to activate the system are designed to respond only to the type of violent forces present during a crash. It is unlikely that the same type of forces will be created during rescue operations.

Even in the 1990s the National Highway Safety Administration and OSHA did not consider unexpected airbag deployment to be a danger with the possible exception of someone being pinned directly behind an air bag and a need to cut or displace the steering wheel.

6.3.1 In New Brunswick Fire Departments Make Unilateral Decisions About Response to Vehicle Incidents

In New Brunswick fire departments make unilateral decisions as to whether to respond to vehicle incidents of any type. New Brunswick 9-1-1 Operating Procedures Directive C-6 states,

> *… if a fire department and municipality has opted to be notified of all motor vehicle collisions with injuries, by signing Appendix E, the Fire Service Enhanced Change Request Form, the fire department will receive all calls to motor vehicle collisions when the caller reports injuries.*
>
> *Contact the fire emergency service provider if the caller identifies keywords such as: smoke, fire, flipped or rolled over, trapped, vehicle in water, airbags deployed.*

Fire departments in New Brunswick, including Saint John, are dispatched to vehicle collisions under several scenarios:

- Report of vehicle fire.
- Victims are reported trapped.
  - This is a valid reason for fire departments to be dispatched to vehicle collisions even though the estimated overreporting rate is close to 30%. [m],[n],[o]
- Fire services have signed an agreement with New Brunswick 9-1-1 requesting to be notified of all motor vehicle collisions with injuries.
  - Upon signing, the fire service, including Saint John, "are mandated to respond once notified".
  - The fire service is then responsible to render first aid assistance in accordance with National Fire Protection Association 1001
- Reports of hazardous fluids or materials.
  - These events could include a vehicle transporting hazardous goods, a leaking fuel tank (gas tank for example) or spilled fluids, such as a small amount of coolant, that are common at a vehicle collision. The majority of 'hazardous' fluids are coolant leaks.
- "When in doubt, send them out"
  - This motto of the dispatch centre and emergency services means if there is doubt because callers are unsure of the severity, send all emergency services 'just in case'. We

have to comment here that 'just in case' is inadequate risk assessment and poor use of resources.

We question the need for fire to attend traffic incidents even if there are injuries. Can Saint John show evidence of need to attend? The literature doesn't indicate a need for fire to attend trauma incidents unless victims are trapped, and the literature indicates bystanders over report entrapment. [m] [n] [o]

We recommend that Saint John Fire, Ambulance New Brunswick, and local police services, using Ambulance New Brunswick's medical priority dispatch tool, should work together to define under which circumstances fire might be required, and, when those circumstances are met, Ambulance New Brunswick should request fire response without delay.

The current New Brunswick 9-1-1 Operating procedures Directive C-6 overuses fire resources and adds risk to the city since fire activity is concentrated on non-core activity. The prime purpose of the Saint John fire department should be to prevent the incidence of fire of all kinds.

Saint John fire reported 46 vehicle extrications over the 8-year data period.

6.3.2 Resource Deployment to Vehicle Collisions

In many situations when fire is dispatched to a vehicle incident two fire trucks are sent. in some cases two trucks are deployed because the situation appears serious enough to warrant more than one truck. But, most often, one truck is sent to work at the incident while the second one is used as a blocker to protect the accident scene. This is more prevalent in multi-lane and highway situations. The idea behind this deployment model is that if a member of the public doesn't become aware of the accident scene and drives into it, rather than around, it is better to strike a 20+ tonne fire truck than a police vehicle or ambulance, or emergency workers. There are some occasions where fire isn't required on scene for emergency work, but a truck is called for blocking duties to protect the fire department's emergency co-workers. While there, the fire department may participate in assisting paramedics or road cleanup.

The deployment of fire to traffic incidents has become prevalent in the last 20 years, in part because of the US influence of fire – paramedic services, social and other media which leads the public and fire department to accept this unquestioned and unvalidated practice, and because it is 'response' and response is considered to be a useful activity.

Studies about secondary accidents question whether the prevalence of emergency vehicles at a traffic incident increases, rather than decreases, the risk of secondary accidents. [s],[t],[c]

Other questions that the City of Saint John should consider:

- What is the cost and effectiveness of resource use by sending two fire trucks with lights and sirens to traffic incidents where their role is usually first aid (which is not time sensitive), cleaning up fluids which could be done by a tow truck driver, or road blocking?
- Almost everything to which fire responds results in the use emergency lights and sirens which increases public risk. Is this a practice that should continue? There are few true emergencies.
- During some of our regular meetings with fire department senior leaders, when the idea of fire suppression staff assisting with prevention activities such as home visits was presented, one of the leaders expressed concern that there was insufficient training time for staff (throwing ladders was the term and example used) so having suppression staff conduct home visits may cut even further into training time.
    - We submit that unvalidated and unneeded responses decrease both training and prevention activity time.

6.3.3 Should Fire trucks be used as Blockers?

There are several studies about collision scene security. The safest practice seems to be to place large cones starting at least 100 metres – some studies suggest a kilometre – before the incident scene to move traffic into an alternate lane. Then, if a driver doesn't recognize the emergency, they can be alerted by the noise of running over several large cones. That's usually impractical, though, unless the Department of Highways or local public works is immediately available to respond and assist with the setup.

Another option is for police to employ a rolling stop and traffic control, essentially using traffic to block itself. That method is exercised in California, Florida, and other states usually on multi-lane roads. There are some locations where highway department or public works vehicles are pulled off other jobs, as practical, to act as blockers. In New Brunswick, fire trucks are often used.

6.3.3.1 What happens when fire truck blockers are hit?

Some firefighters state "Think of what could have happened if we weren't there".

- In response to this question we say: We don't know what would have happened.
    - Would a police vehicle have been hit?
    - Would someone have been injured or killed who would not otherwise been injured or killed?
    - Would the incident not have happened because the police vehicle is smaller, and the inattentive driver would have missed it?
    - Is it the role of the fire service to act as traffic control? Would it be better to place one or two unoccupied police vehicles approximately 100 metres ahead of the traffic incident and, if those were struck, would the loss be a $60,000 to $80,000 police vehicle rather than a $750,000 fire truck?

We can't answer the question, and don't know what would have happened if the fire truck wasn't there. Studies of the subject have not been able to arrive at a conclusive answer as to whether the presence of a fire truck, as a blocker, improves safety or increases risk. Studies have demonstrated that fewer emergency vehicles and flashing lights at an incident reduces the risk of all types of secondary incidents. [c]

One study shows that the vehicle causing a secondary incident is usually a large truck (80%). [t] The result of a fire truck being struck ranges from possibly several hundred thousands of dollars damage and months of out of service time, to replacement of the truck and two or more years of lead time to order. At worst, as shown in the last of the images below (left side), one firefighter deceased, and a police officer injured. The bottom right incident resulted in the driver of the car being pronounced dead on scene, and one passenger and four firefighters injured. Using fire trucks as blockers didn't avoid death and injury.

These are all risks that need to be considered when deciding to use fire trucks as blocking vehicles.

At 3:14 p.m., troopers were sent to the southbound lanes of I-71 for a report of a minor injury crash involving one vehicle. Troopers began to investigate the crash when units with the Town & Country Fire District arrived to assist, the news release states.

6.3.3.2 Alternatives

Some US fire departments are purchasing blocker trailers that respond with a fire truck, and which can include an impact absorbing attenuator, message boards, 64 or more cones, and portable rumble strips to place across the road.

We aren't suggesting that Saint John should purchase a mobile barrier. We are recommending that before determining if the practice of fire response to traffic collisions should continue some questions should be considered:

- If the fire department is going to provide first aid at a traffic incident, when does the paramedic service arrive in relation to the time of arrival of fire? Are the arrival times of fire and paramedics proximal to the extent that the fire department doesn't need to offer substantial aid?
- Does having many emergency vehicles on site make the situation safer or higher risk (secondary accidents)?
- Is there validity in using a fire truck ($750,000 to $1,000,000 replacement) as a blocker or should it be a department of highways, public works, or a purpose-built truck? Some fire services in the US are using second line vehicles as blockers or purchasing purpose-built trucks.
- Is traffic control the responsibility of fire departments?
- Does Saint John want the fire department to take on the traffic control role and under what circumstances (people trapped, request of Ambulance New Brunswick)?

Whether Saint John Fire and the municipality decide to continue responding to medical incidents and traffic collisions, the purpose of our discussion is to be convincing that operational and administrative decisions should be made on complete data, which is not available to the city but should be developed. Further, the city will lower its fire risk considerably by deploying firefighters to assist with prevention rather than responding to incident types that show no evidence of being positively affected by the presence of fire staff.

6.3.4 Automatic Alarms

Until 2018, Saint John Fire sent four fire trucks and a senior officer (Platoon Chief), using lights and sirens, to automatic alarms for a total of 17 people. Automatic alarms were responded to in the same manner as confirmed fires. In 2018 the fire service reduced response to automatic alarms to two trucks for a total of eight people but still using lights and sirens.

Performing multiplication on these incidents means that from 2015 to 2018, inclusive, there were about 2,575 automatic alarms to which 10,300 20+ tonne fire trucks responded and 2,575 platoon chief's cars for 12,875 vehicle responses. From 2019 to 2022 there were 2,361 automatic alarms to which 4,722 heavy trucks responded. Throughout the 8 years that were examined over 15,000 vehicles responded to false alarms.

It's unknown the number of these automatic alarms that turned out to be actual fires and for which there was no other form of alert; for example, someone calling from the location within a very short period of time (60 – 120 seconds). However, the London, U.K Fire Brigade, in the latest annual report, indicates that 0.39% of alarms turned out to be fires but the report doesn't indicate the number that were positive alarms absent of secondary calls.

Some fire departments, including in New Brunswick, being aware that automatic alarms are usually false unless accompanied by calls to 911 indicating smoke or fire, have adopted a policy of restrained response. For example, one fire truck, without using warning systems, will investigate the alarm. We are aware of one fire department that no longer responds to some types of automatic alarms.

In a case of carbon monoxide alarms, and all occupants are out of the building, some fire departments send an officer in a car to the incident (no fire trucks), but not using lights and sirens. Over 30 years ago one of the fire chiefs who now works with Pomax implemented a policy that one fire truck would respond to automatic alarms using lights and sirens while a second would follow in non-emergency mode, observing all traffic laws.

We recommend that Saint John should prospectively track the outcome of all automatic alarms to determine the number that are positive, and no other form of alert was received, and use that information to modify response if warranted. A pattern of automatic alarm outcomes will be seen within six months and a change in response could be implemented within a year depending on the findings.

Saint John should work with the Saint John communications centre to review its policy regarding automatic alarms and reduce many of the responses by 20 tonne trucks operating in emergency mode.

6.4 The Role of Dispatch in Effectiveness and Cost Containment

The Saint John Communications Centre is the 9-1-1 communications center for the Saint John area and provides police dispatch and fire dispatch.

A dispatch centre can have a significant role in improving cost containment and effectiveness of the fire department by way of screening calls to gather information about call type, information provided by the caller or gathered by the call taker, record keeping on behalf of the on-scene fire department and helping to equate that information to incident outcome. This assists quality improvement, quality assurance, and system and deployment validation.

The city and Saint John Fire Department should develop a close working relationship with the Saint John communications centre to enhance the ability to gather data and improve resource usage. There are, for example, products on the market such as Fire Priority Dispatch software that might help determine the real need for fire response but, more importantly, gather data about incoming call information. Pomax isn't endorsing Fire Priority Dispatch because we don't know enough about its use, sensitivity, and specificity. We are much more familiar with an associated product called Medical Priority Dispatch which is used worldwide. Fire Priority Dispatch should be assessed by the fire department and dispatch centre.

Pomax has been contracted to review a number of communications centres in North America including the City and County of San Francisco; Odessa, Texas; Naperville, Illinois; Toronto; St. John's; Halifax; and others. Some have been separate police, fire, or EMS centres, others serve all three services, and some just police and fire. In every circumstance of combined police – fire communications centres we have concluded that the model does not serve fire adequately nor supports, to the extent possible, fire interests and effectiveness. In only one circumstance – the Region of Waterloo Regional Police and Fire Services – did we recommend with specific caveats, the combination of police and fire dispatch.

Under similar circumstances on other projects we would likely recommend that the city and its fire department should establish its own fire specific communication centre to improve the operational effectiveness and cost containment at the fire department. However, we are aware that the strategic direction of the province with respect to 9-1-1 centres would not support such a recommendation. While that is unfortunate, there is a strong opportunity for the City of Saint John to negotiate service delivery with the communication centre to assist and improve productivity and service levels.

6.5 Tanker Use and Deployment

We recommend decommissioning the tankers. There are several reasons:

1. We counted the number of times tankers were used over the 8-year study period, but we were unable to tell whether they were used at fires or responded to fires but not used. Based on response only (not whether the tankers were used), the count of the number of

times tankers attended a reported fire ranged from a high of 15 in 2017, but usually four to six annually.

2. Fire services in Kennebecasis, Simonds, and Grand Bay-Westfield have tankers and can reach a large part of rural Saint John in 10 minutes (Exhibit 8).
3. Engine 2 and engine 7 carry 1,000 gallons of water which is a sufficient quantity to attack a fire while partner fire services respond. Other Saint John apparatus carry from 400 to 800 gallons of water which provides a backup. In fact, this is not an uncommon practice when both tankers are out of service due to illness absence.
4. It seems – but it would take a lot of manual work to quantify – that the tankers are more often used as blocking vehicles when a first vehicle attends a vehicle collision. If our recommendations are followed, the frequency of that practice will be reduced significantly.
5. Article 23.01 of the Collective Agreement states

As long as sufficient funds are provided by the Employer, all existing companies shall be maintained at full strength as herein set forth:

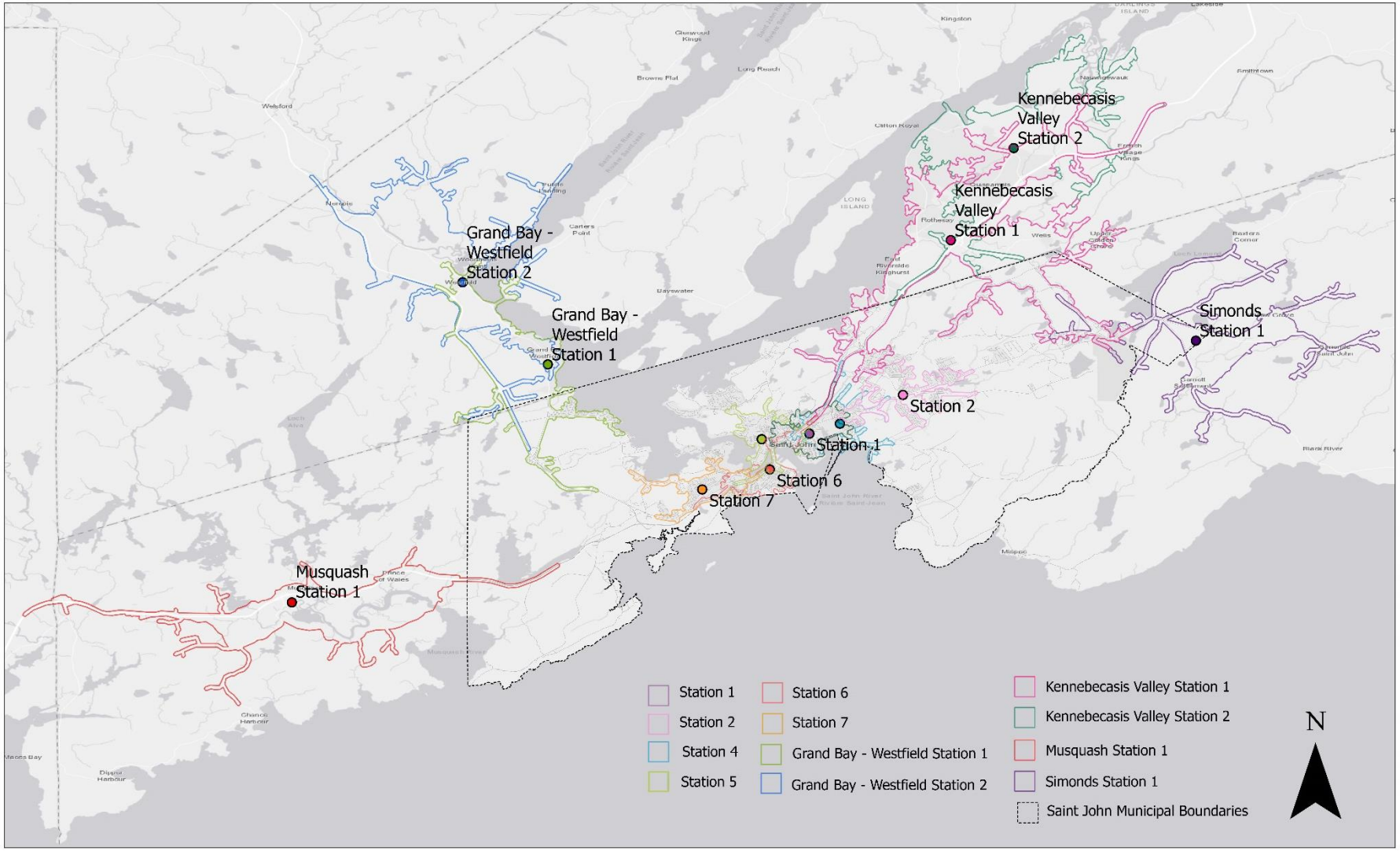
Quint Company	1 Officer, 3 Firefighters
Ladder Company	1 Officer, 3 Firefighters
Engine Company	1 Officer, 3 Firefighters
Tanker Unit	1 Firefighter
Rescue Squad	1 Officer, 3 Firefighters

- The shaded row in the table associated with Article 23.01 shows that there is a firefighter assigned to be a tanker driver. There are two tankers, so two drivers 24-hours a day which equals 17,520 hours a year.
  - Interviews, and Pomax's review of firefighter absence history, leads us to conclude that the tankers are usually staffed 50% of the time or less.
  - The absences are compounded by a practice in the department whereby, when the tankers are unstaffed and there is a fire in a non-hydrant area, the tanker will be left at the station and all firefighters will respond in an engine. It's possible for one or two firefighters to respond in a tanker and the remaining crew to respond in an engine, arriving almost simultaneously, but the firefighters' association resists splitting crews.

We recommend, in concert with other recommendations and comments applicable to apparatus, that the City of Saint John decommission the tankers and redeploy the 17,520 hours of staff time assigned to driving the tankers.

Exhibit 8: Tanker Backup from Fire Services Surrounding Saint John

8 minute travel time for Surrounding Stations with 4 minute travel time for Saint John Stations



7 Response Time and Addressing 90th Percentile Guidelines

7.1 90th Percentile Guidelines

In the small percentage of cases where time might make a difference such as fires, water rescues, and cardiac arrest, we suggest that using a 90th percentile measurement as advocated in National Fire Protection Association documents can result in misleading conclusions.

We reported on response statistics and 90th percentiles in Sections 2.12 and 2.13 but we propose that for incident types where time sensitivity may be considered important that it is best to track performance based on individual occurrences, as can be found in Appendix C, and plot them against several benchmarks. Plotting of this nature can be accomplished for any incident component including call taking and dispatching, turnout, travel time, and others. In this way the fire department, rather than indicating that it is or is not meeting a certain percentile on a municipality-wide, or designated area such as Uptown, can, in addition to calculating percentile, investigate extremes in response and determine whether not meeting a 90th percentile actually contributes to risk in the city.

Although calculating a 90th percentile can be considered a guideline or starting point for more comprehensive analysis, it is, when used by itself, a blunt instrument.

7.2 Is a Four-Minute Driving Time Necessary?

Attaining four-minute driving times as prescribed by the National Fire Protection Association won't be possible in Saint John without a major infusion of funds, but the question that should be addressed is "Why is a four-minute driving time necessary and under what circumstances"? We have already established, in Section 6, that time is rarely a factor in most medical incidents.

In a structure fire event, or even occurrences such as a pot on fire, four minutes is a long time and most would agree that the sooner the fire department arrives, the better the outcome for both property and saving lives. However, shortening response times might not result in the advantages expected.

A study conducted by the University of Fraser Valley called *Smoke Alarm Response Time: Examining the Relationship Between Working Smoke Alarms, Fire Service Response Times, and Fire Outcomes* indicates that smoke alarms may counter the influence of response times.

The study examined

> *868 residential fire incidents that were responded to by Surrey Fire Services between March 2008 and April 2018, inclusive, and reported to the British Columbia (BC) Office of the Fire Commissioner (OFC). At a high-level, this research was intended to examine the relationship between a working fire safety system, fire service response time, and fire outcomes. The analysis*

focused on residential structure fires that either occurred with a working smoke alarm or without a smoke alarm. Data was screened to focus on the influence of response times for the first wave of a total effective attack force. Fire damage and building loss were examined as a function of response time (first unit on-scene and last unit on-scene from the initial attack force), smoke alarm presence, and the time of day at which the fire occurred. The risk of fires spreading beyond the room of origin, where a ***smoke alarm was not present*** *increased by 17% for each one-minute increase in the time required for the fire service to assemble a total effective attack force. The influence of response time was countered by the presence of working smoke alarms, which* ***reduced the likelihood of fires extending beyond the room of origin (by 71%) regardless of response time.*** *Fires that occur during the day were at least 60% less likely to extend beyond the room of origin and were less likely to sustain large amounts of building loss. The analysis provides additional support to the belief that the influence of smoke alarms is to increase the likelihood of building residents controlling the fire before the fire department arrives. This emphasizes the importance of having a working smoke alarm in all residential properties. Furthermore, this supports targeted smoke alarm education and installation efforts that use risk to identify areas within cities that are most likely to have non-functioning or missing alarms.* (Text colouring by the consultants)

A Swedish study called *How Important is the Time Factor? Saving Lives Using Fire and Rescue Services* found

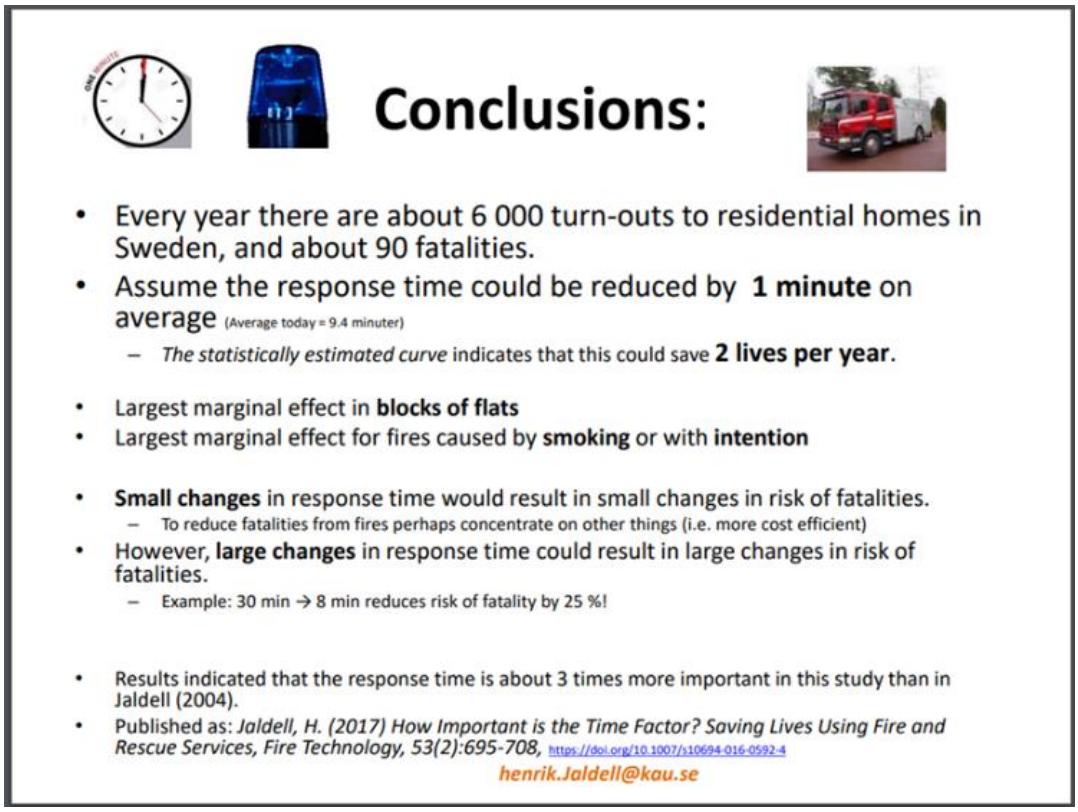
that the risk of fatality is a non-linear function of response time. For a given change of response time, the increase in risk of fatality is large for a short response time, then decreases, and eventually seems to approach zero.

If it was possible to decrease the median response time by 1 min 0.00035 lives could be saved for every turn-out on average. For all turnouts [in Sweden] *to residential homes that means that about two lives, or 3%, could be saved per year.*

Also, there is a multiplicity of factors affecting whether a life can be saved.

The average marginal effect per minute is 0.000321 for model 2. It means that if response time could be reduced by one minute for all turn-outs, then 1/0.000321 = 3115 turn-outs are necessary to be able to save one life per year. However, since there have been 630 fatalities for 573 responses with fatalities, the number of necessary turn-outs is lower calculated as 1/0.000321 × 630/573) = 2833.

The average of 9.4 minutes in the infographic below related to the Swedish study is calculated from the 'time phone rings', not drive time.



The conclusion is that while drive time can be recognized as important, trying to achieve the National Fire Protection Association 1710 standard by reducing driving time – which really means adding stations, firefighters, or both – may incur cost in Saint John without accomplishing the desired effect of lower property loss or lives saved. As the infographic notes "To reduce fatalities from fires perhaps concentrate on other things (i.e. [those that are] more cost efficient)".

Many studies show that working smoke alarms, fire prevention, and public education have the greatest effect on reducing mortality, morbidity, and property loss.[g] [u] A Canadian example is the City of Regina which reduced its fire incidence through public education. In 2003, 42 fires were caused by children playing with matches or lighters. Only two were reported in 2019. In 2001, firefighters attended 704 garbage fires — at least some of which led to far more substantial damage. By 2019, that number had dropped significantly to 124. (Regina Leader Post, Retiring Angela Prawzick reflects on fire education role, Oct 17, 2020).

If the city decides it wants to reduce driving time to bring the service more in line with the NFPA standard and adds a fire station and staff[23], the effect on department-wide response at the 90th

[23] Estimated capital cost of land and a new fire station is $6.5 million. Annual operational costs are estimated at $2.7 million.

percentile would be marginal because it is likely that the extended times at stations 2 and 7 are impacting the service-wide driving time. Therefore, a fire station would have to be placed in the current station 7 and station 2 catchment areas. But, because most incidents occur in populated areas, even a resource enhancement in station 7's low population, low call volume response area – and to a slightly lesser extent, station 2's area – would have little impact on overall fire department 90th percentile times, although it might improve the second arriving vehicle time for two to six fires annually. The other thing of which to be aware is that the 90th percentile standard is applicable to fire incidents – not all incidents. NFPA indicates a four minute driving time at the the 90th percentile is also applicable to medical responses based on a United States centric model of fire departments operating emergency medical services, and the erroneous belief that seconds count in medical calls. That subject has been addressed in Section 6.1.

8 Attendance and 24-hour Shift Pattern

The trial period for the 24-hour shift pattern has been agreed, by way of a memorandum of understanding, to remain in effect for the duration of the collective agreement which ends on December 31st, 2023.

We view the 24-hour shift as being advantageous to firefighters but less so to the employer. Firefighters work a 24-hour shift, during which they can sleep after 10:30 PM – recognizing that they may be disturbed – and then get three days off before returning on the fourth for another 24-hour shift. Over the course of a year, firefighters work seven or eight days a month. Prior to the 24-hour shift pattern firefighters worked two, 10-hour day shifts, then two, 14-hour night shifts before receiving four days off. The number of hours worked per year is the same at 2,184 hours

The 24-hour shift pattern allows firefighters to have more consecutive time off to pursue hobbies, time with family, or other employment. Staff can also live further away since commuting is less frequent compared to a four-day week shift pattern.

We have difficulty finding any benefit for the employer though. Staff spend as many hours on duty whether on a four-day work week or 24-hour shift but training becomes more difficult, for example, because training staff remain on a four or five day a week pattern. Issue resolution is also more challenging because, if an incident occurs, it may be four to eight days before the person who senior staff want to contact is back at work. But what is most intriguing is that illness absence has increased rather than declined, as one would expect, even though firefighters on a 24-hour shift have fewer days at work.

For the following calculations we will assume that the figurative workers have illnesses amounting to **nine workdays** a year.

- If a worker works five days a week, they are scheduled to be at work 247 of 365 days. we reduced this person's regular 260 workdays a year by 13 for statutory holidays. In the other examples we assume that shiftwork staff will be paid in lieu of time off or receive compensation.
- If a worker works a four-day work cycle consisting of four shifts on and four off, the worker will work on 192 days of the year, and
- if a worker works a 24-hour shift as discussed above, that person will work 92 days a year.
- If a person working 247 days a year is sick and away from work for 9, that is a 1 in 27.4 chance that a workday will be taken off due to illness. If a person working 192 days a year is sick and away from work for 9, that is a 1 in 21.3 chance that a workday will be taken off due to illness. If a person working 91 days a year is sick and away from work for 9, then there is a 1 in 10 chance that a workday will be taken off due to illness.

A review of time off since 2015 was completed for this project and we found that the chances of firefighters being ill on a workday has increased with the 24-hour shift pattern even though there are 100 fewer workdays a year, per person, in the 24-hour shift pattern than there were in the previous 10- and 14-hour shift pattern. We acknowledge that there are many reasons for being away from work due to illness and, due to the nature of emergency work, workers may not be able to cope as well as office staff on days they experience illness. But not only has the chance of illness occurring on a workday increased since the 24-hour shift pattern was implemented in 2018, the overall hours of illness have also increased.

The 24-hour shift pattern is a trial which ends at the end of December of 2023. We can't find a benefit to the employer for it to continue.

9 Renewing Fleet Assets

Fire trucks are large, carry a wide range of equipment, and are very expensive. Why do they have to be that way? For the purpose of this report we will assume that Saint John Fire Department has three response areas that we will term as: Uptown (has hydrant water supply); urban (not part of the Uptown area but has hydrant water); and rural, (no hydrants) where firefighting water has to be trucked in or drafted.

Even though trucks from one part of the city will be used in all parts of the city from time to time, is it possible to purchase trucks that are used mostly in stations 1, 4, 5, and 6 areas, in a design to serve those areas? To accomplish this, Saint John Fire would have to ascertain which pieces of equipment are used always, vs. occasionally vs. rarely, and whether some of that equipment can be removed from all trucks and placed in a rescue or other truck as part of secondary response.

Other consideration examples when deciding on truck design are:

- How many metres of hose have been used, at maximum, in the Uptown area?
- How many metres are carried on each truck?
- Does the difference between 'ever used' and 'carried' have to be on all trucks?
- How many metres of drafting hose are carried on each uptown truck?
- How many times has drafting hose been used?
- Is it necessary to carry drafting hose?
- The London, England Fire Brigade, in their 2022 Fire Facts, Incident Response Times publication states that most incidents are quickly resolved by one or two fire engines and a third engine is dispatched in only about 10% of occasions.

Response times for the third fire engine.
Most incidents are quickly resolved by only one or two fire engines. A third fire engine is sent to incidents on about one in ten occasions. Other than the overarching intention that all our fire engines arrive as quickly as possible, there is no standard for the third fire engine to arrive.

London Fire Brigade London Fire Brigade, Fire Facts, Incident Response Times; Response time, page 13

- Saint John Fire dispatches four apparatus and a Platoon Chief to all reported structure fires. What is the outcome of structure fires and is it necessary to send four trucks as a matter of practice? Can deployment models affect truck design and cost?
- How much and what equipment, including ladders, was removed from each apparatus for each incident?
- How much onboard (tank) water was used?
- How much water (including foam agent) was used overall and pumped by each apparatus?
- What was the flow rate per minute and for what duration?
- Can smaller, quick response vehicles be used in some areas of town?

The City of Ottawa has purchased eight smaller fire trucks.

Ottawa's newest fire trucks are 61 centimetres shorter, which helps drivers make tighter turns and potentially get closer to fires on narrower streets and parking lots. (Giacomo Panico/CBC)

Sticker shock led to change

Fighting fires in Ottawa for the past 23 years, Griffin was tasked with helping the city purchase 14 new pumper trucks to replace ones nearing retirement, which had originally cost the city about $650,000 per pumper in the mid-2000s. He said the process hit a snag when it became evident the price tag to replace the existing pumpers with similarly scaled trucks would easily exceed $1 million each. "Ultimately the catalyst was cost," said Griffin. "Our management asked us to come up with ways we could reduce cost, and one of them was to reduce the overall size of the truck."

Each new, smaller pumper cost the city roughly $700,000, yet they have the same water tank and crew capacity, four firefighters, as the model they replace, which was also a key factor given Ottawa's range of neighbourhoods, Griffin said.
"By having the smaller-size trucks, we got a truck that works really well in the urban setting and the suburban setting," he said.

Canadian Broadcasting Corporation

Saint John's truck assets need to be renewed but a thorough examination of truck and chassis need should be completed before spending $1,000,000 or more on a traditional fire truck.

Newer truck chassis such as the Ford F-550 extended cab and crew cab (both with 6.4-liter turbocharged diesel engines), GMC Yukon, and Toyota Hilux are examples of beefier trucks that can serve as a rapid response vehicle, that is, first-arriving pumping apparatus. The Hilux is very popular in European fire departments.

This sized truck is serving as the platform for basic emergency response apparatus in fire departments around the world, especially in the congested cities of developing Asia and Old World cities of Europe.

Battalion Chief Robert Avsec (ret.) served with the Chesterfield (Virginia) Fire & EMS Department for 26 years. He was an instructor for fire, EMS and hazardous materials courses at the local, state and federal levels, which included more than 10 years with the National Fire Academy. *FireRescue 1 Online July 2017*

Pomax isn't recommending that smaller trucks should be purchased rather than traditional fire trucks even though that is a direction we might take, but we are recommending that any purchase request should be accompanied by a data rich business case explaining the value gained by spending up to a half-million dollars more for a traditional fire truck, and why operational reconsideration; that is, a paradigm change in how reducing fire risk and firefighting frequency, is not able to reduce risk, thereby cost[24].

9.1 Tankers

We recommend decommissioning the tankers. They are low value operational assets because of the staff deployment design. They could be sold to a volunteer service that has low call volume and the recovered funds used to purchase, or contribute to, the cost of a rapid response vehicle if a decision to purchase is made. (More information in Section 6 Incident Response and Vehicle Deployment).

9.2 Reserve Vehicles – Are They Needed?

Engines 8 and 9, and Quint 5 are reserve vehicles that can be put into service when one of the front-line vehicles require maintenance. Sometimes maintenance can be accomplished in a day,

[24] Short wheelbase pump and rapid response unit turnout Foleshill UK. introduced in 2013 to respond to smaller incidents which didn't need a response from a full-size fire engine. https://www.youtube.com/watch?v=nYnqc6si7Tk (safe link)

sometimes several days when it is a lengthy job or parts are required. We ask if it is necessary to have spare vehicles.

We acknowledge that it is traditional to have spare vehicles for maintenance backup but when are they used? Are there alternatives to spares?

- Multiple trucks are needed in case of fires only.
- Saint John Fire responds to about 50 structure fires a year.
- Other fires that may require multiple trucks are grass and bush fires – about 80 a year concentrated in April and May.
- For discussion purposes, there are approximately 150 times a year that multiple truck response may be required.
- In the eight-year study period we found 10 instances where two structure fires took place while another structure fire was in progress or, more accurately, had not been cleared because, in some cases, some apparatus had been released from the original scene.
- As part of the data analysis Pomax evaluated the arrival time of each fire apparatus to every structure fire incident and the time spent on scene. We conclude that, like the London Fire Brigade, most fires were handled with three or fewer trucks.
- Saint John currently has seven front line vehicles and two tankers, plus three spares.
- For larger fires which require more staff, fire trucks are used to transport staff and equipment more than they may be needed for pumping capacity.
- Other ways of transporting firefighters and equipment include a van of sufficient size to seat firefighters in turnout gear and a centrally located equipment truck.
- In rare cases, help may be requested from partner fire services.

Assets purchase should be based on good data and facts rather than "what if"?

The need for the number of trucks, the reasons for having the current fleet of heavy trucks, and alternatives to heavy trucks should be considered in consultation with the Director of Transit and Fleet.

Reducing the number of heavy trucks would reduce the cost of maintenance and fuel and it may diminish, over 20 or more years, the need for firehalls that can house several heavy trucks.

In a scenario where Saint John does not keep spare vehicles in reserve and one or two vehicles are out of service for maintenance or repair, occasions may occur when there are staff without trucks. While we expect this to be rare, it is an opportunity to assign those staff to other response vehicles, all day training, or fulfill other duties, work with social services to reduce fire risk, or assist other city departments or partner agencies. There will not be a lack of work, particularly fire prevention activity and public education. But using firefighters in this manner requires planning and readiness to use resources as they become available.

Saint John should move as quickly as possible to put in place a data informed plan to renew its fire department fleet. That does not mean that all purchases need to be heavy trucks. The intent of this section is to encourage the city and fire department to determine real needs vs. traditional truck purchasing activity. For example, if the number of fires and responses can be reduced, and if rapid response vehicles are a successful initiative, replacement may be every five to seven years although at $250,000 rather than one million dollars.

9.2.1 Fleet Recommendations

With the objective to reduce the fleet of heavy trucks as much as possible, we recommend working with the Director of Transit and Fleet Services to

- purchase three rapid response vehicles (see Section 6),
- decommission the current reserve trucks,
- put in place a monitoring and data gathering system to optimize rapid maintenance for the fire department fleet,
- put in place a system to track and determine the need for, use of, and alternatives to some of the front-line heavy trucks,
- decommission the tankers, use other trucks in the fleet for additional water in non-hydrant areas, and work with partner fire departments to augment water supply on a mutual or automatic aid basis.

10 Technology

Even though the Saint John fire fleet is old, and replacement needs to start as quickly as possible, if it came to making a choice between a truck or technology, we would delay the purchase of a truck to acquire the technology – software, hardware, extensive training – to achieve the data required to elevate the operational and administrative aspects of the fire service. Use knowledge to drive down fire frequency and improve firefighter safety when response is necessary.

Technology should be invested in to define risk, improve safety and effectiveness, and support the core purpose of public protection. The cost of technology should be measured against complement offsets and effectiveness that will achieve efficiency and lower costs. As in any business, financial break-even, and cost reduction points should be included in any supporting business case.

Traditionally, fire departments' service provision has been evaluated on response time and resource arrival and it served the public well for many years. But a shift in focus to the application of technology for information gathering and analytics is necessary in order to determine the most valuable use of existing resources, assets required in the future, mitigation activities, and education concentration.

Technology will enable officers and firefighters to gather information about incidents including the cause, injuries, loss, resources required, on scene activity, and other aspects of emergency response in almost real time rather than making notes on paper (virtual or physically) that may or may not be later included in a records management system.

Technology will also allow gathering of risk-related information such as floor plans, hydrants, sprinkler systems, hazardous material, and other characteristics of commercial or industrial establishments, multi-residential dwellings, schools, hospitals, assisted living locations, and other occupancies which can be reviewed enroute to an emergency.

And it will enable staff and firefighters conducting prevention endeavors to record information found at the time of activity without waiting until a return to the fire station. It will also assist firefighters conducting neighbourhood safety and fire awareness programs to record risk activities or unique neighbourhood characteristics as they are encountered.

Analytics is the use of data gathered to discover meaningful patterns and applying those relationships to increase effectiveness or efficiency, whether it is response related, education, prevention, or other circumstances. Analytics is not limited to emergency incidents but can assist with determining education programs, patterns to assist prevention program scheduling, and to associate causal relations with outcomes. It will assist Saint John and it's fire service to anticipate

when emergencies may occur based on historical patterns and will help determine the most effective and efficient method of response and use of responding resources.

Data gathered will result in information dissemination to inform the initiatives that will be of primary importance from time to time.

10.1 Analytics and Risk

Risk determination is the process of gathering reliable data, looking for meaningful patterns, analyzing information and using it effectively to determine the right response and resource allocation depending on incident type.

Careful collection and interpretation of data improves decisions about tactical, operational, educational, prevention, and strategic priorities. Trend analysis will enable the fire service and city to predict future needs, deploy resources, and improve services. For example, answering questions as to when, if, and the number of fire responders that should be sent to medical emergencies, the nature of the vehicle that should be used, or the number of firefighters and equipment that should undertake initial response to different emergency types. It may mean moving away from a 'one size fits most' response, or the risk analysis may confirm that a standards based, or prescriptive response, is indeed the right one.

Analytics will enable the fire service to identify all event types and their potential for occurrence based on historical patterns, the equipment used most frequently, when incidents are most likely to occur (season, day, and time) the resources required to effectively and efficiently resolve the incident type, determine initiatives that might moderate risks, and increase protection to the public by virtue of reducing incidents.

10.2 Recommended Technology

10.2.1 For 'as soon as possible' implementation:

A relational incident activity outcome data base so that the fire service and the city can measure the benefit of response activity. Although we have not found a market ready product of this nature, companies like First Due (which has recently joined forces with Central Square) have configurable data bases and are interested in working with fire services that want to improve their information gathering and output.

Inspection and incident planning software including the supporting hardware so that prevention and public education records can be captured, on site, and uploaded in real time thus avoiding note taking and transferring information to a static (dumb) record management system. Such software and hardware should increase efficiency and effectively increase staff time and value. Licenses and hardware sufficient to serve all prevention and education staff and

firefighter teams assigned to day-to-day prevention activity should be purchased. Companies like APX, ESO and others supply such products.

Geographic Positioning System – Automatic Vehicle Locating vehicle movement reporting: This technology automatically reports vehicle movement such as departing station, arriving incident, departing incident, back at station thereby avoiding missed activity time stamps or erroneous vehicle movement times; for example, reporting in service while waiting for the full firefighting team to board the apparatus. Several hundred, or more, time stamps are missed each year in Saint John. A GPS – AVL reporting system will improve data collection.

Improved Dispatch – Fire Service Integration
Some on-scene activities could be tracked by the fire dispatch service including critical time records and other activities. These activities could be reported to dispatch from the incident commander or firefighters using helmet-incorporated hands-free communication. The information recorded by a dispatcher should be directly entered into Saint John's record system so that it will be part of the overall incident without handling the material more than once.

10.2.2 Future consideration technology

Technology that eventually may help to reduce the number of firefighters needed on site or safely allow more than one assignment on scene; for example:

Scene Apparatus Manager (SAM) is a digital fire pump control system not unlike portable controls used on concrete truck pump systems, although more critical. It manages fire truck pumps, tanks, intakes, and discharges and appears to get agent on a fire 20 to 30 seconds faster than manually operated pump systems. Even though a firefighter is still required to monitor the scene apparatus manager, SAM is marketed as allowing the pump operator, using wireless remote controls, to also be able to help with fire size up and scene monitoring. We're not sure that is true but simplified digital pump operation will likely be standard on future fire trucks. In 10 to 15 years voice activated or artificial intelligence pump operation may be possible thereby eliminating the need for a pump monitor/operator.

11 Governance and Organization

Saint John Fire and Rescue can benefit from an organizational realignment to reflect the recommended shift to fire prevention, fact-based risk assessment, and clearer responsibility and performance paths within the fire service, while receiving corporate support during several years of change.

11.1 Organizational Analysis is More Art than Science

Determining an organizational structure that is objectively best for an entity is generally not possible because knowledgeable leaders and even experts may disagree about the virtues of different structures. Within the range of reasonable alternatives, some observers might prefer one alternative while others might prefer another.

In addition, the structure that will work best for an organization depends on its people, management systems, culture, and priorities. For example, an organizational structure that is theoretically sound will not serve an organization well unless the existing staff has the capabilities to implement the structure. Alternatively, if the structure is sound, an organization might work to develop the staff capabilities needed to support the structure and implement the structure over time. Available management systems also affect what organizational structures are practical. In general, more effective information and communications systems are needed to implement a decentralized structure than to implement a more centralized structure. Moreover, the culture of an organization influences organizational features that should be emphasized. While an organization with a strong culture of accountability may not need a structure that facilitates accountability, other organizations may need organizational structures to enhance accountability and performance. Organizational priorities—which may change over time—also influence the types of structures that will work best for an organization.

The management style and capabilities of key leaders also influence the type of structure that should be implemented. No matter how capable, all managers have strengths and weaknesses. An effective structure leverages managerial strengths and compensates for shortcomings.

The art of organizational design centers on making tradeoffs. An organizational structure designed to help an entity achieve one set of objectives and priorities may be ill suited to support efforts to achieve different objectives. Hence, effectively evaluating organizational alternatives requires making these tradeoffs explicit. To the extent possible, tradeoffs implicit in an entity's organizational structure should reflect the organization's needs and priorities.

11.2 Management Structure

The current fire service management structure is shown in Exhibit 9.

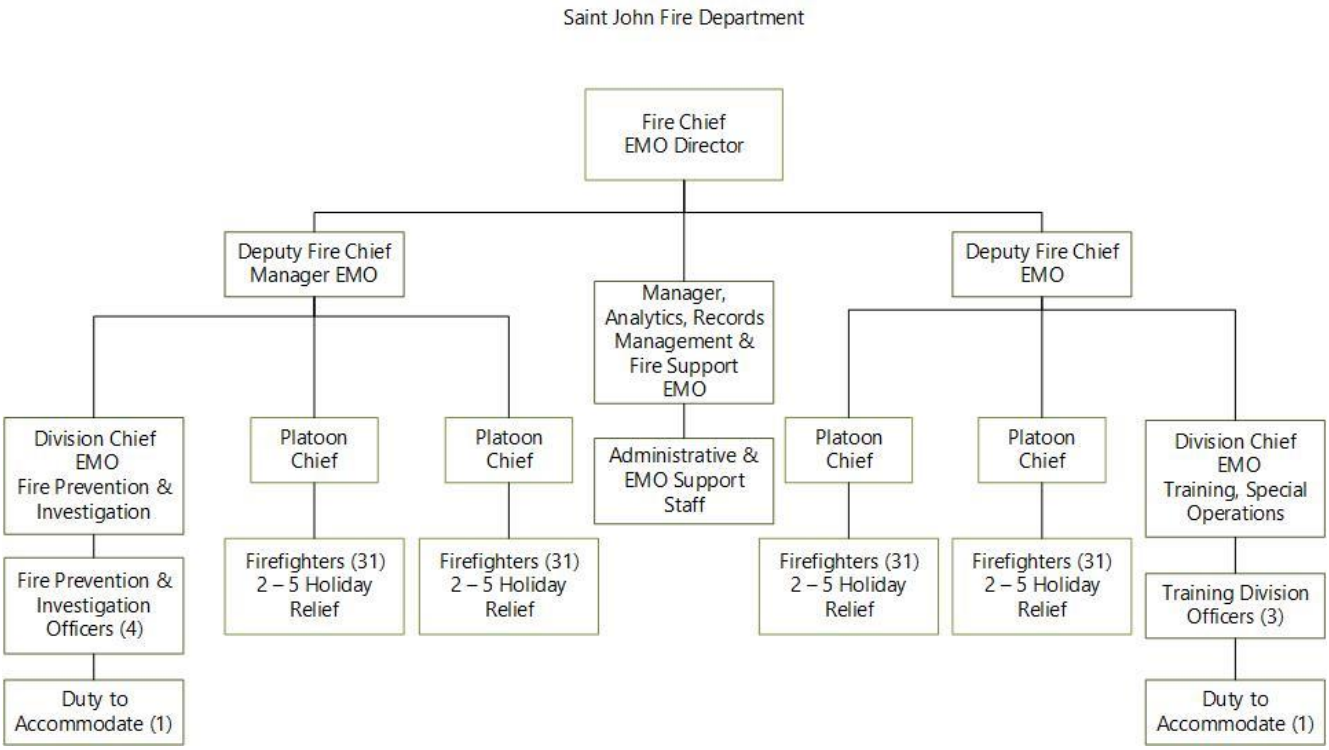
In addition to the Fire Chief, the management structure includes

- two deputy chiefs (one position is vacant),
- four platoon chiefs,
- two division chiefs,
- manager, analytics.

We have found that

- 10 positions are part of the management structure,
- seven positions are indicated as having an Emergency Measures Organization responsibility,
- the management structure is robust in that the four Platoon Chiefs are exempt staff which allows greater management oversight than if they were part of the firefighters association which is the case in several other provinces.

Exhibit 9: Saint John Fire Department Current Organization



11.3 Emergency Measures and Community Emergency Management Coordinator

We haven't seen evidence of significant risk that would warrant the emphasis apparently placed on emergency measures organization activity as reflected in the number of staff members with EMO responsibility as reflected in Exhibit 9, above. In many municpalities the fire chief or a deputy is the community emergency management coordinator, or lead, (CEMC) in addition to regular duties. In a few cases, the CEMC or Assistant CEMC role resides with an administrative

position. Each municipality is different and must adopt an organization, including emergency measures responsibility, based on local risks. We have clearly shown that in Saint John the primary risk is fires in dwellings and small businesses, but mostly in residences. While emergency measures and management are important for other eventualities including weather related, industrial, and other events – and while we acknowledge the recognition afforded to the Saint John Emergency Management Organization in the past – we suggest that the city should consider if EMO responsibilities, and perhaps a complement, would be better positioned in another department thus allowing the Chief and Deputy to concentrate on the changes recommended in this report, to the extent adopted.

11.4 Design for Success

A new strategic direction and operational paradigm, as is recommended in this document, is likely to fail if it doesn't receive the benefit of an acceptable support structure. In private business, successful changes are supported by a project team and steering committee, and we recommend the same in Saint John.

The city should create a project group, such as a Fire Services Governance Committee (Committee) that should take the form of a project team with the sponsor being the Chief Administrative Officer.

A governance structure of this nature with the Chief Administrative Officer as the sponsor, signals the importance of refocusing the fire department to fire prevention, and supports the fire chief through an extended, busy transitional period.

The Committee would be responsible for oversight of Fire and Rescue Services strategy and ensuring accountability for implementing recommendations adopted by the city. The Committee would receive presentations from the Fire Chief, offer strategy guidance to the Chief, assist with reviewing plans supporting the strategy, purchases, resource deployment, and assist with information brought to Common Council. The Chief's day to day responsibility for administration and operations of the fire department and reporting relationship to the Chief Administrative officer would continue.

Chaired by a neutral senior city staff member, committee members should include several senior leaders including from finance, corporate communications, human resources, and fleet services. This Committee and project team approach will support the fire department in creating partnerships to focus prevention efforts that meet the community's needs, while maintaining appropriate emergency response.

The committee should include a Project Management Professional to assist with creating work plans, establishing goals and objectives, and tracking tasks as the strategy and associated plans progress over several years.

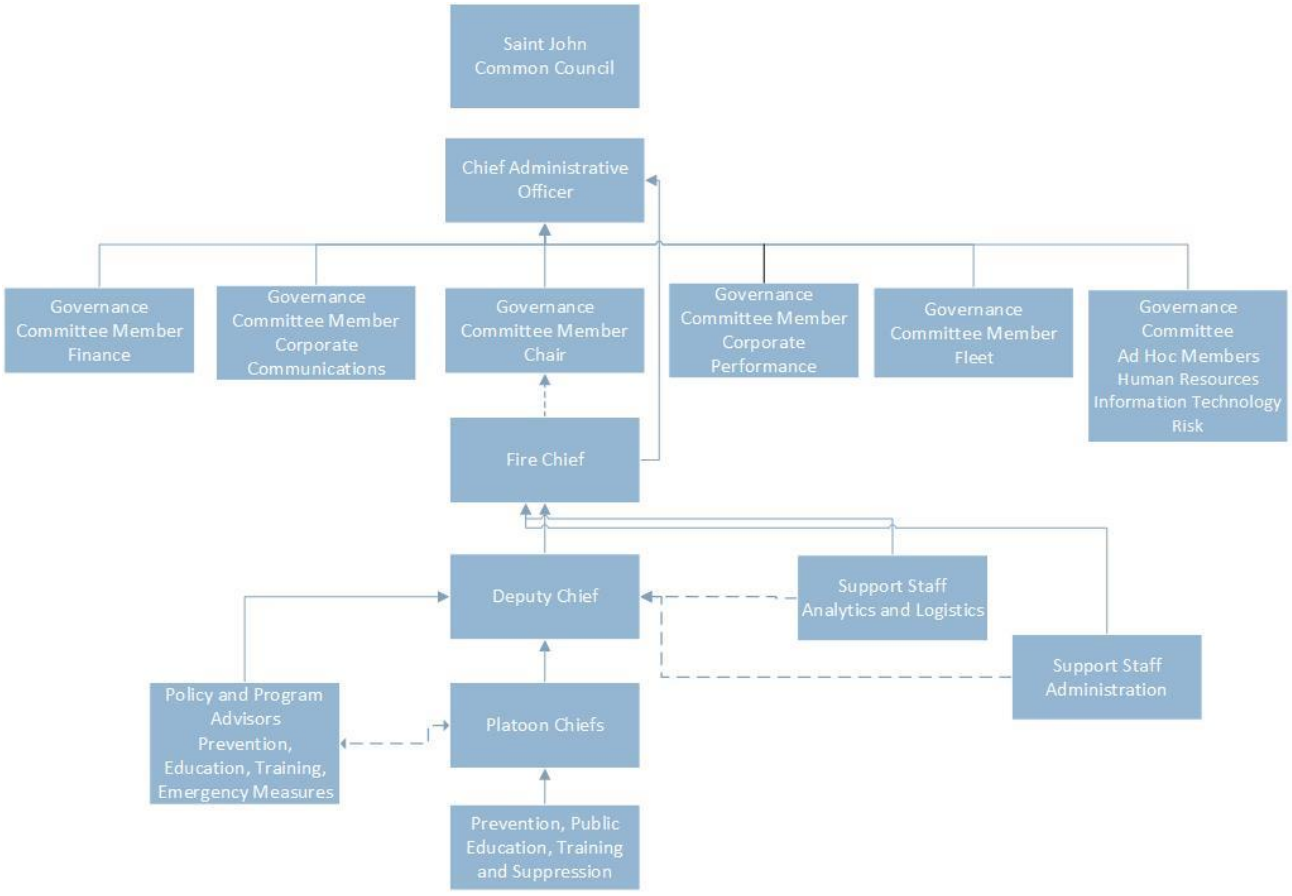
We envision that the Committee will continue to fulfill its mandate for a minimum of three years and, at the end of that period, review the fire service progress and recommend to the Chief Administrative Officer next steps that support the path described in this document, which includes the possible continuation of the committee.

Further, we see this committee as being a focal point for determining the talent and job functions required within the fire service to ensure success of the recommended direction, and adjusting the aptitude, positions, and capabilities from time to time to assist success.

We recommend that

- Saint John implement the organizational structure depicted in Exhibit 10;
- the vacant deputy's position be redeployed to fulfil another role as determined by the city;
- prevention, public education, training, and suppression should all fall within the responsibility of the Platoon Chiefs who would ensure duties, as described within this report, and where adopted by Common Council, are accomplished on each shift, and assist the transition to a prevention-centric organization; and
- the Division Chiefs' positions should become Policy and Program Advisors to the Deputy Chief with respect to prevention, public education, training, and emergency measures.

Exhibit 10: Recommended Organizational Structure



11.5 Local Governance Reform

New Brunswick has recently proceeded with local governance reform which reduced local entities from 340 to 90 (78 municipalities and 12 rural districts). Although Saint John's boundaries were not affected by the legislation, it is an opportunity to abide by the spirit of the local governance restructuring by broadening partnerships and enhancing the current communication with surrounding fire services to partner on training, mutual aid response, and possibly equipment sharing.

Memoranda of Agreement should be established with partner agencies with respect to each of mutual or automatic aid, training, equipment sharing, and other areas of mutual benefit.

Part 2: The Strategy

12 Introduction to the Strategy Section

12.1 Vision, Mission, Values

The purpose of this project is to design, develop, and deliver an implementation plan, in a 15-year strategy, to achieve the best possible fire service while in accordance and aligned with the financial policies as adopted by the City of Saint John.

The strategy presented in this report is that of establishing a culture of objective, data-based decision making, grounded in good business practices[v], within the Saint John Fire Department. Currently, the Saint John Fire Department's vision, mission, values[25] and culture are to deliver rapid and robust emergency response, and the department's leaders and staff do that well. The strategy proposed in this report is designed to augment the already good emergency response by suggesting and recommending ways for the fire department to work with community and other partners to enhance prevention efforts and reduce danger to the public.

Good Business Practices
There is healthy discussion within emergency services when the suggestion is made that public safety should be operated based on business practices. There is a cadre that contends that business practices shouldn't be a consideration because public safety saves lives. Another group contends that efficiency and effectiveness and the careful use of public funds, within the parameters set by local government, should always be part of decisions. We support the latter.

This report is based on the principle that a municipality has an obligation to provide responsible and accountable governance with respect to matters within its jurisdiction. Protecting the public through implementing and maintaining cost-effective emergency avoidance and response systems is imperative to the duty of responsible and good government.

[25] The **Vision** of the SJFD is to anticipate the challenges of the new millennium and through progressive planning and leadership, provide an effective and innovative response to the evolving Fire and Rescue needs of the citizens and industries of Saint John.
The **Mission** of the SJFD is to minimize the loss of life and injury as well as damage to the environment, through effective and efficient traditional and non-traditional fire rescue services.
Value Statement –We the members of the SJFD shall base our conduct on the highest ethical standards both in our private lives and in our responses to the needs of our citizens. We shall service with professionalism, courtesy and respect, recognizing the diverse nature of our community. We shall hold devotion to duty above personal risk.

Pomax believes in fire prevention and public education as a primary method of avoiding incidents, and that fire departments should demonstrate strong efforts in those areas. This approach is widely supported by fire departments across Canada and the United States and in most developed countries. Prevention and Education is endorsed by National Fire Protection Association Standard 1730 and by the Center for Public Safety Excellence and Commission on Fire Accreditation International.

The **National Fire Protection Association** (NFPA) publishes more than 300 consensus codes and standards intended to minimize the possibility and effects of fire and other risks. NFPA codes and standards, administered by more than 250 Technical Committees comprising approximately 8,000 volunteers, are adopted and used throughout the world.

The **Center for Public Safety Excellence** (CPSE) is a not-for-profit corporation and is a primary resource for the fire and emergency profession to continuously improve services, resulting in a higher quality of life for communities.

CPSE has successfully helped public safety agencies around the world streamline and improve the services they provide their communities through its numerous programs and services.

In the Saint John Fire Department, the primary focus is that of risk and response. More specifically, the fire department has determined that industry, older buildings, and the construction of those old buildings puts Saint John in the category of high risk for fire or other incident type and the department wishes to ensure it is ready to respond accordingly. But while risk recognition and adequate response should not be set aside, the best way to protect the public is through corporate fire prevention efforts – not just the fire department's prevention effort. Fires and industrial accidents are mostly preventable and a social challenge but, in Saint John, they are being treated as emergencies. Emergencies occur when other initiatives are not effective or fail.

The consulting team was struck, particularly in the early to mid-stages of the project, as to the emphasis by the fire service on perceived risk, response, and call volume. We heard statements of concern about how call volume had declined but 'now the numbers are getting back up'. We heard little, if anything, until the late stages of the project, about a willingness for suppression staff (firefighters) to participate in public education and prevention activities. At that time we were told that, historically, suppression staff had a role in education but not in the past ten years.

Fire departments and other public safety services must continue to be prepared to respond to emergencies, but the purpose of fire departments should be to work with other municipal, provincial, and federal partners, and private corporations to reduce the number of incidents and mitigate the effect when response is required. We acknowledge that the fire department will bring forward several examples of working with other organizations, but we did not find that these efforts resulted in value for the effort. In other words, just because there are committees

and cooperative ventures in the form of agreements, has not shown to have attenuated the Saint John fire department's emphasis of risk and response.

The plans and techniques that will be detailed and recommended in support of the strategy entail activities entrenched in medicine and other sciences, commonplace in emergency medical services, widely used in police services, and in practice for almost 30 years in fire services in the United Kingdom and other countries, but relatively unknown in North America. And the reason they are unknown and not practiced in North America is directly attributable to culture rather than North American geography, or climate, or building structure, or any other reason that some contend negates their use here.

13 Proposed Strategy

A strategy supports the vision, mission, and values of an organization.

For the purpose of supporting our strategy discussion we offer a suggested Vision, Purpose statement, and Strategy statement at the end of this section. You may want to follow the links and read those first. For a definition of strategy, click here.

In 2010, the Swedish Civil Contingencies Agency (MSB) announced a "vision zero" of zero deaths or serious injuries due to fire in Sweden by 2050[w], [x]. The City of Saint John Draft Road Safety Strategy suggests a Vision Zero for road safety and we encourage the city to also consider and establish a Vision Zero for fire, similar to Sweden's, over the next 25 years. A vision of that nature is supported by a strategy to prevent fire death and injury, but it requires a scientific approach – once again, good data is imperative.

> The … Vision Zero policy has become an inspiration and model for systematic safety work in many fields. In short, Vision Zero combines an ethical approach – that it is never acceptable to let people die or become seriously injured in environments where the risks are clearly preventable – with a scientific approach to the principles of prevention. The Vision Zero was introduced in Sweden, applied to road safety, and has since spread to other countries and other problem domains. In this chapter, we wish to illustrate Vision Zero as it was originally formulated, and what a Vision Zero model, according to the same principles, would imply if transferred to fire safety. Finally, it is discussed what challenges it entails to introduce a Vision Zero on fire, based on Swedish experience where a Vision Zero for fire safety was launched already in 2010.
> *Residential Fire Safety (pp.259-269); Ragnar Andersson Karlstads Universitet*

13.1 What Would be Required to Accomplish Vision Zero for Fire?

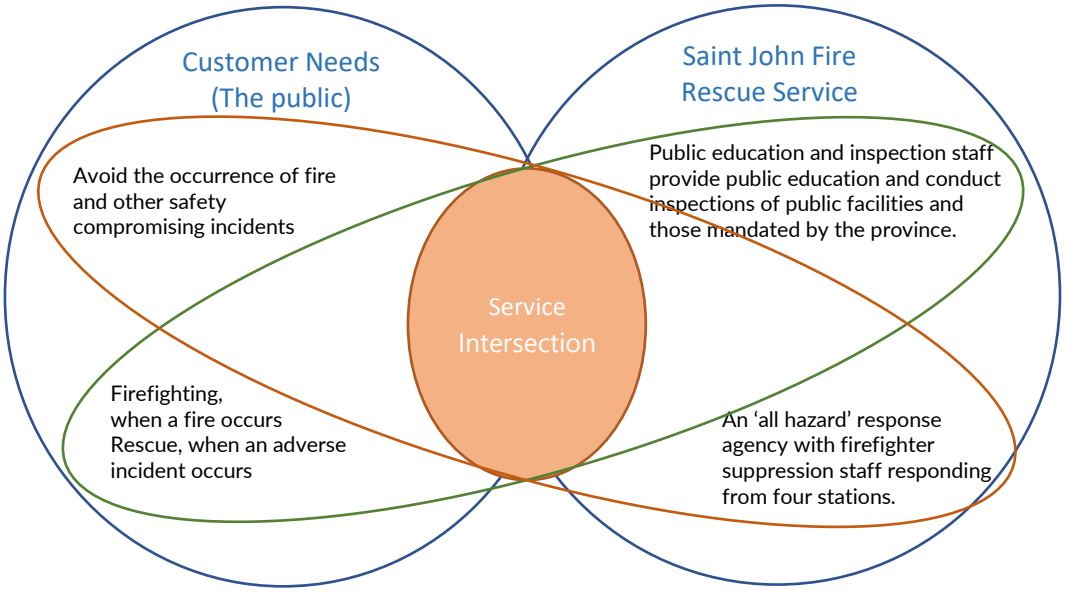
1. A philosophy where prevention, education, and efforts to continually decrease the number of fires is a primary objective. (please see Section 5.3.1)
2. A re-thinking of the purpose of fire services to that of everyone in the department being responsible for, and continuously involved in, prevention activity, not just the prevention division,
3. The development of data that saint john does not yet gather, and dependence on objective information for decision making,
4. Refocusing attention on prevention while maintaining appropriate response capabilities,
5. Using inquisitive decision making to set parameters on when response is of value to the public vs. When response occurs because that has been customary practice, and using the time recovered to achieve a reduction in fire incidents.
6. Clear, consistent, and wide-spread messages to the public that fire services will be visiting to assist with home and industry fire prevention techniques.

13.2 Strategy

Saint John fire provides both prevention and educational activity, and response to the public. There is a 'sweet spot', where most public needs are met, that we will refer to as the 'Service Intersection' of community need and service provision (Exhibit 11).

On the public (customer) side, help is required to avoid the occurrence of fire and other safety compromises and, when firefighting or rescue are necessary, the public needs rapid, but scaled, service provision. The fire department provides that service, preferably first with an aggressive prevention approach and, as a fallback, response. But the prevention and education components are overtaxed and need help.

Exhibit 11: Intersection of Needs and Service



13.2.1 How does Saint John Establish a New Strategy?

Establishing a strategy is straightforward. Take a lesson from the story Michele Buck, CEO of Hershey, tells.

> *…. five and a half years ago, when I became the CEO of Hershey, I had a vision that we could be something more than a candymaker. Since then, we've embarked on an ambitious journey. First, we set a bold new strategy: to make Hershey a snacking powerhouse by expanding into the savory and better-for-you product categories. Then we made it happen, by streamlining our global operations, bolstering our core, developing a more courageous culture, and executing a series of diversifying acquisitions.*
>
> *Harvard Business Review, Volume 100, 2022*

So, the steps are

1. Establish a vision.
2. Set a strategy.
3. Make it happen.

We have suggested a vision of continuous risk decline for Saint John and its fire service, and Vision Zero with respect to fire deaths and major injuries. Then the city and fire service have to make it happen by establishing a new culture that is courageous enough to rely on data to employ its resources in the right place and avoid "What if? scenarios". We have found ample evidence that the culture should be 'prevention, prevention, prevention'.

13.3 Supporting Plans

The fire service has to establish plans if it decides to pursue the recommended strategy. That means,

1. senior staff planning sessions championed by the Chief and the CAO, off site, initially and on a quarterly basis, and uninterrupted;
2. present a clear vision – explain the strategy to firefighters, department heads in the city, other emergency services including police agencies, paramedic services, dispatch centres, partner fire services;
3. finding 'thought leaders' among firefighters and captains who will be the front-line champions for culture change and protecting the public through prevention;
4. establishing record keeping and data awareness to improve activity documentation for both prevention and response;
5. acknowledge the naysayers – those uncomfortable with changing the status quo both inside and outside the organization – but don't let them change the direction or interrupt plans;
6. meet staff and other stakeholders – including the public – quarterly for the next two years to update them on progress, inform them of new or revised plans;
7. communicate with stakeholders until you feel that overcommunication is occurring, then communicate some more because there will be some who will contend that they aren't getting ANY information;
8. repeat for five to ten years until the new prevention-centric paradigm becomes the culture of Saint John's fire service and the city.

A paradigm is the current state of affairs or accepted beliefs. A paradigm shift is when the current state moves (shifts).

In 1962 Thomas Kuhn (The Structure of Scientific Revolutions) talked about scientific revolution and the paradigm shift. The concept is that, in the development of ideas, there becomes a focus on a set of assumptions that form an existing paradigm, and science or practice progresses with

that paradigm by improving and improving the fundamental assumptions but not questioning them. From time to time there is a slowdown of the improvement progress, and a set of anomalies arises that can't be well-explained by the existing paradigm.

When there are enough anomalies, and there is a compelling enough new paradigm that it takes over, we have, what is called, a paradigm shift; it's a shift in how we think about things. For example, the Center for Public Safety Excellence 21st Century White Paper addresses avoiding "*being vested in a 20th century paradigm or antiquated … bureaucracy*".

That 'shift' point is being reached in fire services. Preventing incidents from occurring is the best way to protect the public and firefighters in Saint John, yet the greatest efforts and resources – at significant cost – are still being applied to response.

13.4 Vison, Purpose, Strategy

We suggest the following vision, purpose, and strategy statements for Saint John fire.

Vision
Our vision is a city where risk to the public is in continuous decline, and livability and safety are enhanced.

Purpose
To protect the public by using precise, detailed data to inform prevention, public education, response requirements, and resource levels; ensure the cost of the department is aligned with the city's needs; forestall growth in emergency response; and ensure information provided to the public and city is objective, accurate, transparent, and in-depth.

Strategy Statement
To safeguard the public through education and prevention practices, achieve incident reduction and mitigation in partnership with public and private organizations, and use detailed data to determine where and how resources should be distributed.

Saint John Fire Department Strategy Statement

To safeguard the public through education and prevention practices, achieve incident reduction and mitigation in partnership with public and private organizations, and use detailed data to determine where and how resources should be distributed.

"safeguard the public"

The Saint John fire department will promote a culture of prevention and public education, throughout all divisions and levels of the department, as the primary method of saving lives, reducing injury, and protecting property. The need for an appropriate response to fire and rescue emergencies will continue, but public and firefighter safety is greatest when the need for response is reduced to the lowest possible level through education and prevention.

"partnership"

We will collaborate administratively and operationally with other City of Saint John divisions, other fire departments, provincial and federal agencies, business, industry, and social and other agencies to promote fire and other safety understanding, incident reduction, mitigation, and response.

"detailed data"

Our data analysis will include tracking and measuring all aspects of incident response, activity, equipment used, and outcome to enable us to provide detailed reports to city administration and council, reduce unnecessary activity, ensure efficiency in equipment purchase, maintenance, and use, and find safe alternatives to forestall emergency response wherever possible.

"where and how resources should be distributed"

We will use data to determine human and capital resource distribution, promote administrative, operational, and cost efficiency and effectiveness, and increase operational value.

Part 3: The Plan

14 Recommendations

As a forward to the recommendations, we want to acknowledge that we were allowed a broad swath of time to investigate every aspect of the fire service; neither the fire department nor municipality pressured us to come up with quick answers.

The City of Saint John has opportunities to enable its fire department to increase effectiveness, and improve public safety, efficiency, and cost savings. These include

- being more judicious as to the type of calls to which the department responds,
- assessing the number of apparatus sent to calls and the circumstances and information, gathered by the dispatch centre, which result in being dispatched,
- reconsidering the type of apparatus and equipment required based on evidence and need rather than practice and tradition,
- adopting, as a primary public safety principal expectation within the city, that other than when training, responding to incidents, or allocated breaks, fire staff will be engaged in prevention services.
- working with the communications centre to improve call screening and reduce response priorities or gather improved incident information,
- working with other departments such as building inspections and social services to reduce risk and improve the well-being of the public, and generally re-thinking the provision of fire services because the current model is based on the historical model of experiencing a structure 'fire-a-day' in the community. That is no longer the case,
- establishing formal mutual and automatic aid, training, and sharing agreements with partner agencies to improve working effectiveness and reduce capital and operational costs.

14.1 Recommendations

The recommendations that follow align with the strategy statement shown above and the vision, purpose, and strategy suggested in Section 13.4.

Recommendation 1: Shift to a Fire Prevention Focus
This recommendation relates to '*safeguarding the public*' noted in the strategy statement and represents the core responsibility paradigm shift described in Section 5.3.1 (All Firefighters Should be Fire Prevention Officers, page 54).

The paradigm shift requires a change of perspective by fire services and firefighters as to their core responsibility which should be prevention, although the need for suppression and rescue continues.

The Saint John Fire Service will promote a culture of prevention and public education, throughout all divisions and levels of the department, as the primary method of saving lives,

reducing injury, and protecting property. Preventing incidents from occurring is the best way to protect the public. Refocus the activity of all Saint John Fire Department staff onto prevention activity, while maintaining appropriate response capabilities.

Fire Prevention & Investigation should become part of an overall fire service prevention initiative, reporting to the Platoon Chiefs where specialists (currently, the Fire Prevention Officers) would assist the Platoon Chiefs with coordination of prevention activities by firefighters while also addressing the more major fire risk issues in Saint John that require the intervention of a qualified investigator. Firefighters are 'risk aware' professionals by virtue of the role they play in suppression and that knowledge can be extended, in a coordinated manner, to the public and property owners. Section 5.3.1 outlines a number of activities that can be completed by suppression staff.

To support the shift to a fire prevention focus

- Provide training to firefighters to National Fire Protection Association 1031 "Standard for Professional Qualifications for Fire Inspector and Plan Examiner", 2014 Edition, Chapter 5 (Fire Inspector II), and 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).
- Require all new firefighters to have taken all courses associated with National Fire Protection Association 1031 "Standard for Professional Qualifications for Fire Inspector and Plan Examiner", 2014 Edition, Chapter 5 (Fire Inspector II), and 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) upon hire.

We suggest only successful completion of courses would be required, not certification for NFPA 1031 and 1035.

National Fire Protection Association NFPA 1031 and 1035 are expected to be combined as a single standard in 2024.

Recommendation 2: Risk Assessment

This recommendation relates to '*safeguarding the public*' noted in the strategy statement.

The request for proposal required completion of a community risk profile (Appendix F). In fact, the full report delivers an Integrated Risk Assessment Plan to the extent that data was available. The data, as discussed and presented, indicates that risk is in the uptown and urban areas. Exhibit 4 , Exhibit 5, and Appendix B demonstrate the majority of structure fires occur in urban areas and mainly Uptown.

Service levels should be based on an integrated risk assessment as suggested and defined in this document. Risk is dynamic and mitigation should be based on periodic risk assessments and

adjusted to meet needs. This requires an assessment of all risks to life and injury to the community, resulting in a long-term plan to make the Fire and Rescue Service more responsive to locally identified needs. This means targeting resources to prevent incidents from happening, while also making sure resources are in the right location to best protect the community. An integrated risk assessment considers commercial, economic, social, environmental, and heritage concerns. We further recommend that the city

- invests in non-emergency service risk analysis courses, books, and periodicals for staff, to enable a wider understanding of the psychology of risk determination, and
- utilizes a risk determination model such as the Commission on Fire Accreditation International three-axis risk categorization or an integrated risk assessment as employed by the United Kingdom.
- should acknowledge, within PlanSJ, what the data indicates and reconsider the emphasis being placed on industrial risk which is not borne out by the data. Further, PlanSJ should place equal prominence on prevention, partnerships, and public education.

Recommendation 3: Governance and Organization

This recommendation relates to '*partnerships*' noted in the strategy statement.

- Create a project group, such as a Fire Services Governance Committee (Committee). The Committee should take the form of a project team with the sponsor being the Chief Administrative Officer or the city's Corporate Performance section.
- A governance structure of this nature signals the importance of refocusing the fire department to fire prevention and supports the fire chief through an extended, busy transitional period.
- The Committee would be responsible for oversight of Fire and Rescue Services and ensuring accountability for implementing recommendations adopted by the city from this review. The Committee would receive presentations from the Fire Chief, offer strategy guidance to the Chief, assist with reviewing plans supporting the strategy, purchases, resource deployment, and assist with information brought to Common Council.
- Chaired by a neutral senior city staff member, membership should include several senior leaders including from finance, corporate communications, human resources, and fleet services. The Fire Chief would report through this committee to the Chief Administrative Officer. There are many models in other jurisdictions where the Fire Chief reports to a Commissioner of Community Services or a Commissioner of Public Safety. This Committee and project team approach will support the Fire Service in creating partnerships to focus prevention efforts that meet the community's needs, while maintaining appropriate response.
- We envision that the Committee will continue to fulfill its mandate for a minimum of three years and, at the end of that period, review the fire service progress and recommend to the Chief Administrative Officer a revised organizational or reporting structure for the fire department that supports the path described in this document, or continuation of the committee.

- Further, we see this committee as being a focal point for determining the talent and job functions required within the fire service to ensure success of the recommended direction, and adjusting the aptitude, positions, and capabilities from time to time to assist success.

We recommend

- the vacant deputy's position be redeployed to fulfil another role, and implement the organizational structure depicted in Exhibit 10

Recommendation 4: Performance Management

This recommendation relates to '*data'* noted in the strategy statement.

Adopt a fact informed, research-based business model upon which to base day-to-day operational requirements and mid to long term planning to meet the protection requirements of Saint John. This recommendation includes:

- Implementation of a records management system that is fully supported by a relational incident activity outcome database so that the fire service and the city can measure the benefit of response activity.
- Establish a small working group, supported by Information Technology, to include the fire service, finance, the fire department records management vendor, and the public safety communications centre, to configure the record management system to capture dispatch intake data, fire department on scene activity, and incident outcome information.
- Ensure that inspection and incident planning software, including the supporting hardware, allow prevention and public education records to be captured on site and uploaded in real time thus avoiding note taking and transferring information to a static (dumb) record management system.
- Implement improvements into Geographic Positioning System – Automatic Vehicle Locating vehicle movement reporting. This technology reports vehicle movement such as departing station, arriving incident, departing incident, and back at station automatically thereby avoiding missed activity time stamps or erroneous vehicle movement times.
- Repurpose an existing position within the city, if possible, to resource corporate database management and data analytics skills. Critical to the majority of recommendations is an analyst complement to work with the fire department, First Due record management system, and Information Technology to achieve an on-scene activity, and outcome information, database. If repurposing a position isn't possible, create a new position.

Recommendation 5: Response Models

This recommendation relates to '*data*' and '*partnerships*' noted in the strategy statement and '*operations'* findings within the report.

- Retain, and maintain, on-going advice of a medical director to reduce response to medical incidents only to those that include unconscious, unresponsive, and apneic which includes

cardiac arrest or asphyxiation, or as requested by Ambulance New Brunswick's communication centre.

- Reduce response to traffic events only to those where a caller indicates people are trapped or as requested by Ambulance New Brunswick's communication centre.
  - No longer participate in New Brunswick 9-1-1 Operating Procedures Directive C-6 as described in Section 6.3.1.
- Reconfigure response to automatic alarms, such as smoke and carbon monoxide, to reduce the number of trucks responding. Determine the percentage of automatic alarms in the past five or more years that are positively associated with a fire (absent of secondary confirmation by a caller), or the number of carbon monoxide alarms where it was not confirmed that the building had been vacated. Alternatively, undertake a one year prospective analysis of alarm response outcomes and adjust response methods based on the findings.
- Cease funding the tanker staffing and redeploy the 17,520 hours of staff time assigned to driving the tankers to other roles (see Recommendation 7 with respect to decommissioning the tankers).

Recommendation 6: Dispatch and Communications
This recommendation relates to '*partnerships*' noted in the strategy statement and 'o*perations*' findings within the report.

The Public Safety Answering Point and dispatch service plays an important but often unrecognized role in the deployment of fire service resources. Nurturing the partnership between fire and dispatch to improve processes and, thus, effectiveness and efficiency will enhance the time fire service has for the core prevention and education role. (Section 6.4, The Role of Dispatch in Effectiveness and Cost Containment).

- Establish a fire service dispatch agreement with the communications centre to encompass the recommendations in this report including gathering information to assist determining the information that should be captured from callers.
- Establish a fire service dispatch agreement with the communications centre to include accepting and recording real-time incident information by the dispatcher. This recommendation includes the dispatcher capturing information provided by the on-scene Incident Commander within the fire service record management system.
- Negotiate service delivery with the communication centre to assist and improve productivity and service levels.

Recommendation 7: Assets and Facilities
This recommendation relates to 'p*artnerships*' noted in the strategy statement and 'o*perations*' findings within the report.

There has been no evidence that the closure of station 8 at the end of 2020 has resulted in an unacceptable increased risk to the city or station 8's pre-2020 response area. Current risk can be

reduced throughout the city by implementing the range of recommendations found in this document.

Fire trucks are large, carry a wide range of equipment, some of which is rarely used, and are very expensive. When it is time for replacement, determination of the type of rolling asset should be informed by a data rich business case explaining if there is value gained by spending a million dollars or more for a traditional fire truck, and why operational reconsideration; that is, a paradigm change in how reducing fire risk and firefighting frequency, can contribute to right-sizing the fleet.

- Dispose of station 8.
- Decommission the three reserve vehicles.
- Decommission the tanker trucks and redeploy the 17,520 hours of staff time assigned to driving the tankers to other roles (see Recommendation 5 with respect to tanker staff funding).
- Assess the purchase of SUVs or sedans based on a determination of whether the fire service is going to continue responding to medical incidents, traffic events, and automatic alarms at the same rate as present. SUVs or sedans can be staffed with one or two firefighters.
- Evaluate the equipment required to be carried on fire trucks and the size of trucks based on the use of data as described in this report.

14.2 Planning Steps

The steps in this section are critical to adopting a prevention centric strategy. After the city has decided on a strategy, the next step is to communicate that position to all levels within the city, partner agencies, and the public.

Within 30 days of approval of the strategy and plan

- Establish the fire services governance committee to help guide the fire department to a new prevention specific culture.
- Communicate the revised fire and safety protection approach to the firefighters.
- Communicate the revised approach to the public and the media so they understand the plans that are being made for the fire service.
- Appoint a Project Management Professional to assist with creating work plans, establishing goals and objectives, and tracking tasks as the strategy and associated plans progress over several years.
- Identify thought leaders in the fire department who can help with explaining and championing the new vision and strategy.
- Engage a medical professional to advise the governance committee as to medical response parameters. Institute those parameters.

Based on a 90-day target:

- Fill the position of a program analyst (analytics professional).
- Implement a revised response model based on advice of a medical professional and research material related to traffic events and automatic alarms.
- Decommission the reserve vehicles and tankers.
- Cease funding the tanker staffing.

Based on a six-month target:

- Draft a plan for firefighters to participate in home and business safety checks
- Orient and schedule fire suppression crews to conduct home and business safety checks;
  - within 10 days of completing the orientation, implement a minimum of three hours a day, seven days a week of home and business safety checks, and public engagement.
- Ensure records of home and business visits, such as date, time, addresses, principal people on site, alarms checked, advice provided, follow-up required are all accurately tracked, possibly in First Due.
- Initiate discussions with 9-1-1, fire dispatch, police services, paramedic services to achieve improved Dispatch – Fire Service coordination including fire dispatch support of fire response by capturing on-scene information.
- Work with the record management vendor to develop a relational database for incident outcome metrics.

Based on an 18-month target

- Start analyzing and using outcome metrics to determine response profiles, particularly to medical, traffic, and alarm incidents.

Based on a two-year to 30-month target

- Procure and implement
  - fire inspection and incident planning software and supporting hardware.
  - Geographic Positioning – Automatic Vehicle Locating and reporting software and hardware.
  - Public education activity tracking software and supporting hardware.
- Decide whether revised response protocols will affect vehicle purchasing decisions.

Based on a 30-month to five-year target

- Reinforce the prevention centric safety model
- Train all firefighters to National Fire Protection Association Fire Prevention/Inspection Level II and Fire and Life Safety Educator standards.

- As a prerequisite, require all new hires to acquire National Fire Protection Association Fire Prevention/Inspection Level II and Fire and Life Safety Educator training before receiving an offer of employment.

Based on a five-to-ten-year model

- Continue to reinforce a prevention culture within the fire services, with partners, the city, and the public.
- Utilize metrics including outcome data to inform the operation of the fire service.

Appendix A Request for Proposal Deliverables

RFP PARTICULARS

A. The Deliverables

The proponent shall conduct a fire service review with the objective of creating a fifteen-year fire service strategy for the City of Saint John. The fire service review and fifteen-year fire service strategy will incorporate three main criteria as it works to identify the appropriate service level(s) for the taxpayers of Saint John. The three main criteria are: community risk assessment; benchmarking of NFPA and other applicable standards; and adherence to the City's Financial Policies.

Background Information
Due to the City's sustainability needs and through recommendations in the EY 2020 report, Common Council resolved to close Fire Station 8 along with Engine Company 8, effective December 31, 2020. Council also resolved to examine the City's fire service from a response, deployment, and risk mitigation perspective, before instituting any additional equipment and personnel reductions as recommended in the EY 2020 report.

SCOPE OF WORK

Council Resolution
The purpose of this Request for Proposal is to identify and engage a consultant with the experience and ability to undertake a fire service review which considers the City of Saint John financial position, the risk profile of the community, and applicable National Fire Protection Association (NFPA) and related standards. The review must also map out a fire service strategy and applicable fire service level(s) for the City of Saint John for the next 15 years.

STATEMENT OF NEEDS

Objectives
Complete a review of the current state of the service delivery of the Saint John Fire Department, to include but not limited to:

- Organizational design and governance;
- History, formation, and general description of the fire department;
- Service area and general demographics of the population;
- A description of the current service delivery infrastructure; and

Review any current or draft performance goals, objectives, and measures

Complete a community risk assessment focusing on mandatory risk profiles to include but not limited to:

- Geographic Profile;
- Building Stock Profile;
- Critical Infrastructure Profile;
- Demographic Profile;
- Hazard Profile;
- Public Safety Response Profile;
- Community Services Profile;
- Economic Profile; and
- Past Loss and Event History Profile

As part of the community risk assessment the proponent must address the risk level matrix (probability and consequences) pertaining to the City of Saint John, including strategies around prevention, mitigation, response, and recovery / resiliency.

The proponent is to consider stakeholder consultations in the assessment of the community risk profile. The proponent is also welcomed to provide any other assessment tool(s) or best practices to facilitate the assessment.

Identification of Services Provided

Identification of all services provided by SJFD, including whether the service provided is identified as a core or optional service or if there are services better suited or economically advantageous to be done outside the fire department. The analysis should outline why this service is being offered by SJFD and the risks, if any, of discontinuing the optional services.

Determine the cost for provision of existing services

Determine the cost of providing each of the services described above. The costs shall include, but not be limited to, staff costs (pay, benefits, etc.), specialized apparatus and or equipment costs that may be required for each of the services. Results shall be presented in a tabular form with explanatory notes. A historical record of fire service cost shall be provided as part of the findings

Given the constraint of current departmental budget, complete a review of the Saint John Fire Department deployment which will include, at minimum; optimal apparatus type and placement, optimal station locations and future response options (automatic aid, mutual aid, alternative personnel models, organizational design, volunteers, etc.). This objective is to include but not limited to:

- A review of current service delivery compared to industry benchmarks

- Using the applicable NFPA standards, community risk profile and geographical restrictions of the City of Saint John, the successful proponent shall examine the current apparatus and response profile and make recommendations as to the optimal apparatus types, distribution, station locations and response utilization that will provide an acceptable level of service to the community while sustaining fire service cost in accordance with the financial policies of the City of Saint John

> *Optimal:* most desirable or satisfactory
> *Acceptable:* capable or worthy of being accepted

- General locations of future necessary fire stations and create a 30-year fire station plan
- Analysis of neighbouring departments and resources for mutual and automatic aid or regionalization of services and how those arrangements could integrate into the overall strategy
- Selection and deployment of apparatus by type
- Deployment of special units or resources including department's role as medical first responders
- Distribution – Initial attack (first due) resources for risk-specific intervention
- Concentration – effective response force assembly, or the initial resources necessary to stop the escalation of the emergency for each risk type

Long-Term Planning

Develop a 15-year plan to shape the SJFD to the recommended options as outlined above including the identification of the fire service level that the citizens can expect. As part (options to be explored) of long term plan and consistent with the above objective, the proponent is required to provide an examination of the following (and not limited to) options:

Internal:

1. Strategy for adjusting to expenditure increases beyond financial policies
2. Identification of cost efficiencies through emerging technologies
3. Other as proposed by consultant

External:

1. Mutual Aid Agreements
2. Automatic Aid Agreements
3. Regional Fire Service
4. Other as proposed by consultant

Contingency Planning

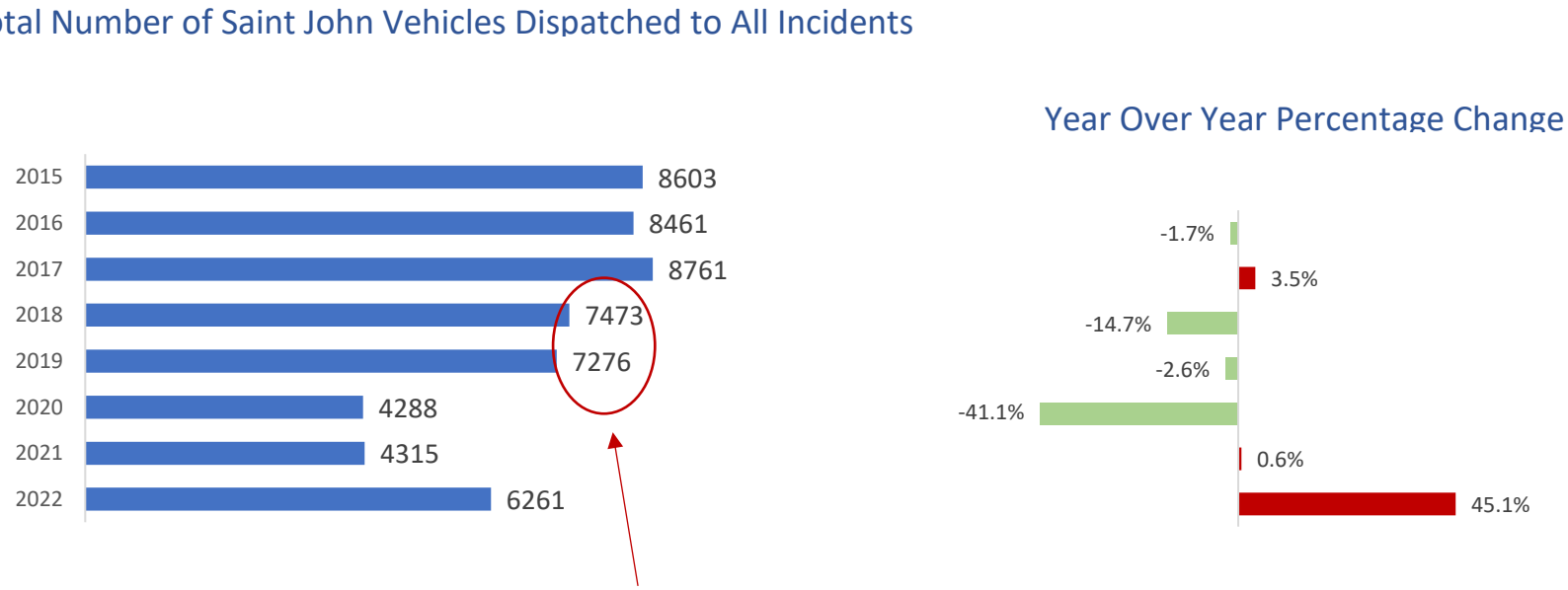
The plan should identify a strategy of flexibility to accommodate expected areas of growth as identified in PlanSJ or other related growth plans or documents (specific projections to be given by staff during consultation). The 15-year plan should also include a strategy to keep departmental costs aligned to the financial policies for the City of Saint John

Complete a performance management plan which will position the Saint John Fire Department for success in the implementation and monitoring of the 15 Year Strategic Plan, to include:

- Illustrate the degree of benefit to be gained through its implementation
- Extent to which it achieves established performance targets
- Potential negative consequences
- Assignment of oversight responsibilities
- Schedule of assessments
- Review requirement

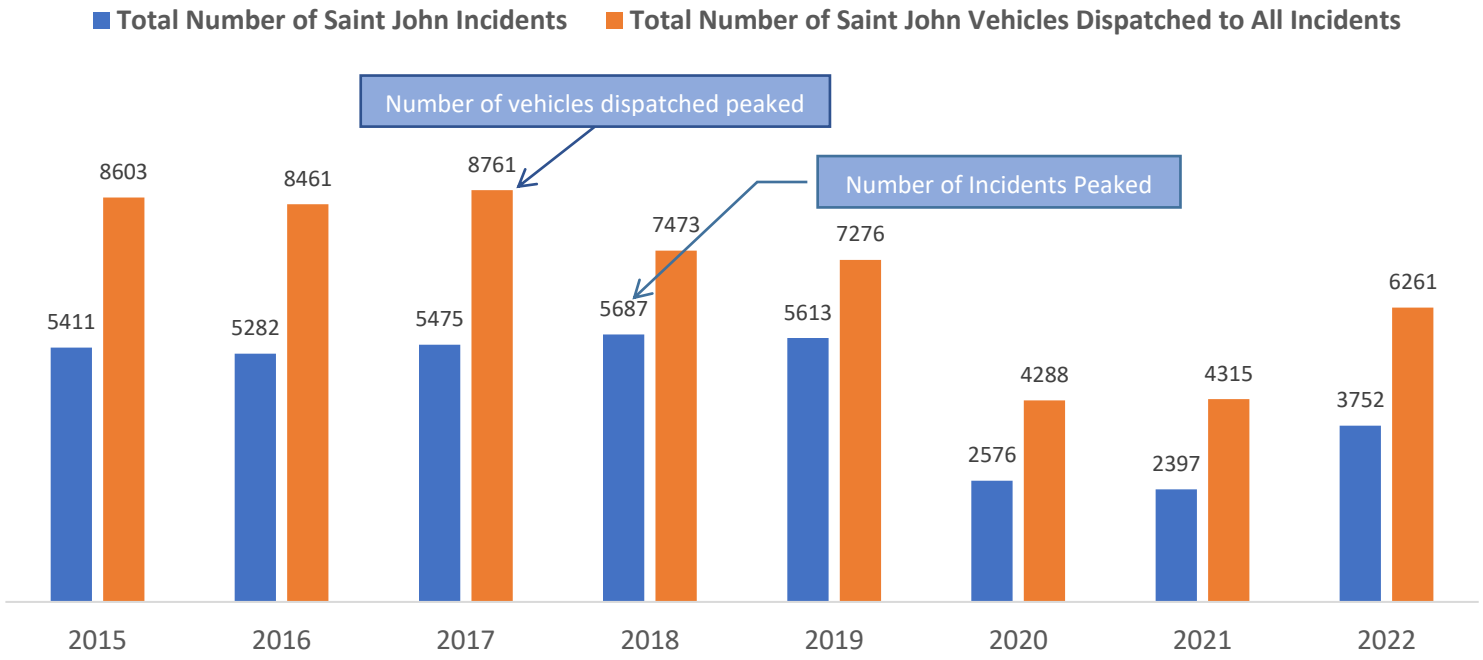
Appendix B Detailed Incident Information

Chart 11: Total Number of Saint John Vehicles Dispatched to All Incidents



- The fire department indicates the reduction in vehicle use is partially attributable to a change in policy as to the number trucks sent to automatic alarms.
- Prior to 2018 four fire trucks, each staffed with four firefighters, and a command vehicle with one officer (total 17 staff) were dispatched to automatic alarms. Automatic alarms were assumed to be fires until otherwise determined. This was later revised to two trucks with four firefighters each (8 firefighters). The majority of automatic alarms are false although the data is not detailed enough to determine the percentage in Saint John.

Chart 12: Total Number of Saint John Incidents and Vehicles Dispatched 2015 – 2022



The following charts indicate the number of incidents by call type. Fire departments in New Brunswick report several elements of incidents to the New Brunswick Office of the Fire Marshal (OFM) based on 181 OFM incident types. For the purposes of this presentation, we provide information relevant to 13 major categories, which include the 181 incident types. Although we present 13 main categories, we have available the same analysis, as shown below, for each of the 181 types.

Chart 13: Average Number of Apparatus Sent to Each Incident

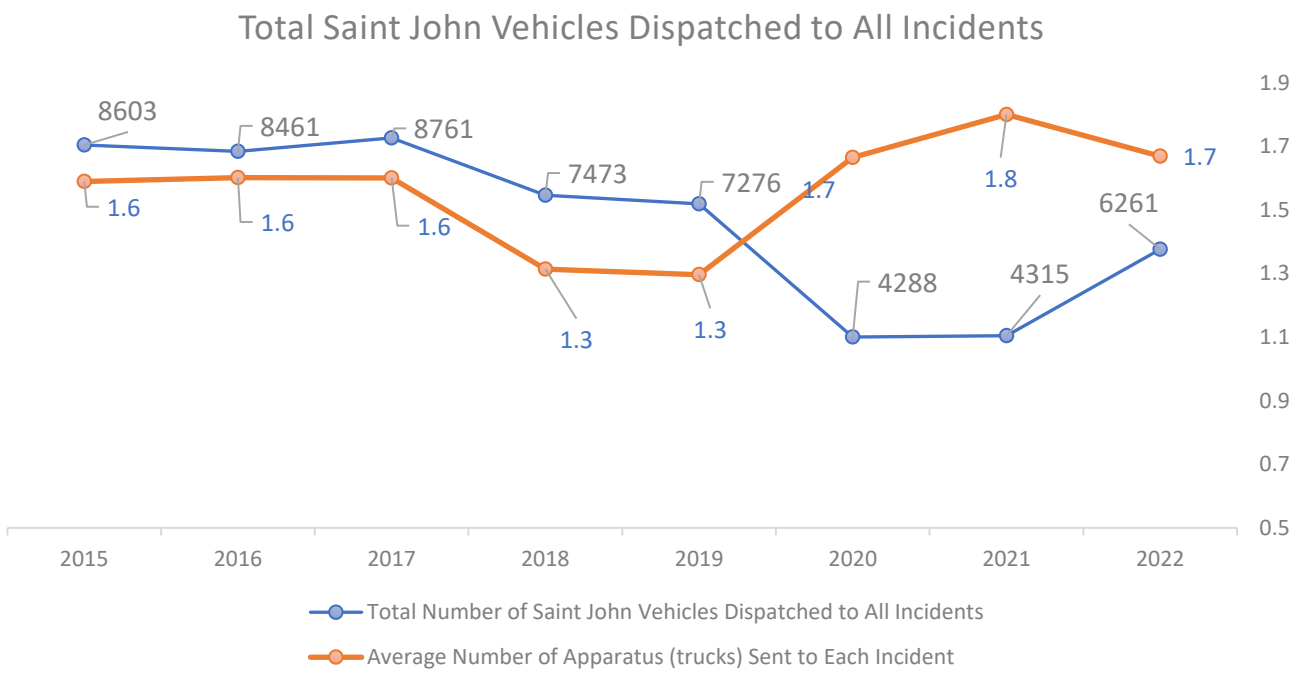
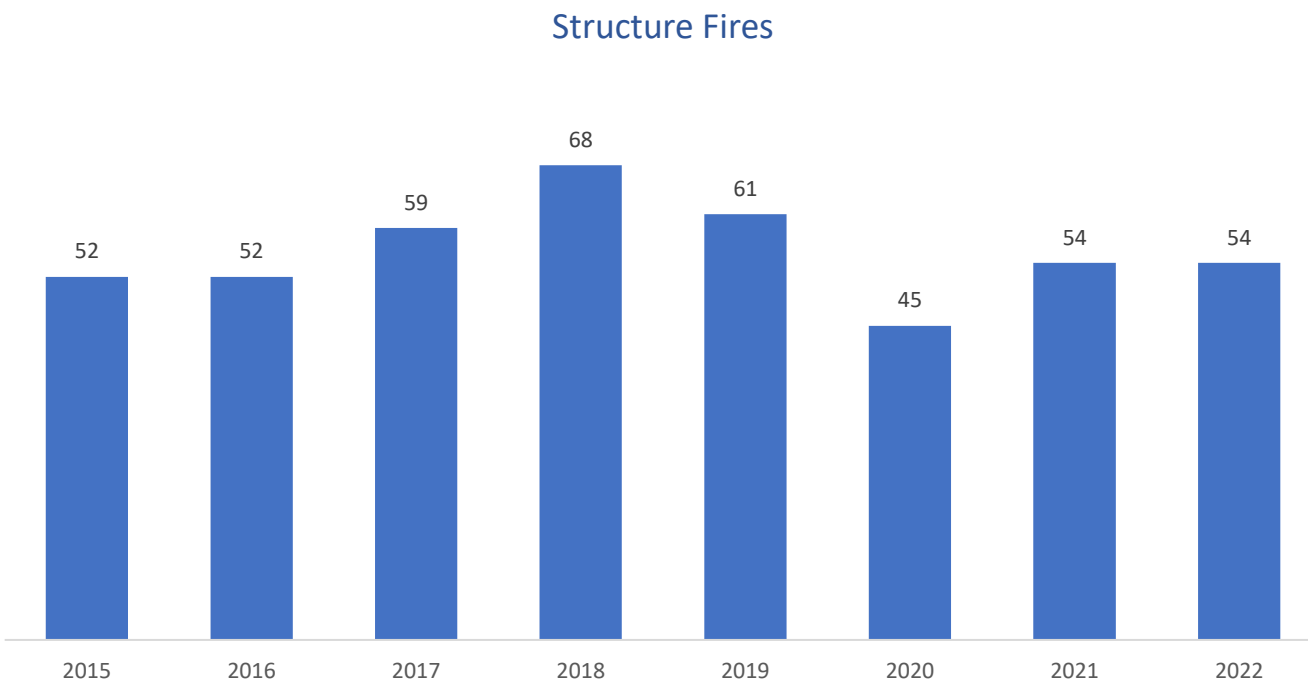


Chart 13 shows the total number of trucks that were sent to all events in the years indicated whereas the decimal number shows the average number of trucks sent to each incident (trucks sent annually divided by number of incidents annually).

Changes in the 'vehicles dispatched to events occurring ratio' offer opportunities to seek further information as to why the ratios altered.

Chart 14 indicates the total structure fires in Saint John by year. There is an encouraging downward trend since a high of 68 fires in 2018.

Chart 14: Structure Fires 2015 – 2022



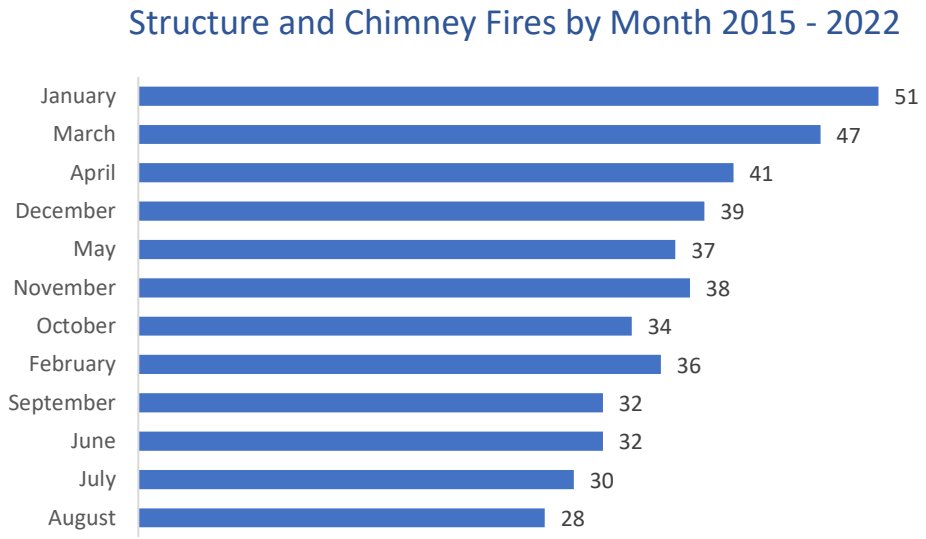
Structure fires include

- structure fire - other
- building fire
- fires in structure other than a building
- chimney fire
- fire in mobile property used as a fixed structure, other
- fire in mobile home used as fixed residence
- fire in portable building, fixed location

On average, structure fires have occurred from a high of 1.4 to 0.9 times weekly.

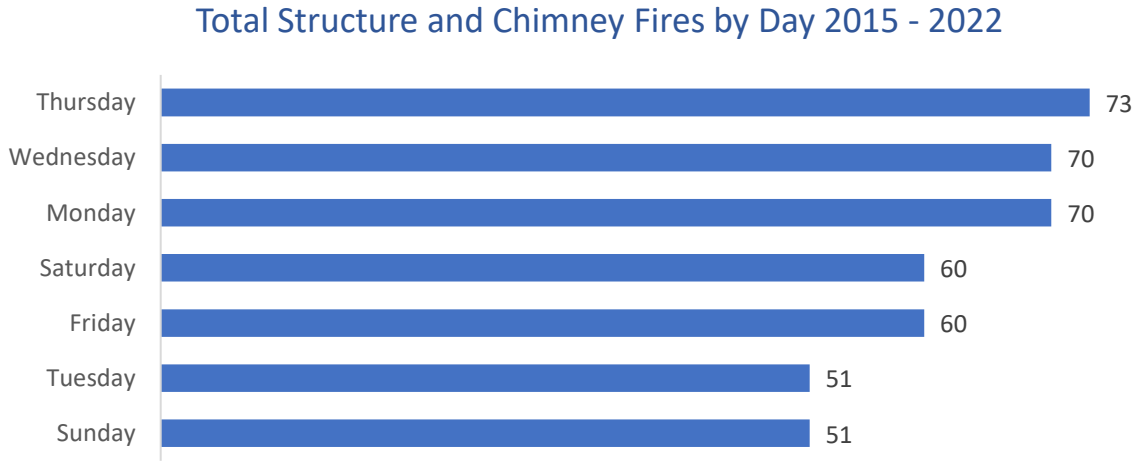
When do Structure Fires Occur?

Chart 15: Structure and Chimney Fires by Month Cumulative 2015 - 2022



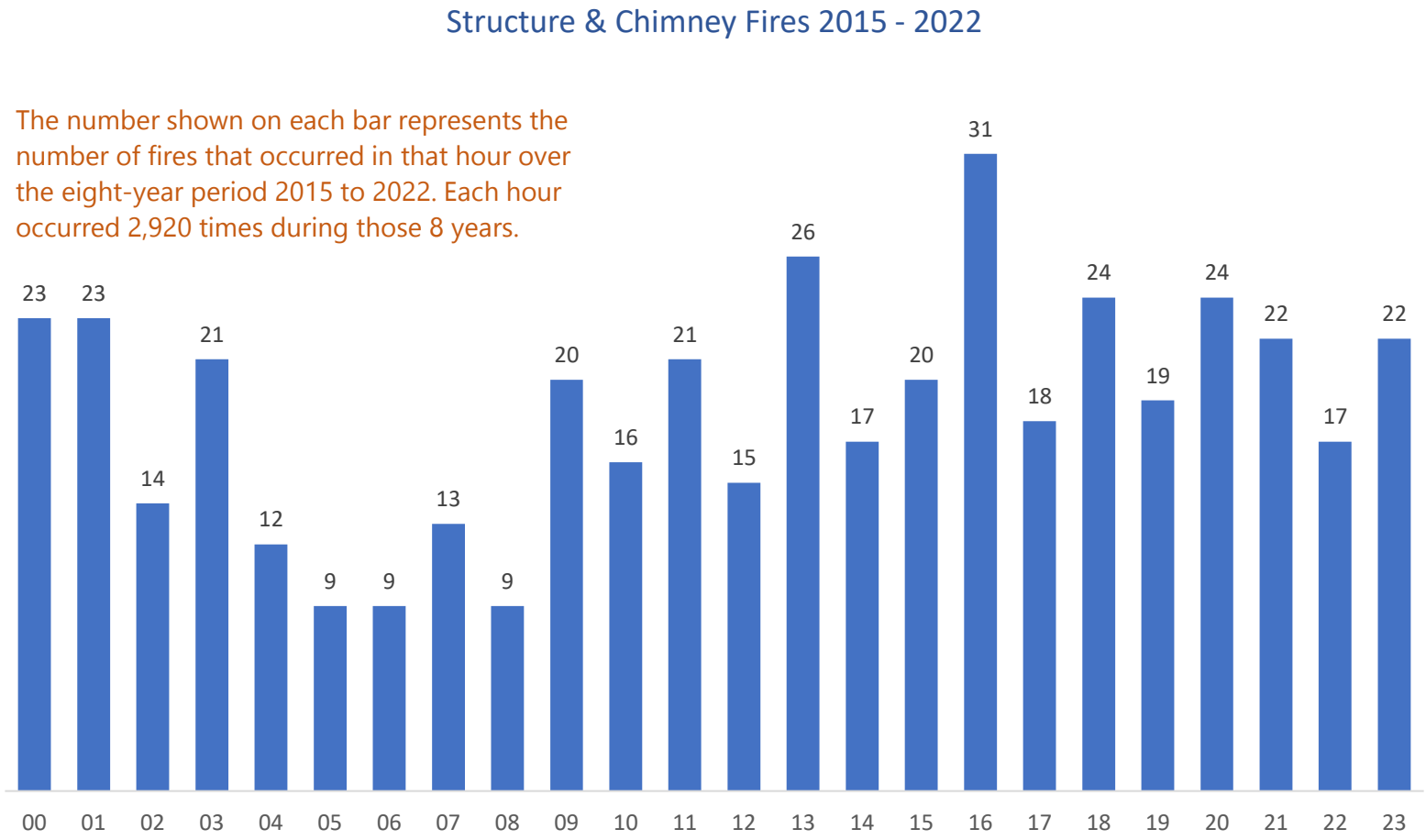
In the 8-year period 2015 – 2022, the predominant months for structure fires were January, March, and April, and the fewest in August, July, June, and September.

Chart 16: Total Structure and Chimney Fires by Day 2015 - 2022



The most structure fires occurred on Thursdays, Wednesdays, and Mondays and the fewest on Sundays and Tuesdays.

Chart 17: Structure Fires by Hour 2015 - 2022



- The greatest number of fires in the last eight years occurred at 1600 hours, or 4:00 PM.
- The fewest incidents occurred from 4:00 AM to 8:00 AM.
- Nine incidents took place in the hours of 5:00, 6:00, and 8:00 AM with an average of 1.1 fires a year in each hour (9 fires divided by 8 years= 1.1 fires in that hour).

Other Fire Incidents

Chart 18: Other Fire Incidents

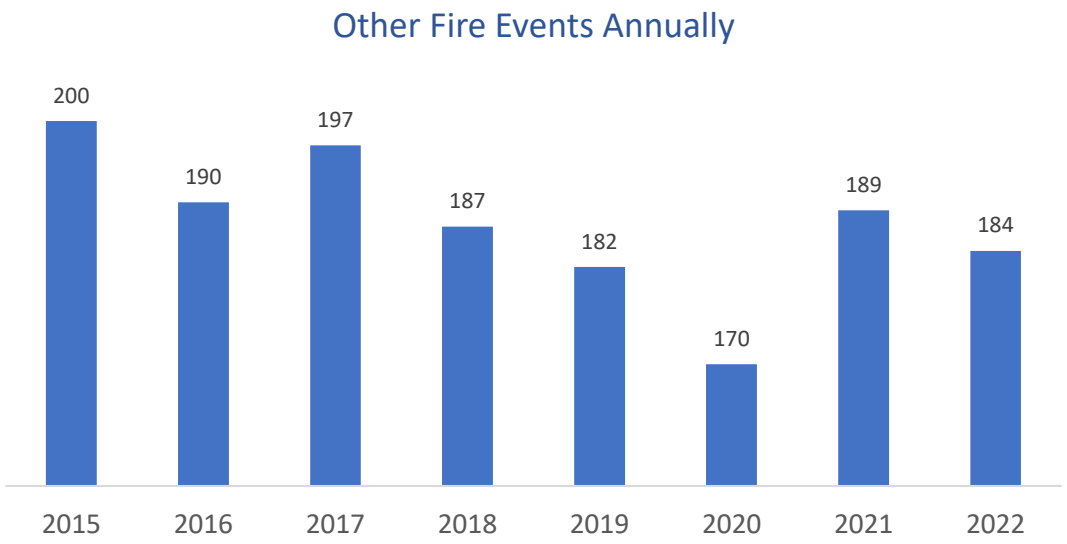
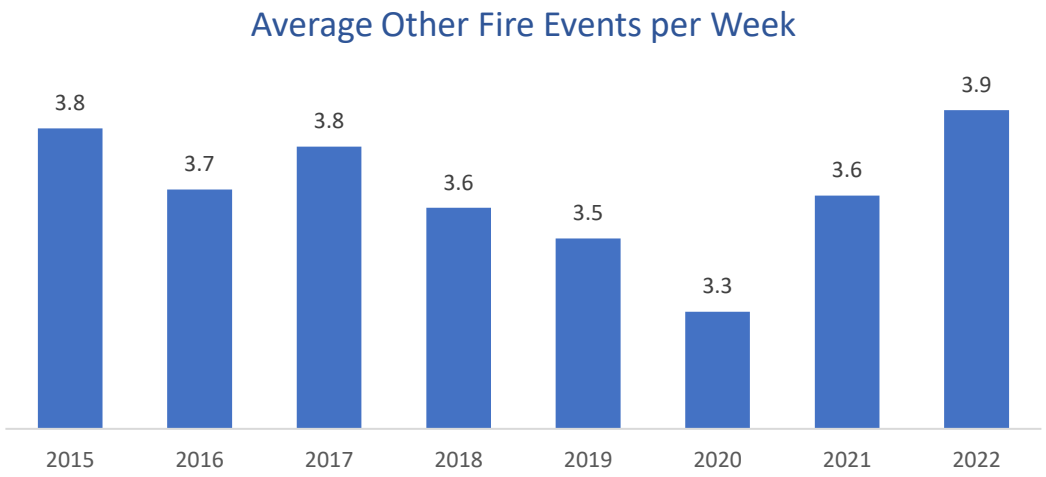


Chart 19: Average Number of 'Other Fires' per Week



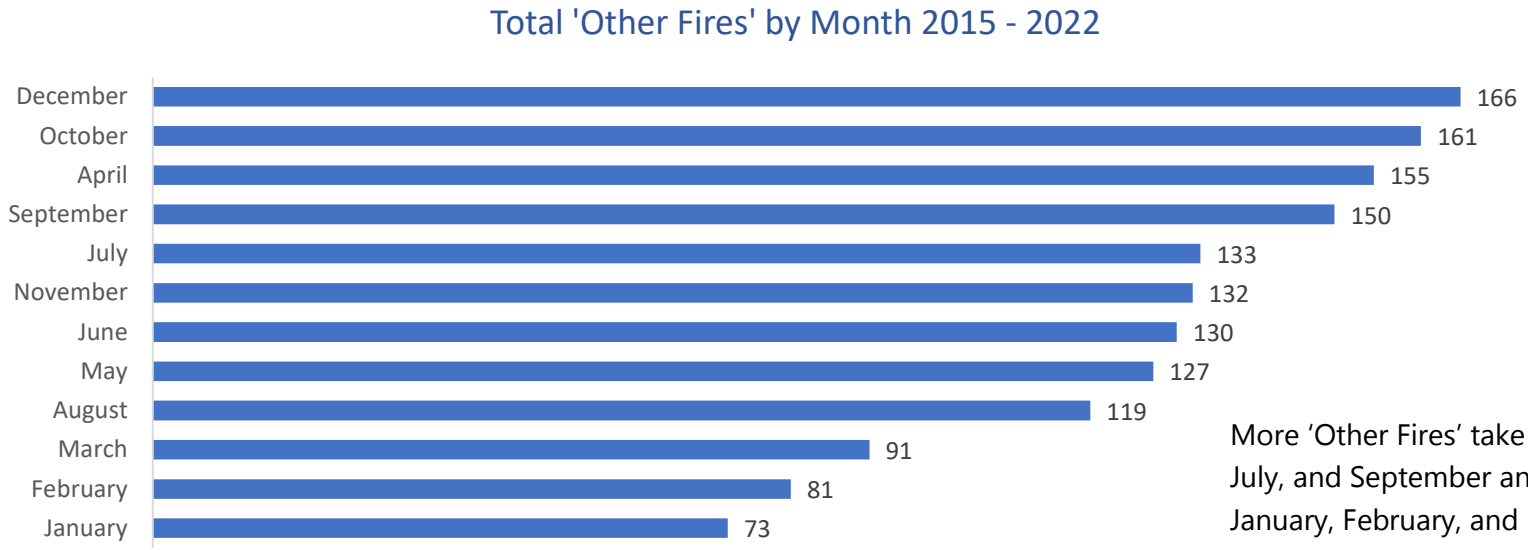
'Other Fires' encompass a wide range such as

- cooking fire, confined to container
- incinerator overload or malfunction, fire confined
- fuel burner/boiler malfunction, fire confined
- other appliance fire, confined to appliance
- trash or rubbish fire, contained
- fire in motor home, camper, recreational vehicle
- fire in portable building, fixed location
- outside rubbish fire, other
- outside rubbish, trash, or waste fire
- garbage dump or sanitary landfill fire
- dumpster or other outside trash receptacle fire

Based on an annual average, between 3.3 and 3.9 'Other Fire' events occur weekly.

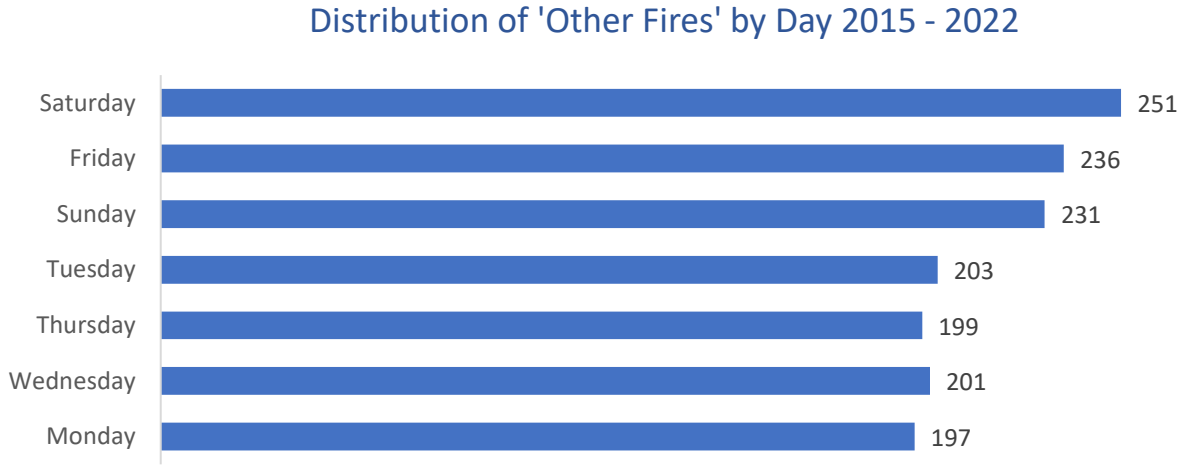
When do 'Other Fires' Occur?

Chart 20: Distribution of 'Other Fires' by Month



More 'Other Fires' take place in May, August, July, and September and the fewest in January, February, and March.

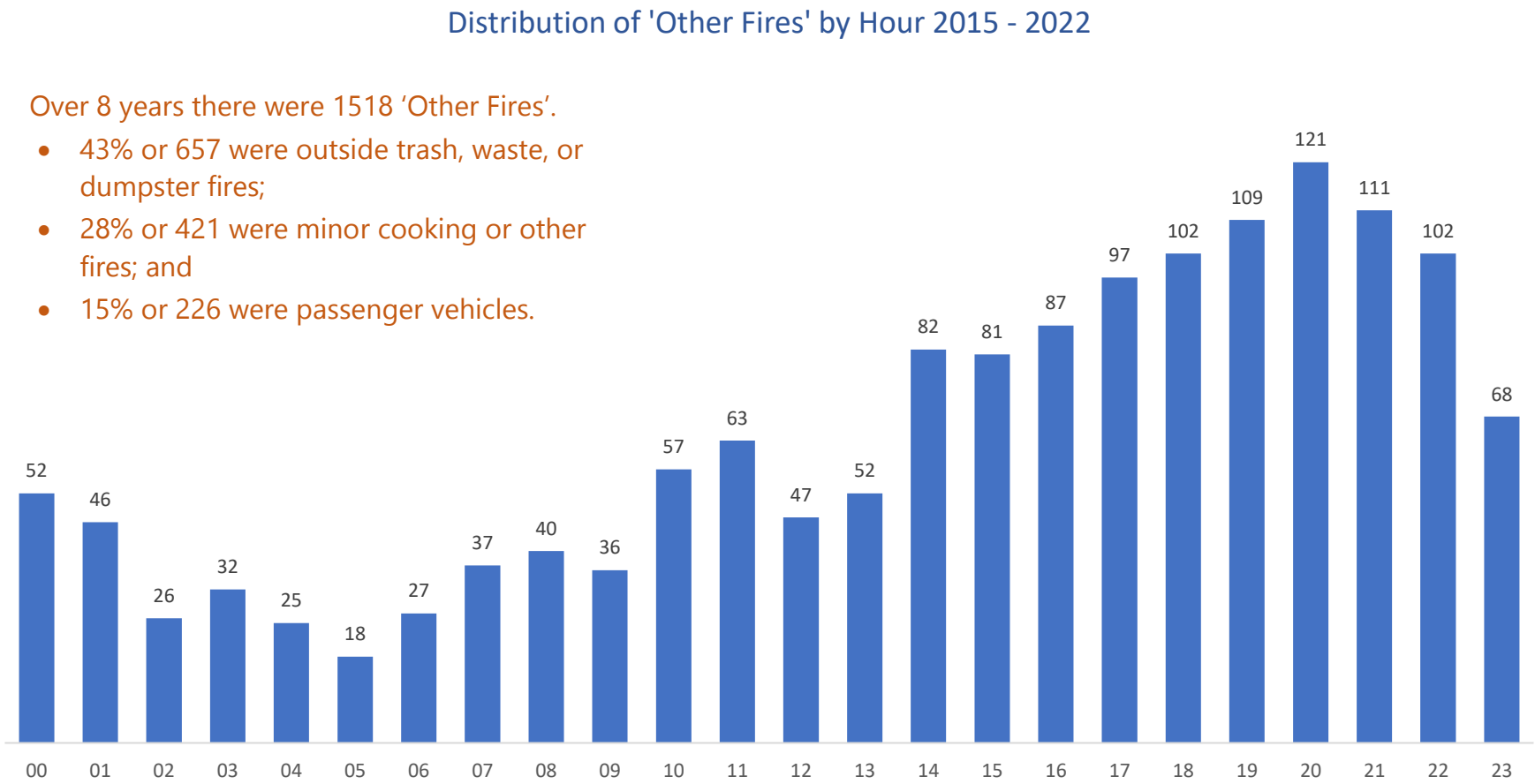
Chart 21: Distribution of 'Other Fires' by Day



'Other Fires' occurred most frequently on Saturdays, Fridays, and Sundays. Fewer took place on Mondays, Wednesdays, Thursdays, and Tuesdays. But there were still a lot of 'Other Fires'.

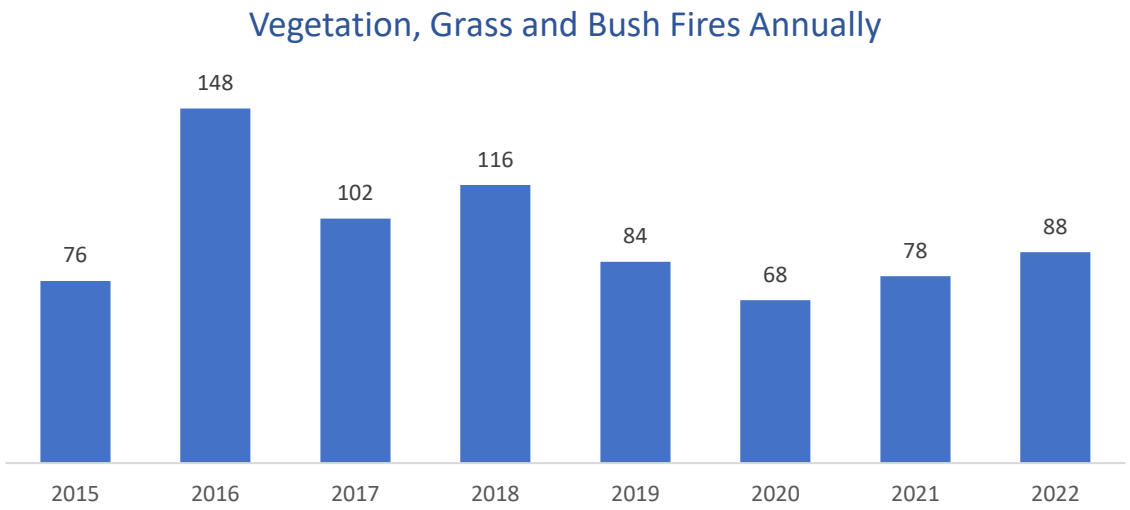
There is an opportunity for the fire service to determine the cause of 'Other Fires' frequency and put plans in place to reduce then through education and prevention.

Chart 22: Distribution of 'Other Fires' by Hour



Vegetation, Grass, & Brush Fires

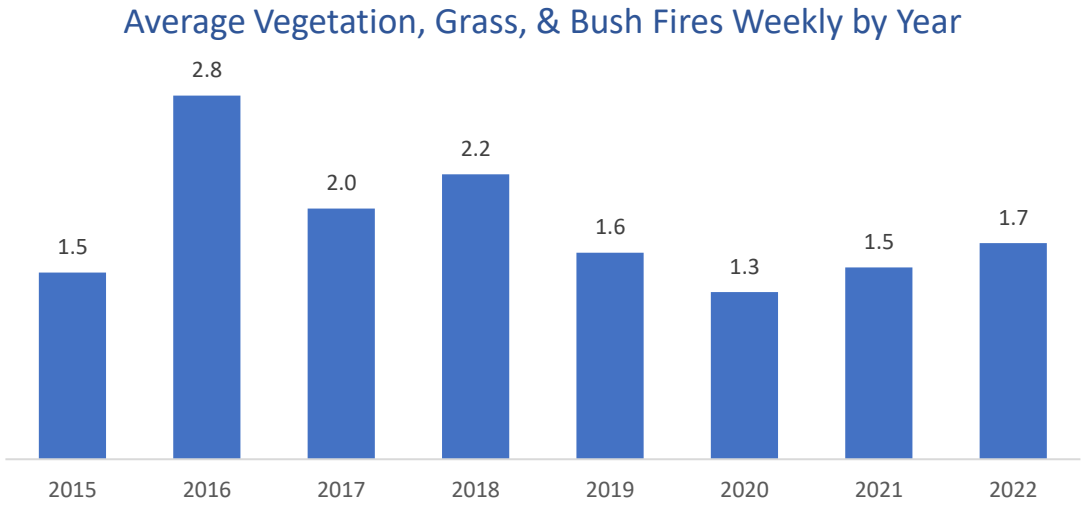
Chart 23: Vegetation, Grass, & Brush Fires



Vegetation, grass and brush fires include

- Natural vegetation fire, other
- Forest, woods, or wildland fire
- Brush or brush-and-grass mixture fire
- Grass fire
- Cultivated vegetation, crop fire, other
- Cultivated grain or crop fire
- Cultivated orchard or vineyard fire
- Cultivated trees or nursery stock fire

Chart 24: Average Vegetation, Grass, & Bush Fire Events Weekly

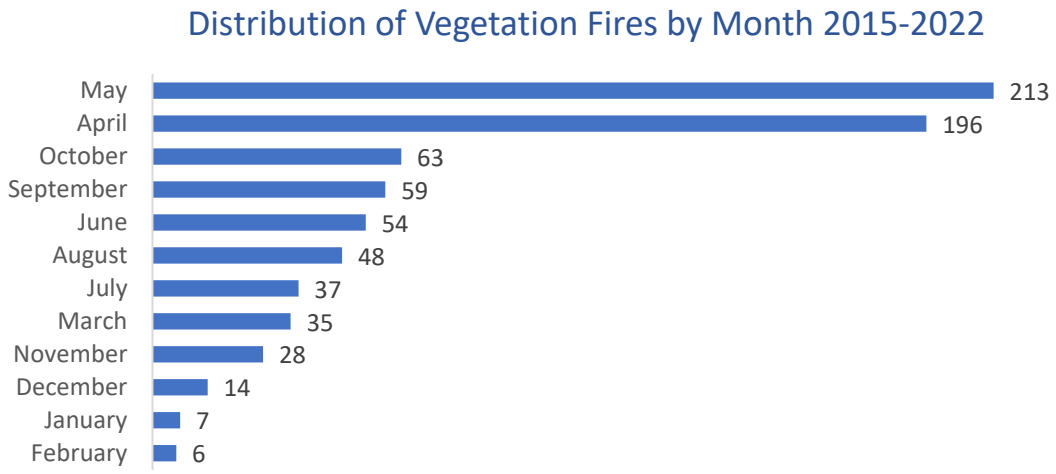


Vegetation, grass, and bush fires have occurred, on average, ranging from a high of almost three times a week in 2016 to a low of 1.3 times weekly in 2020.

Over the past 8 years 82% of this category of fires have been brush or grass fires (51% grass, 31% brush).

When do Vegetation, Grass, and Brush Fires Occur?

Chart 25: Distribution of Vegetation, Grass, & Bush Fires by Month

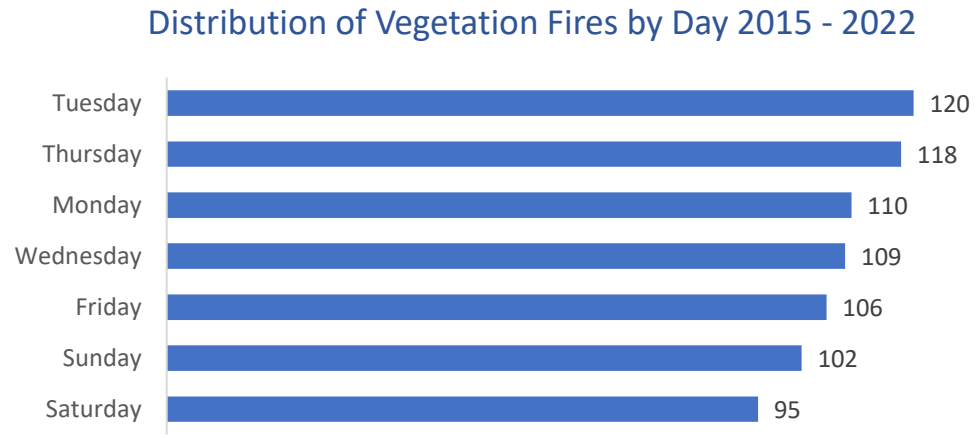


Over three times as many vegetation, grass, and bush fires happened in each of April and May, over the past eight years, than in any other month.

Of the total 760 fires of this kind in the past eight years, 442 occurred from 2015 – 2018 and 315 from 2019 to 2022; so, an improvement in frequency is taking place.

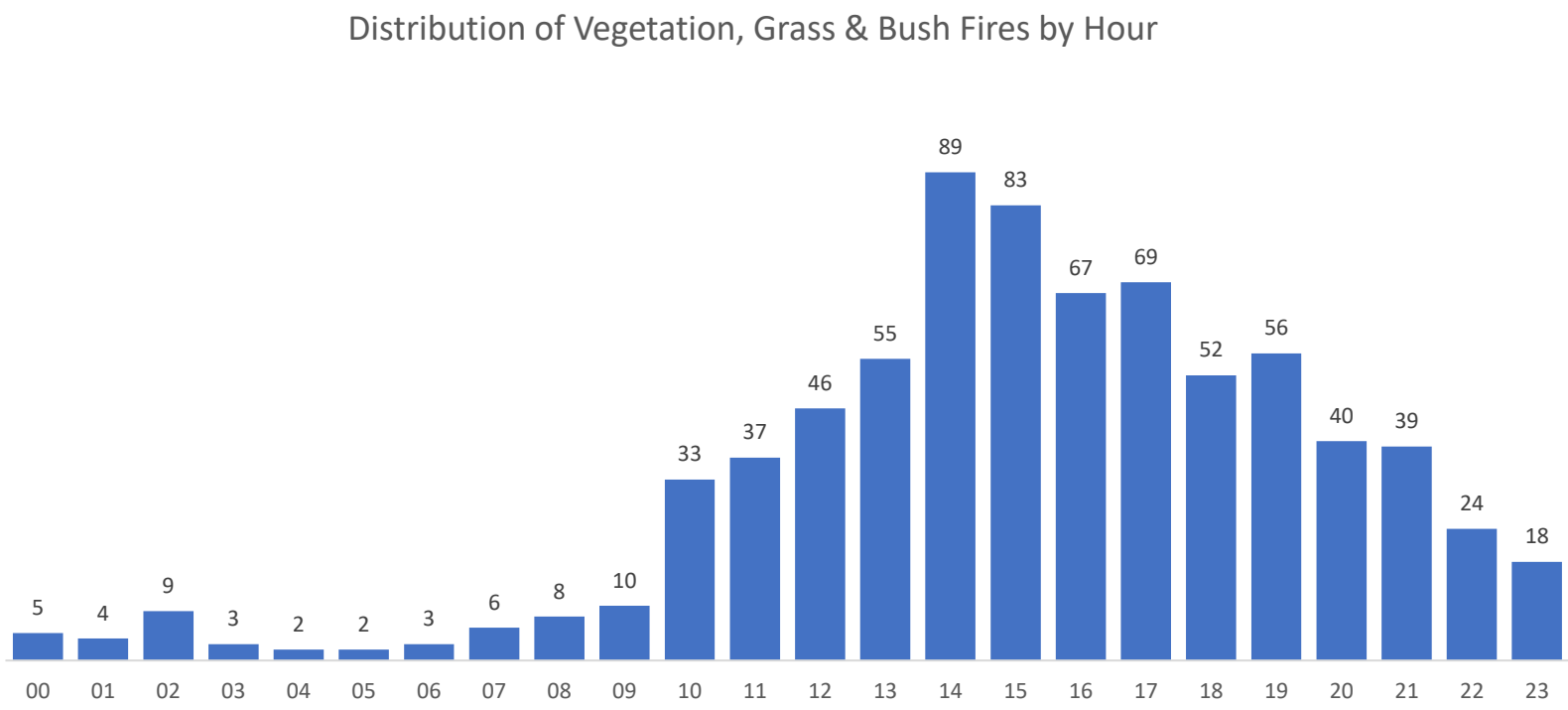
This knowledge offers an opportunity for prevention efforts once Saint John Fire Service has determined the cause for this distribution.

Chart 26: Distribution of Vegetation, Grass, and Bush Fires by Day 2015 – 2022



More vegetation fires have taken place on Tuesday, Thursday, Monday, and Wednesday, with a slight decline Friday and Sunday, but the fewest occur on Saturday

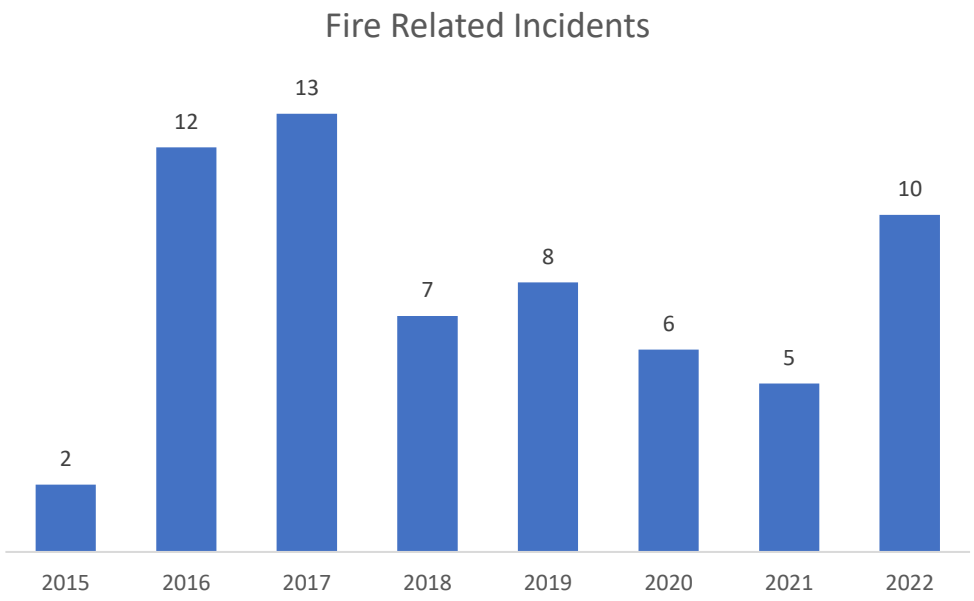
Chart 27: Distribution of Vegetation, Grass & bush Fires by Hour 2015 – 2022



Data indicates that of the 760 vegetation, grass, and bush fires that occurred in the last 8 years, over 400 take place in April and May and, although there isn't a great variation in distribution by day, more happen Monday to Thursday, and between 2:00 and 7:00 PM.

The questions to answer are "Why is that?" and "What can be done to reduce the frequency"?

Chart 28: Fire related Incidents



These incidents occur infrequently but almost 80% are excessive heat causing scorching but no fire.

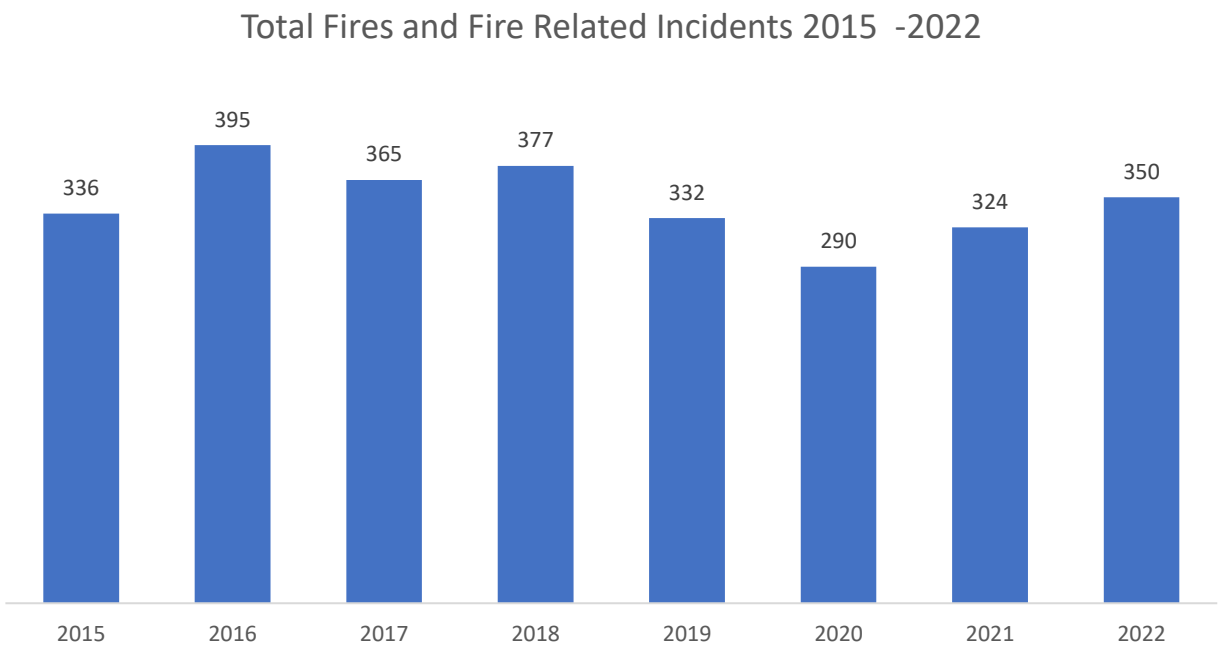
Fire related incidents are those that are initially thought to be fires, but aren't. They include

- Overpressure rupture, explosion, overheat other
- Overpressure rupture from steam, other
- Overpressure rupture of steam pipe or pipeline
- Overpressure rupture of steam boiler
- Steam rupture of pressure or process vessel
- Overpressure rupture from air or gas, other
- Overpressure rupture of air or gas pipe/pipeline
- Overpressure rupture of boiler from air or gas
- Air or gas rupture of pressure or process vessel
- Chemical reaction rupture of process vessel
- Explosion (no fire), other
- Munitions or bomb explosion (no fire)
- Blasting agent explosion (no fire)
- Fireworks explosion (no fire)
- Dust explosion, (no fire)
- Excessive heat, scorch burns with no ignition

A Summary of Eight Years of Fire Responses in Saint John

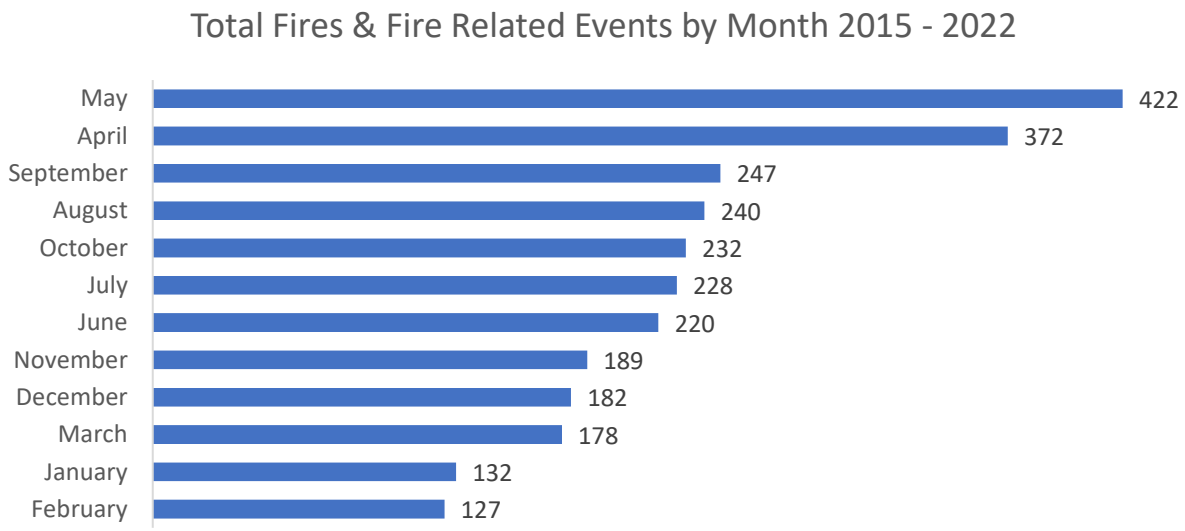
The following four charts (Chart 29 to Chart 32) indicate the total number of fires and fire related incidents to which the fire service responded from 2015 to 2022 inclusive.

Chart 29: Total Fires and Fire Related Events 2015 – 2022



The total of all fire and fire related events ranged from a high of 395 in 2016 to a (likely) COVID-19 related low of 290 in 2020.

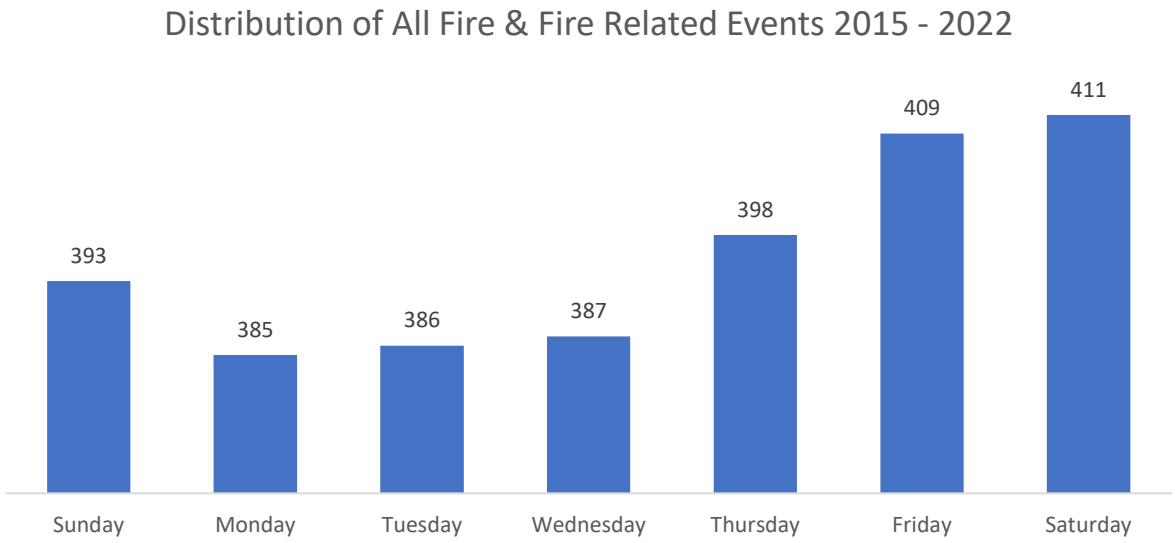
Chart 30: Total Fires and Fire Related Events by Month 2015 – 2022



Over the past eight years the most fire and fire related events occurred in May and April mostly due to vegetation, grass, and bush fires which are concentrated in those months.

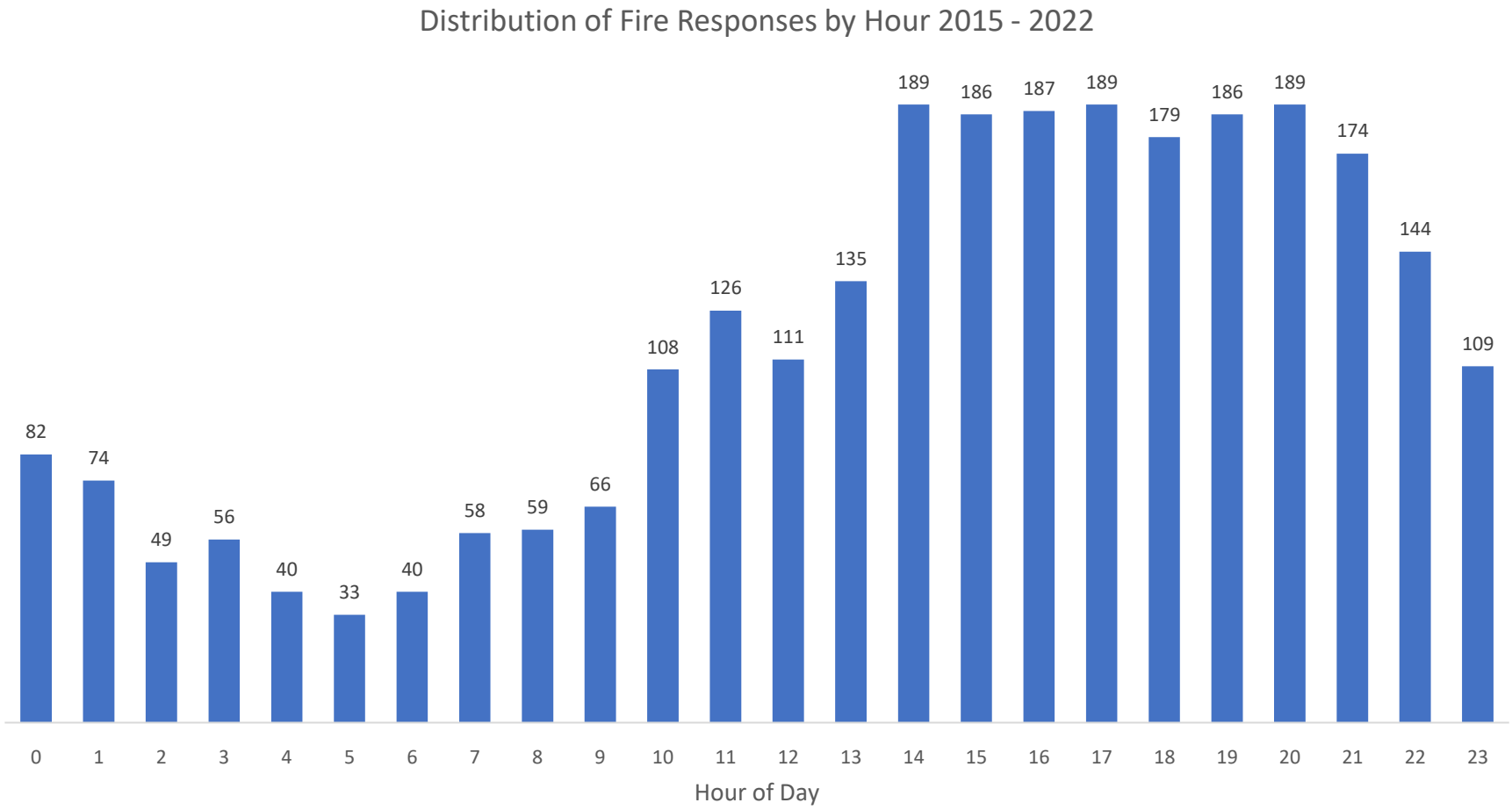
Following those highs are September, August, October, July, and June during which many occurrences are driven by outside trash fires.

Chart 31: Distribution of All Fires and Fire related Events by Day 2015 - 2022



The high days for fires and fire related events are Thursdays, Fridays, Saturdays, and Sundays possibly due to outside trash fires which are most frequent on weekends.

Chart 32: Distribution of Responses to All Fires and Fire Related Events 2015 - 2022 by Hour



Fires and fire related events increase in frequency around 2:00 in the afternoon to about 10:00 in the evenings. This coincides with the high times for vegetation, grass, and bush fires (around 2:00 PM and outside trash fires (peaks around 8:00 PM).

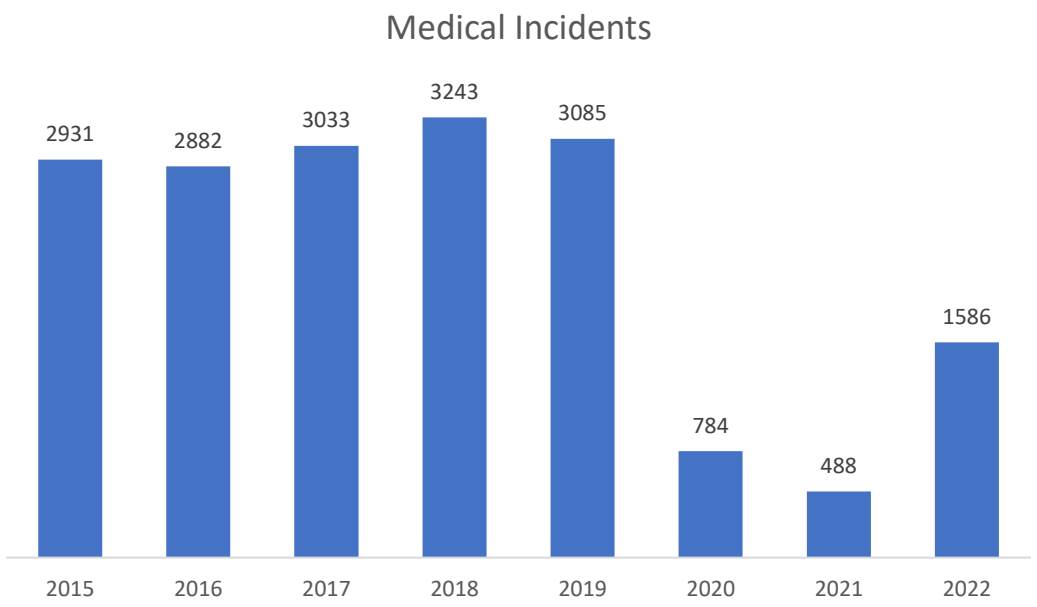
On average, Saint John Fire Service responds to approximately 6 fires of all types, each week. The greatest number of these are dumpster and vegetation fires.

Chart 33: Medical Incidents

Medical incidents were briefly discussed earlier in Section 2.2.1.

Responses to medical events peaked in 2018 at 3,243 events but declined by about 158 in 2019. They fell further in 2020 due to a lack of personal protective equipment and a medically advised decision to restrict firefighter response to only the most critical medical incidents to protect firefighters, to the extent possible, from COVID-19.

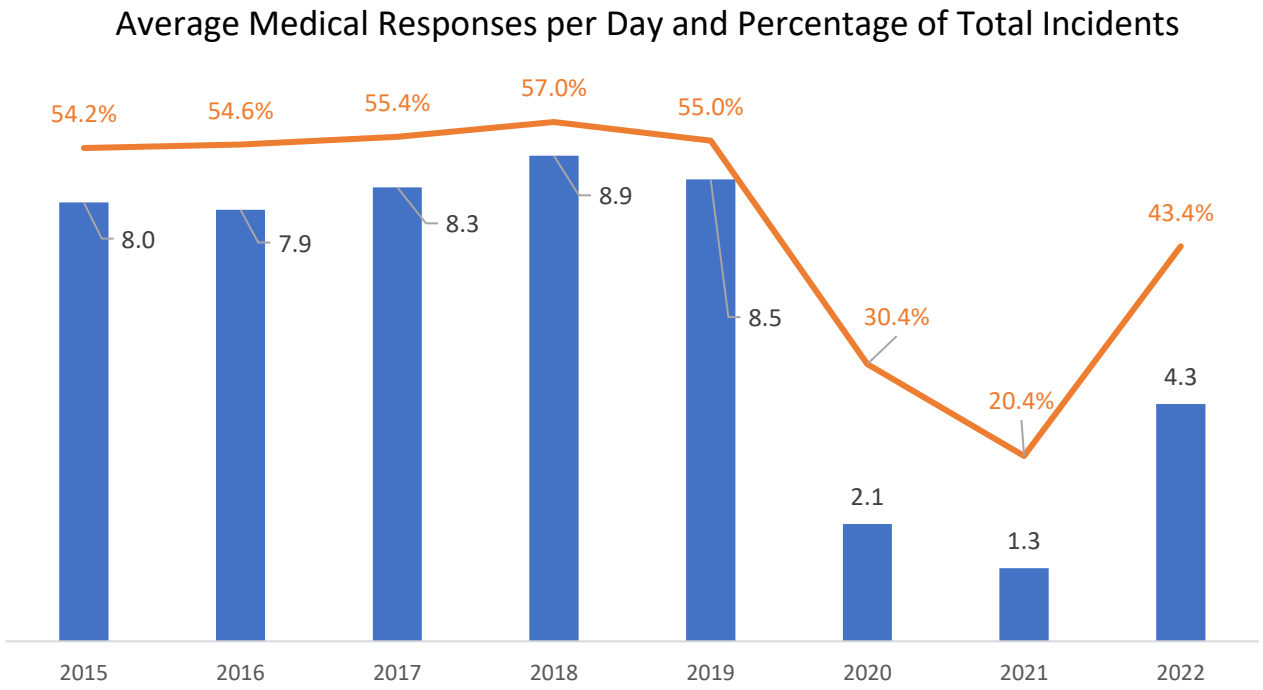
Incidents declined further by 296 in 2021 but have rebounded by 1093 – or an average of 3 calls a day – in 2022 due to a decision (without medical advice) to increase the types of medical incidents to which to respond.



Medical incidents include events categorized by the New Brunswick Fire Marshal as

- Medical assist, assist EMS crew
- Emergency medical service, other
- EMS call, excluding vehicle accident with injury
- Electrocution or potential electrocution

Chart 34: Average Medical Responses per Day and Percentage of Total Incidents

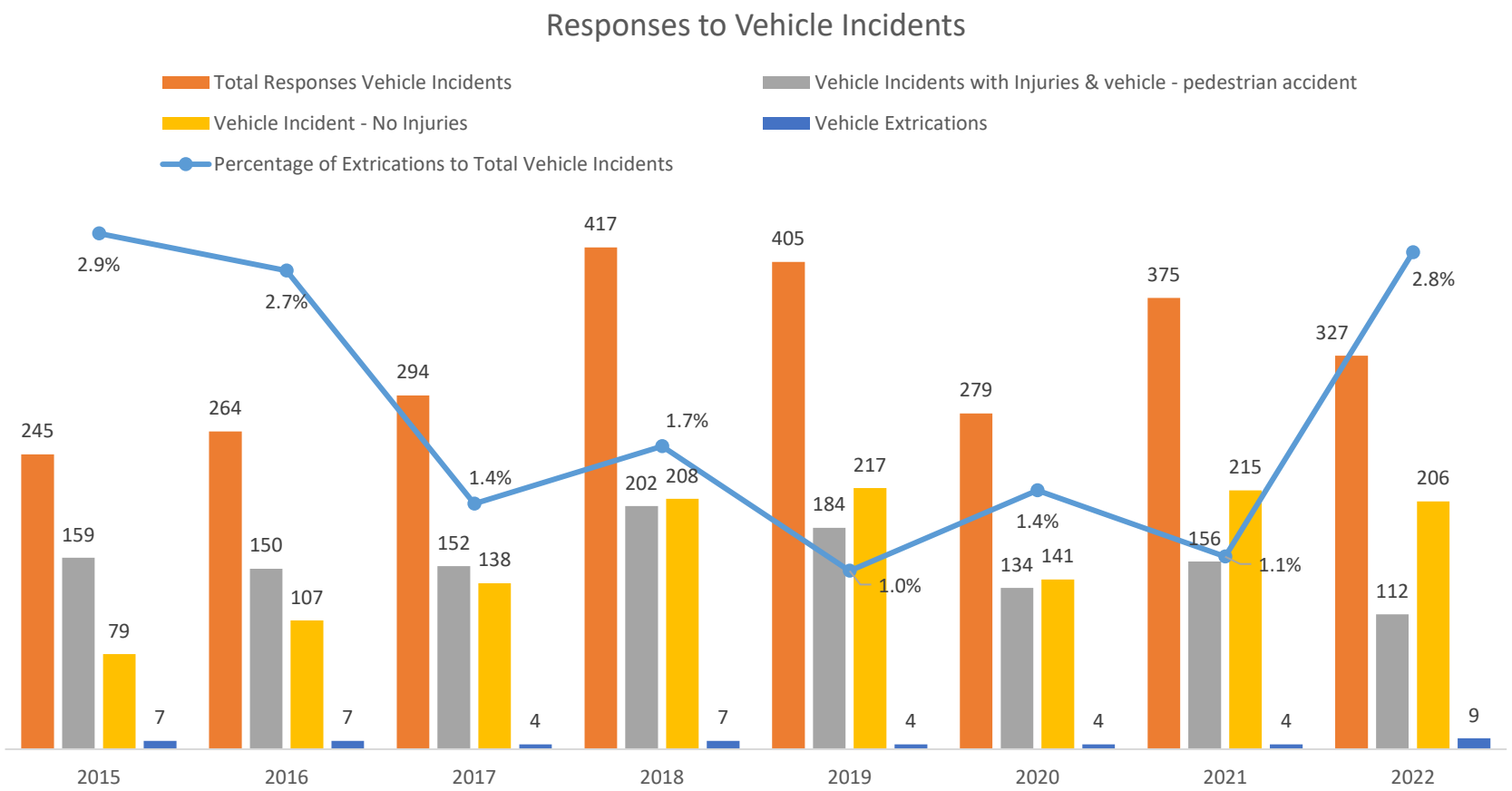


Saint John Fire responded to an average of between eight and nine medical incidents a day until 2020 when medical responses dropped to two a day because of a lack of contagion personal protective equipment, and risk management to protect fire staff from COVID.

That dropped further to an average of 1.3 a day in 2021 but rose to 4.3 a day in 2022 for the reasons indicated previously.

The average percentage of medical incidents per year, relative to overall incidents, ranged from a high of 57% in 2018 to a low average of 20.4% in 2021. In 2022, medical incidents rose to an average of 43.4% of all events.

hart 35: Responses to Vehicle Incidents



Responses to vehicle incidents include vehicle incidents with injuries; vehicle pedestrian accident; vehicle incidents without injuries, and vehicle extrications.

The frequency of Saint John fire response to vehicle incidents maintained an upward trend from 2015 (245 total responses) until 2018 (417 responses) with a slight decline to 405 in 2019. That dropped to 279 in 2020 (COVID influence) but rose again to 375 in 2021, declining to 327 in 2022. The important statistic to note is that the need for extrication has been only 3%, at the highest, of all vehicle responses, to lows of 1% in 2019.

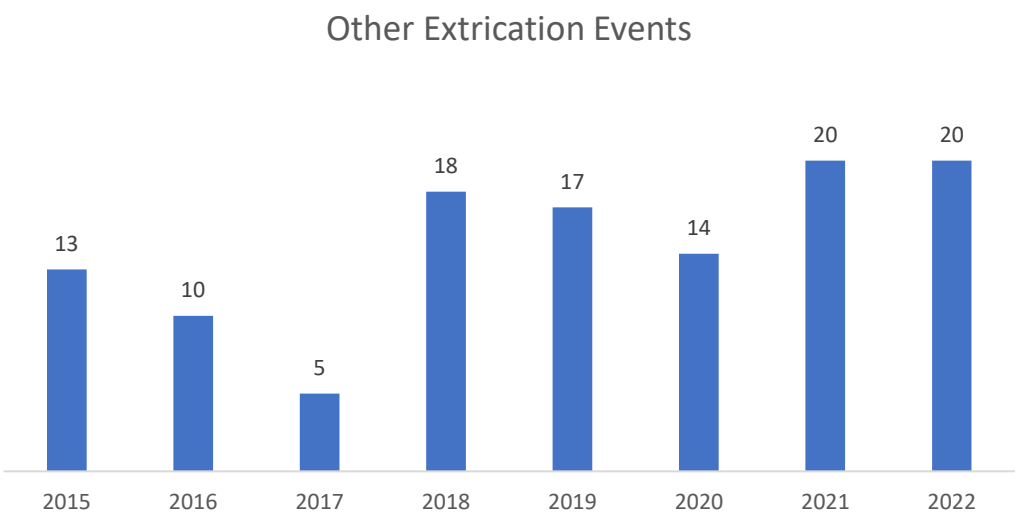
We are not able to determine what ‘extrication’ means; that is, was it accomplished with low effort, perhaps using prybars to open a jammed door, or did it take hydraulic rescue tools to free victims. Unfortunately, there are no records that can be readily searched to provide an answer about this or other activities performed by firefighters.

The information illustrated in

hart 35 also contributes to the questions

- Why are there so many responses to vehicle incidents when data indicates that fewer than 3% require extrication?
- What information was provided or gathered at the communications centre that would provide information about entrapment thus reducing multiple responses?
- Does the fire department have to respond to such a high number of vehicle incidents?
- Why are decisions as to whether the Saint John fire department is required at incidents being made by the fire department and dispatch centre rather than the paramedic service?

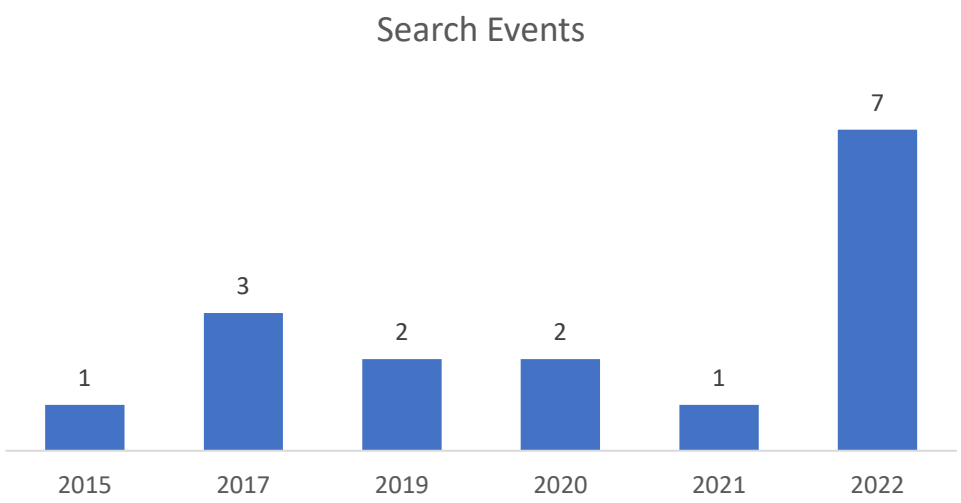
Chart 36: Other Extrication Events



Other Extrication Events include:

- Extrication, rescue, other (32 occurrences in eight years);
- Extrication of victims from building or structure (11 occurrences in eight years); and
- Removal of victim(s) from stalled elevator (74 occurrences in eight years).

Chart 37: Search Events 2015 – 2022

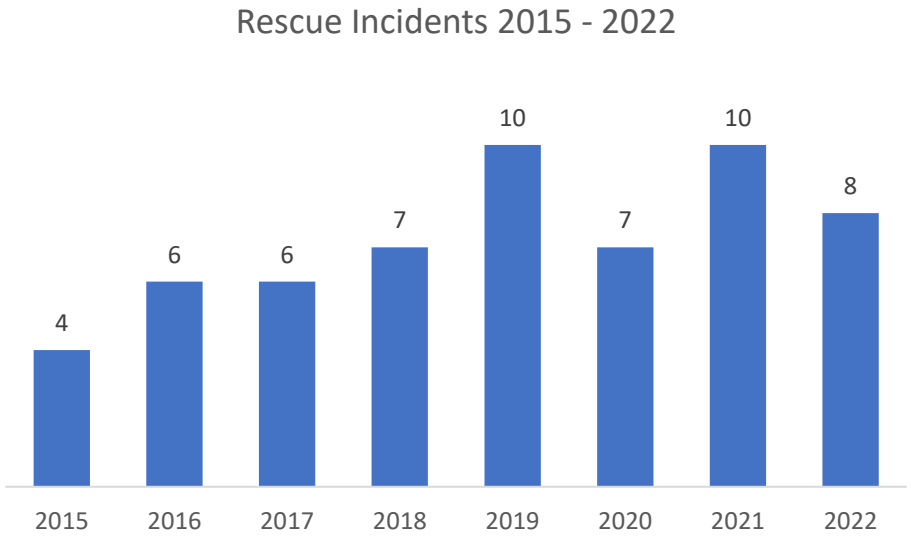


Search events include

- searches for a person – land, water, underground, other.

Fortunately, only a few searches happen each year although a peak of 7 took place in 2022.

Chart 38: Rescue Incidents 2015 - 2022



Incidents categorized as rescues are shown by number of rescues by year in Chart 38 and by type in Chart 39.

Some types of rescues did not occur in all years.

Chart 39: Rescues by Type 2015 – 2022

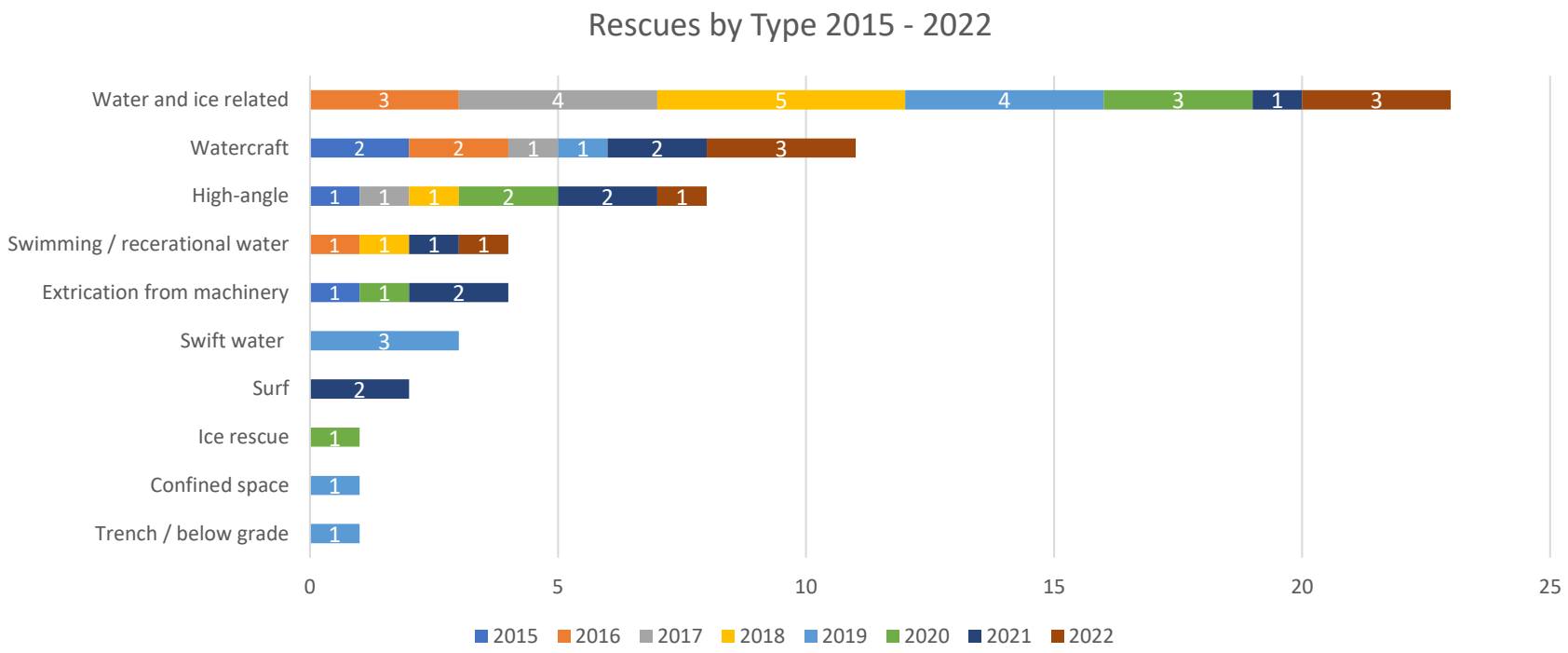


Chart 40: Number of Automatic Alarms and Alarm Malfunctions 2015 - 2022

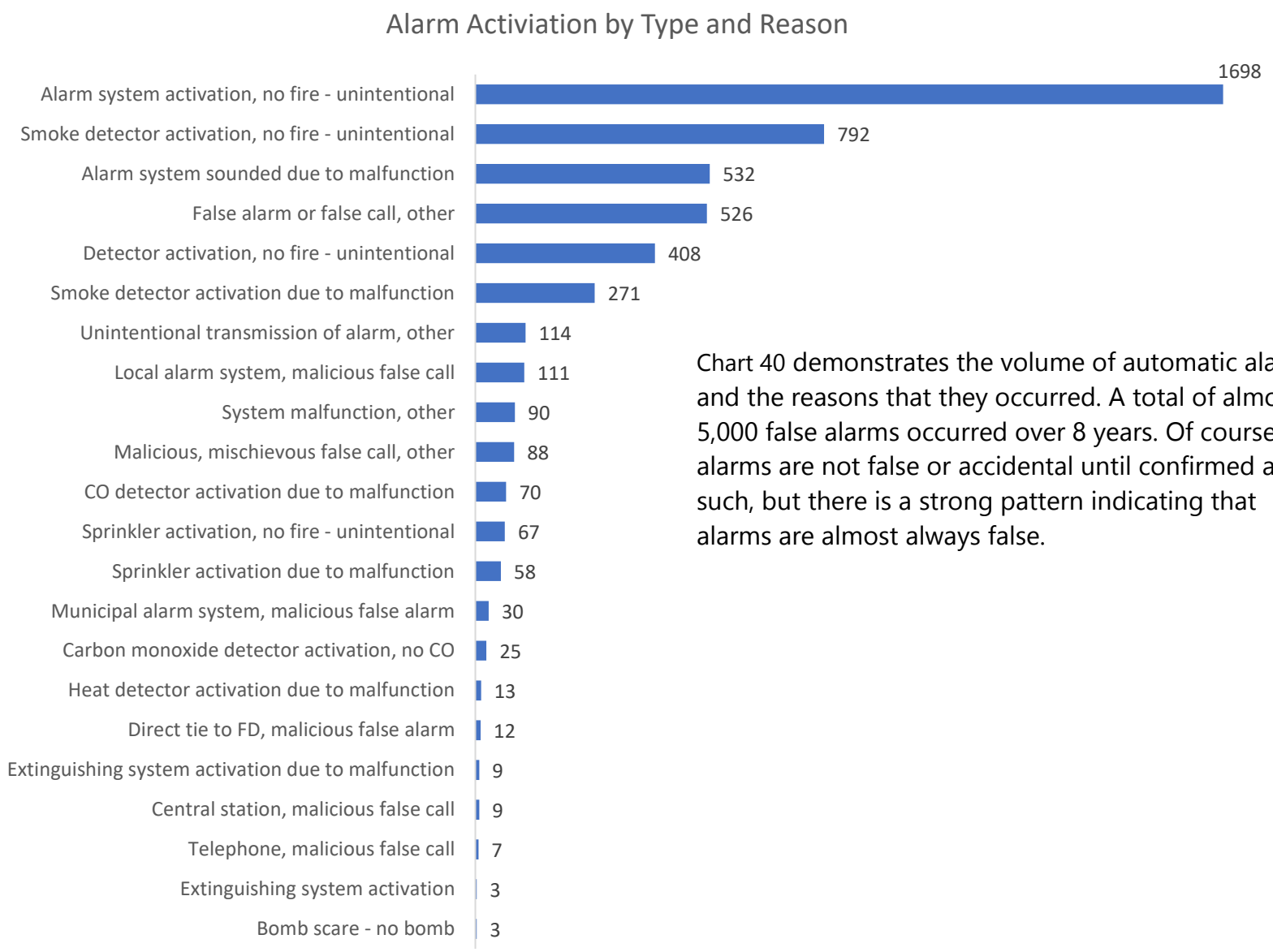


Chart 40 demonstrates the volume of automatic alarms and the reasons that they occurred. A total of almost 5,000 false alarms occurred over 8 years. Of course, alarms are not false or accidental until confirmed as such, but there is a strong pattern indicating that alarms are almost always false.

Chart 41: Number of Automatic Alarms by Year

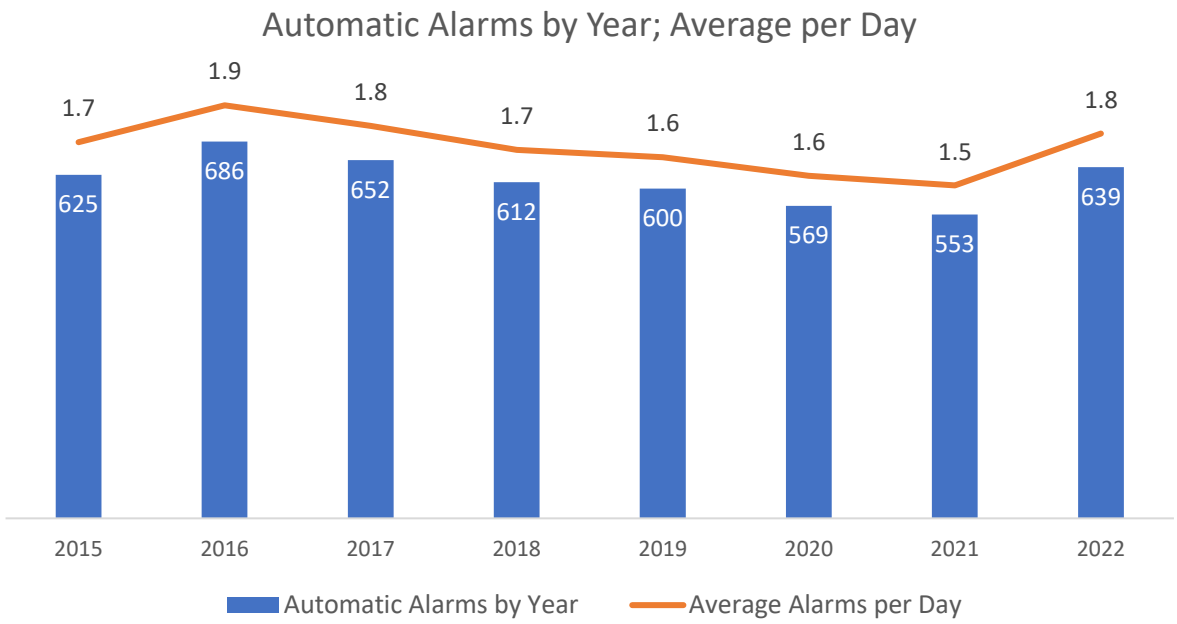


Chart 41 indicates the number of automatic alarm events that have occurred in each of the past eight years; that is, an average of 1.5 to 1.9 a day totaling almost 5,000 automatic alarms from 2015 to 2022.

Chart 42: Automatic Alarms by Month

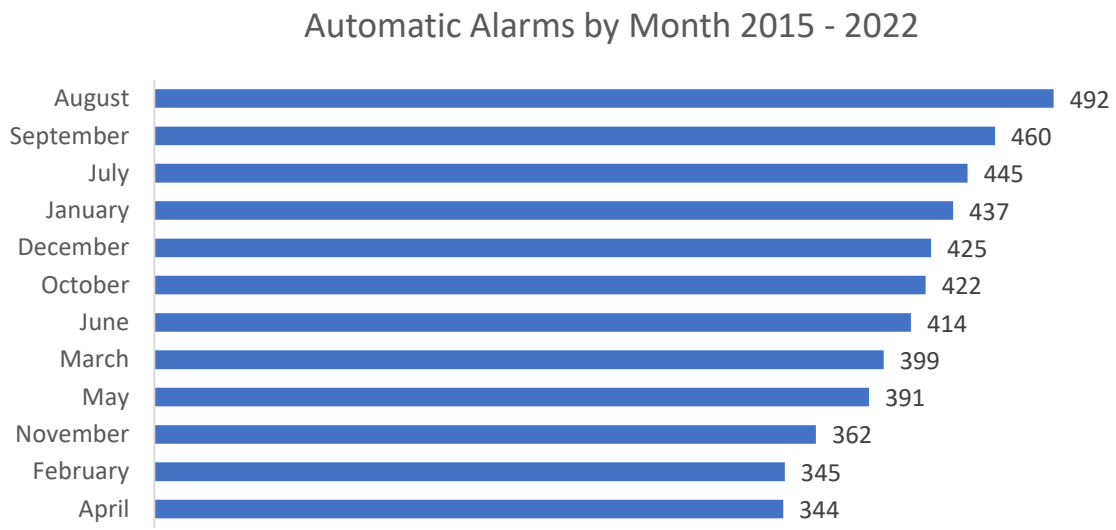


Chart 42 shows which months registered the greatest number of automatic alarms during the eight years of data examined.

There is insufficient information in the data to determine why automatic alarms occur in this distribution.

Chart 43: Automatic Alarms by Day 2015 – 2022

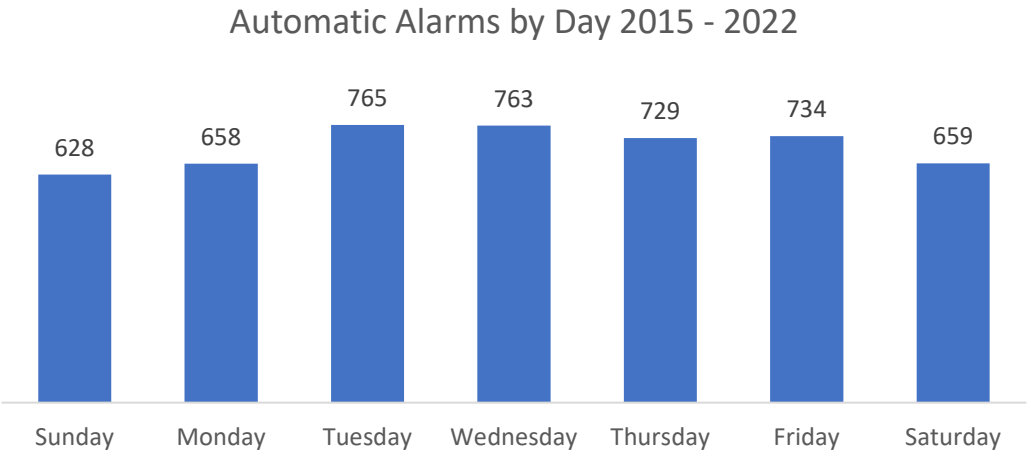


Chart 43 demonstrates the distribution of alarm activation by day. Slightly more occur Tuesday to Friday than Saturday, Sunday, or Monday.

There was insufficient information to explain why.

Chart 44: Automatic Alarms by Hour

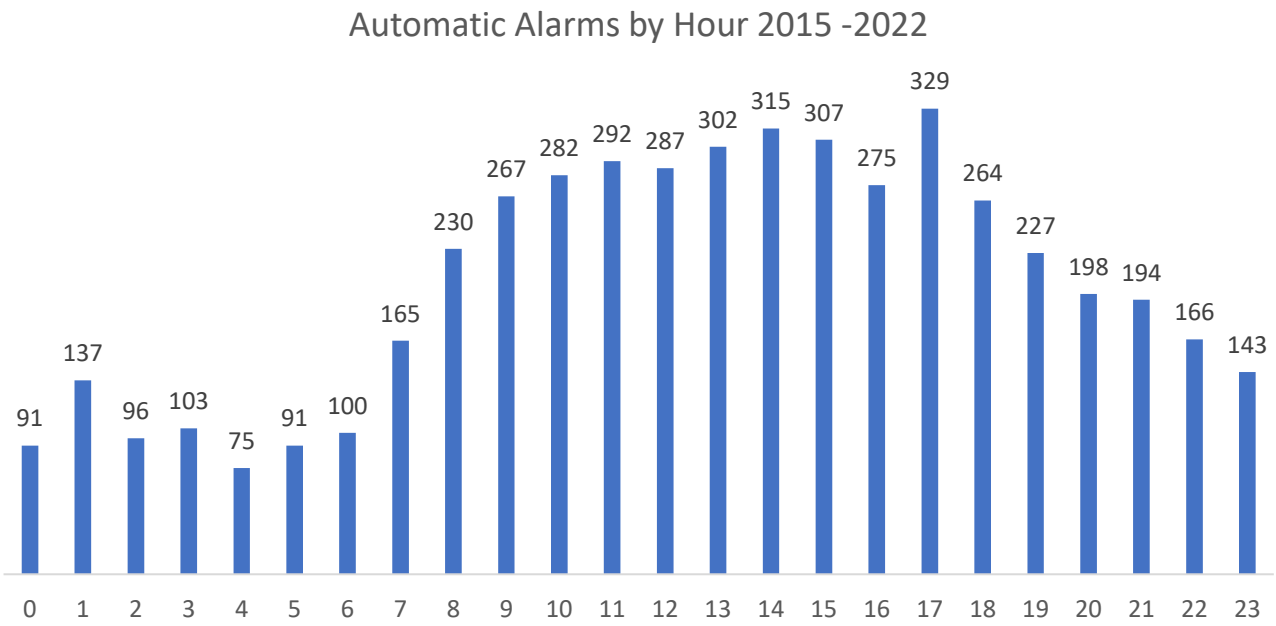


Chart 44 demonstrates the distribution of automatic alarms by hour. The majority of alarms occur when people are more active and have the tendency to set off alarms accidentally

Experience in other projects indicates that alarm maintenance contributes to unintentional alarms.

Until 2018, Saint John Fire sent four fire trucks and a senior officer (Platoon Chief), using lights and sirens, to automatic alarms for a total of 17 people. Automatic alarms were responded to in the same manner as confirmed fires. In 2018 the fire service reduced response to automatic alarms to two trucks for a total of eight people but still using lights and sirens.

Some fire departments, including in New Brunswick, being aware that automatic alarms are usually false unless accompanied by calls to 911 indicating smoke or fire, have adopted a policy of restrained response. For example, one fire truck, without using warning systems, will investigate the alarm. We are aware of one fire department that no longer responds to some types of automatic alarms.

In a case of carbon monoxide alarms, and all occupants are out of the building, some fire departments send an officer in a car to the incident (no fire trucks), but not using lights and sirens. Over 30 years ago one of the fire chiefs who now works with Pomax implemented a policy that one fire truck would respond to automatic alarms using lights and sirens while a second would follow in non-emergency mode, observing all traffic laws.

Performing multiplication on these incidents means that from 2015 to 2018, inclusive, there were about 2,575 automatic alarms to which 10,300 20+ tonne fire trucks responded and 2,575 platoon chief's cars for 12,875 vehicle responses. From 2019 to 2022 there were 2,361 automatic alarms to which 4,722 heavy trucks responded. Throughout the 8 years that were examined over 15,000 vehicles responded to false alarms.

Saint John should work with the Saint John communications centre to review its policy regarding automatic alarms and reduce many of the responses by 20 tonne trucks operating in emergency mode.

Chart 45: Other Incident Types 2015 – 2022

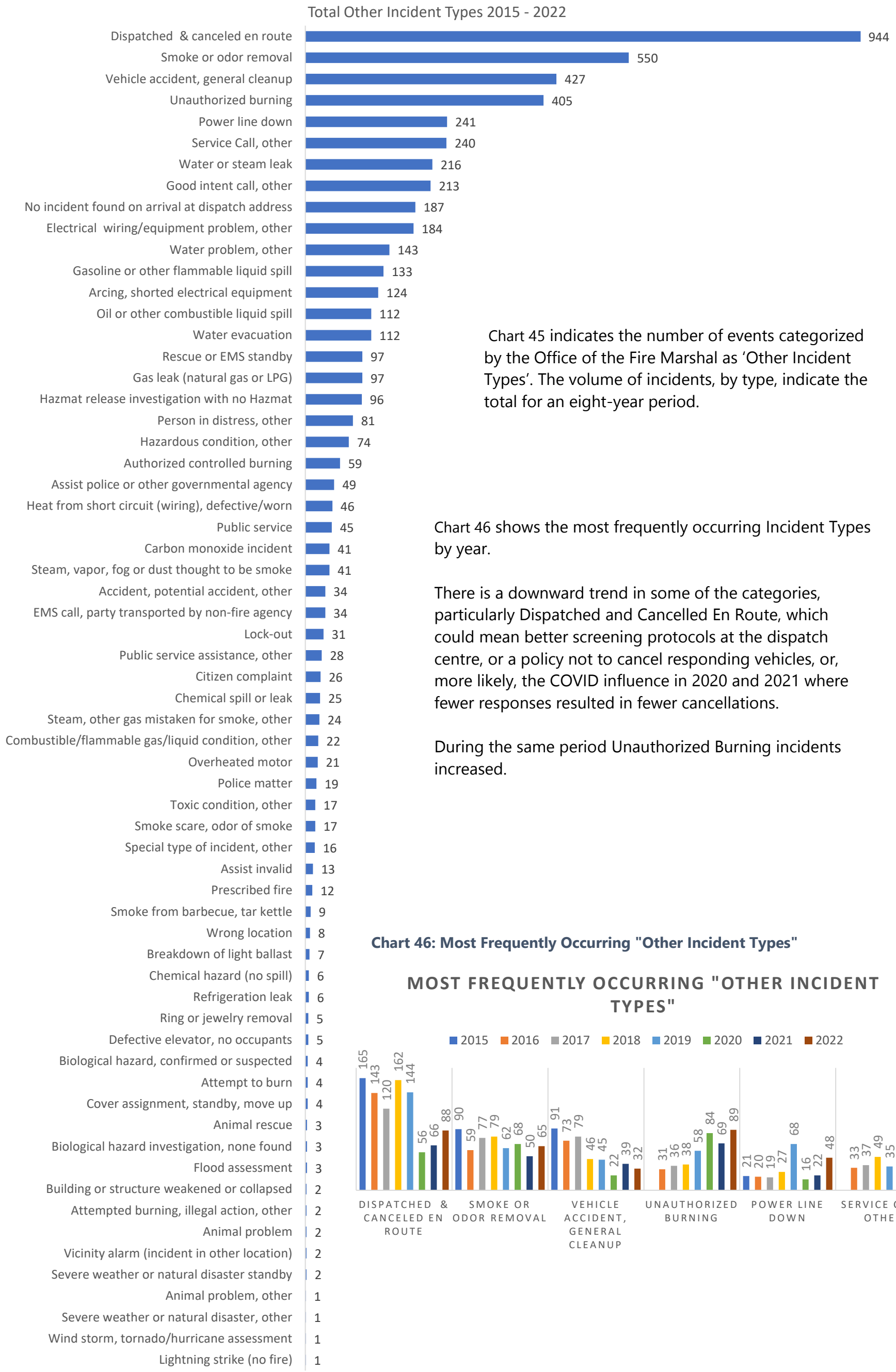


Chart 45 indicates the number of events categorized by the Office of the Fire Marshal as 'Other Incident Types'. The volume of incidents, by type, indicate the total for an eight-year period.

Chart 46 shows the most frequently occurring Incident Types by year.

There is a downward trend in some of the categories, particularly Dispatched and Cancelled En Route, which could mean better screening protocols at the dispatch centre, or a policy not to cancel responding vehicles, or, more likely, the COVID influence in 2020 and 2021 where fewer responses resulted in fewer cancellations.

During the same period Unauthorized Burning incidents increased.

Chart 46: Most Frequently Occurring "Other Incident Types"

Incident Response Performance

The information in this section details the response performance of the whole fire department and by individual fire station. The content, and the charts, may be tedious for some readers but it is important to follow because, as we observed in the opening pages of this document, "…the subject of fire and rescue services … is much more complex than most people understand". Plus, these charts will be an important support structure for the strategy we recommend.

Chart 47 through Chart 54 show performance of the first three stages of an incident process; that is, call receiving and dispatch, preparation time, and driving time (please see Exhibit 2: Response Graphic for further information). These are shown in the first three bars of the charts and are calculated at the 90th percentile which means that 90% of all incidents are responded to in the times shown, 10% take longer. As an example, the information shown for **2015** in Chart 47 indicates

- call receiving and firefighter alerting by the Saint John communication centre took one-minute and 55 seconds at the 90th percentile;
- preparation by firefighters to leave the station took two-minutes and two seconds at the 90th percentile; and
- drive time to incidents took six-minutes and 18 seconds at the 90th percentile.

Chart 47: Call Performance - Saint John Fire Department; All Stations All Incident Types

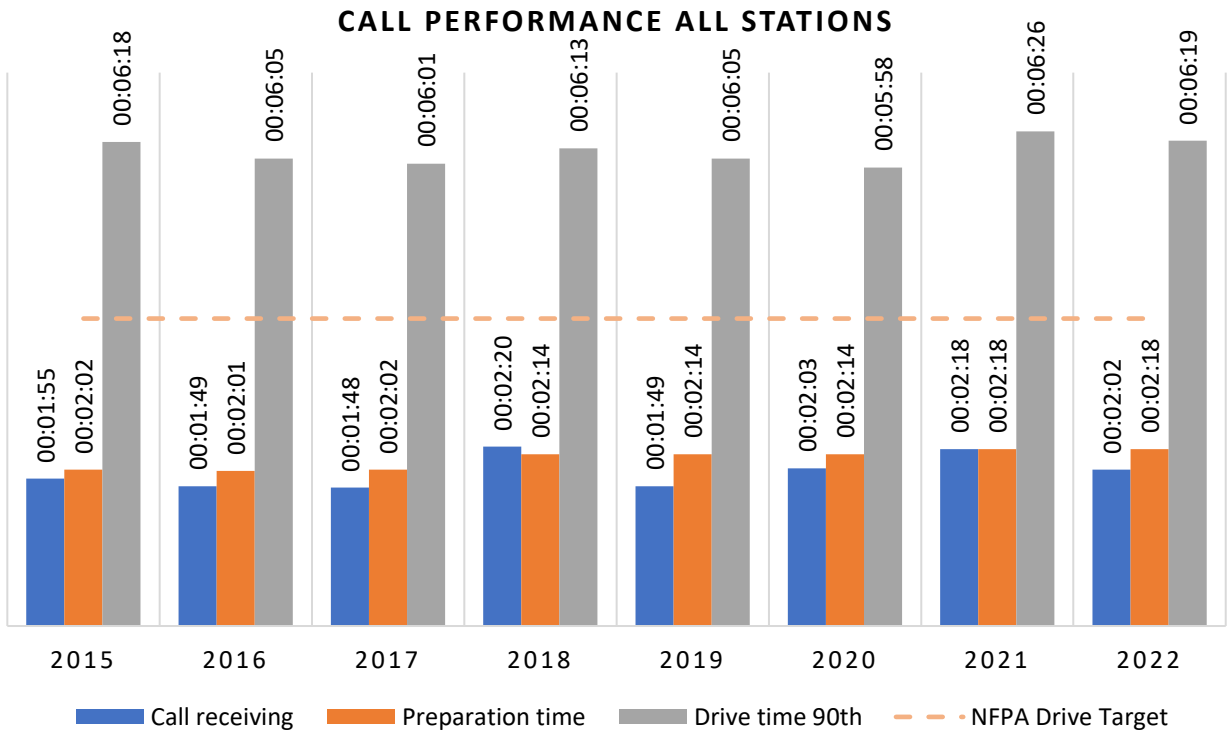
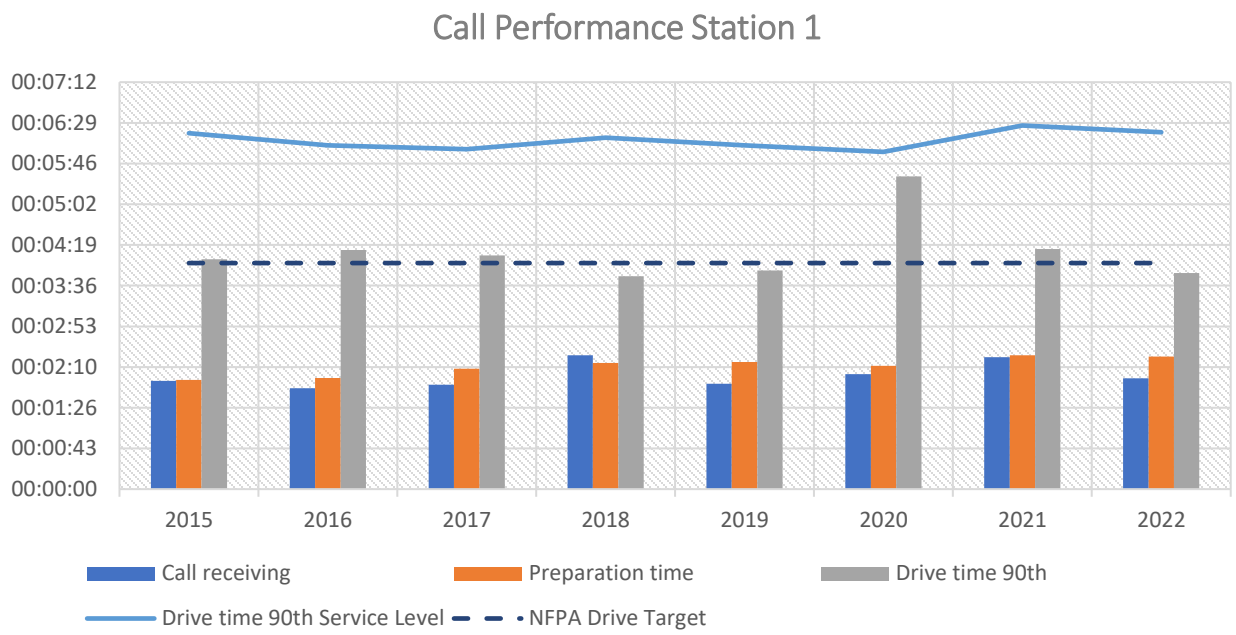
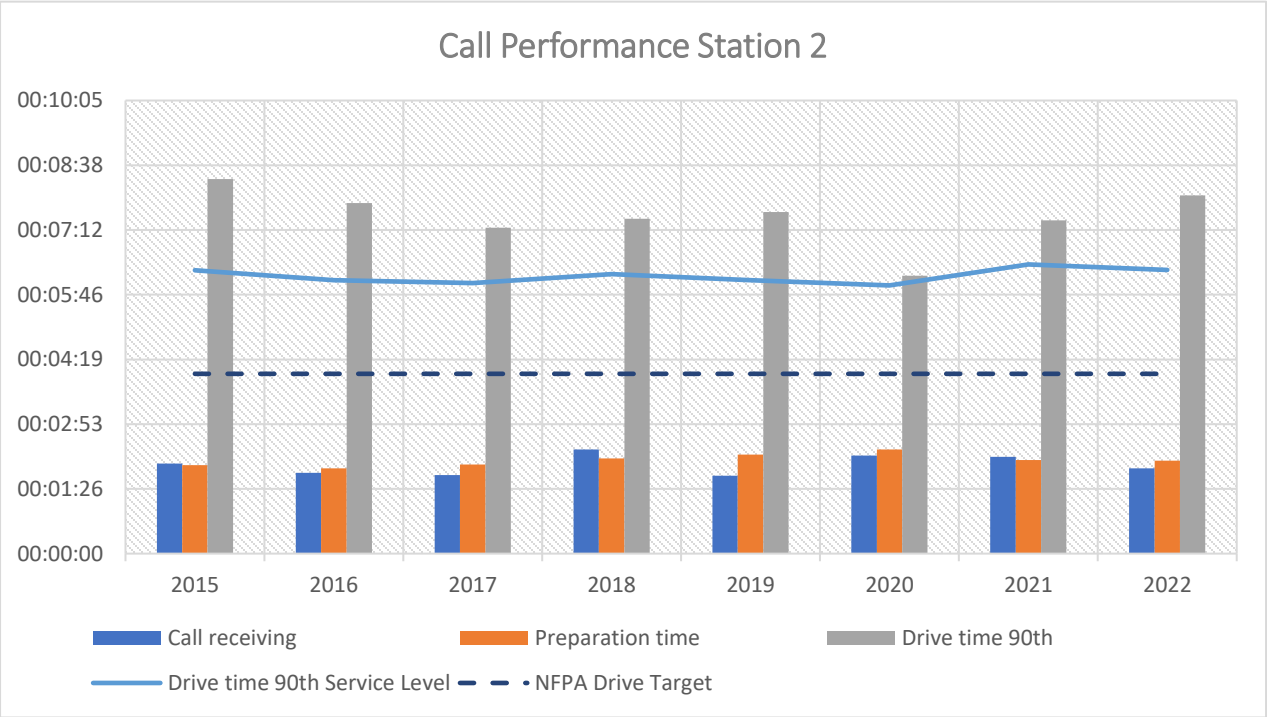


Chart 48: Call Performance Station 1



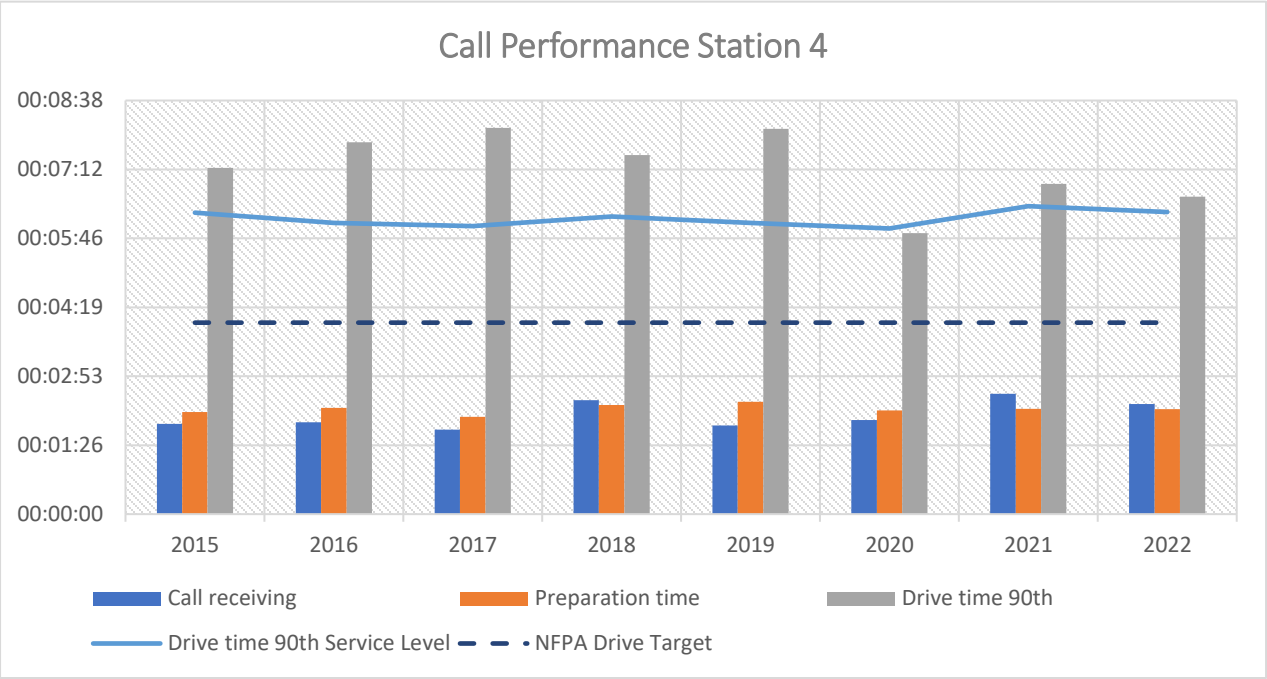
Station 1's performance for Drive Time and Response is in the range of 26 to 147 seconds less (faster) than the aggregate of stations. This is likely because it principally serves as a first responding station to a mostly urban area. Other than in 2020, station 1's Drive Time was close to, or under, the NFPA standard of first arriving apparatus in 240 seconds or less.

Chart 49: Call Performance Station 2



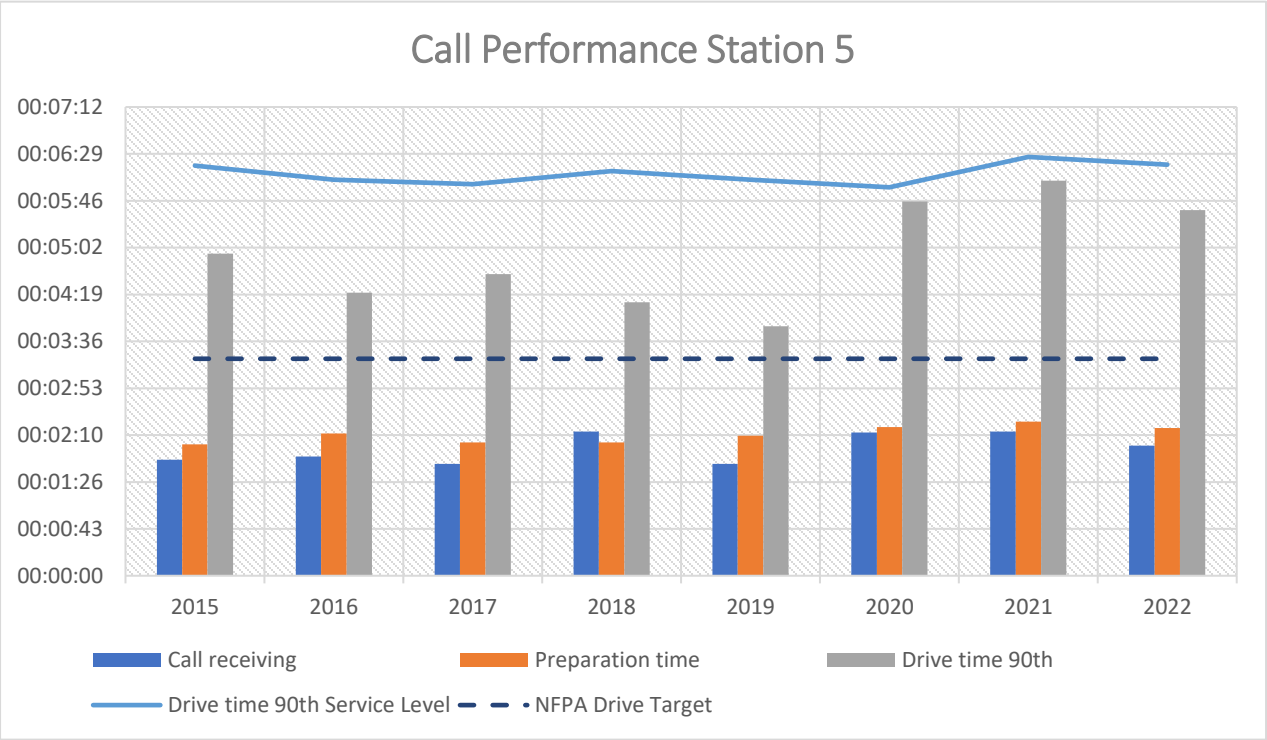
Station 2's performance for Drive Time and Response is in the range of almost the same to 122 seconds longer than the aggregate of all stations. This is likely because it serves less densely populated urban and rural areas as a first responding station and has longer distances to cover than Uptown stations.

Chart 50: Call Performance Station 4



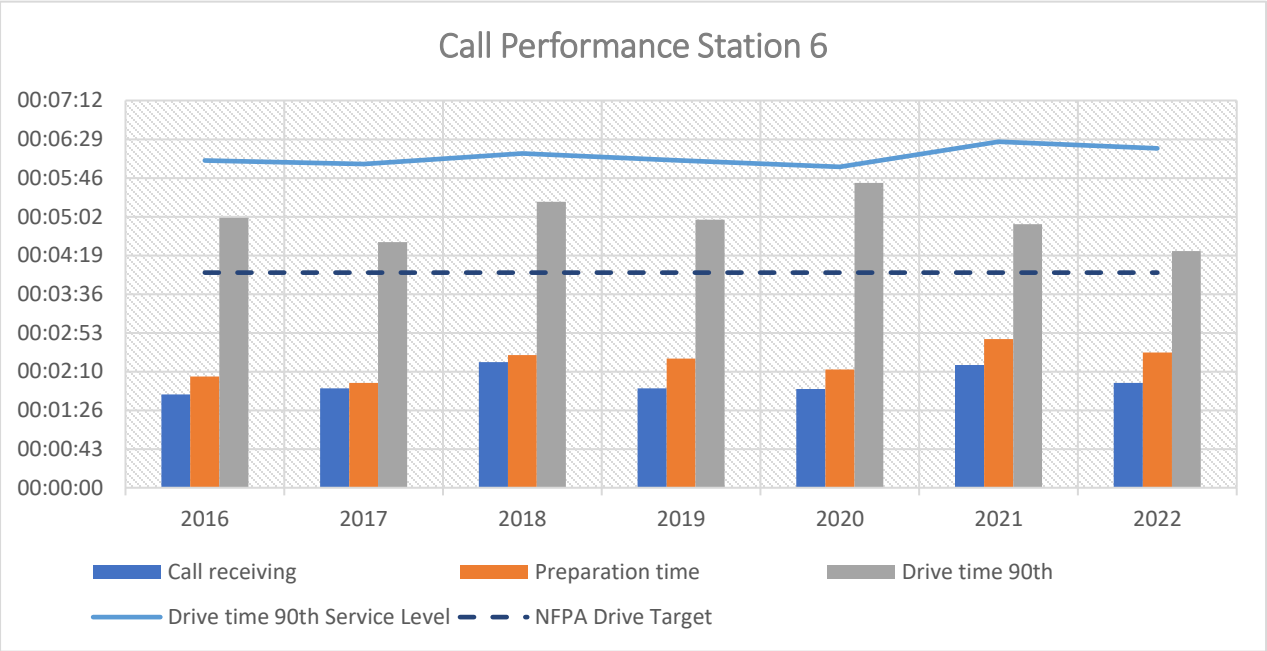
Station 4's performance for Drive Time and Response is in the range of almost the same to 123 seconds longer than the aggregate of all stations. Like station 2 it also serves a less densely populated area.

Chart 51: Call Performance Station 5



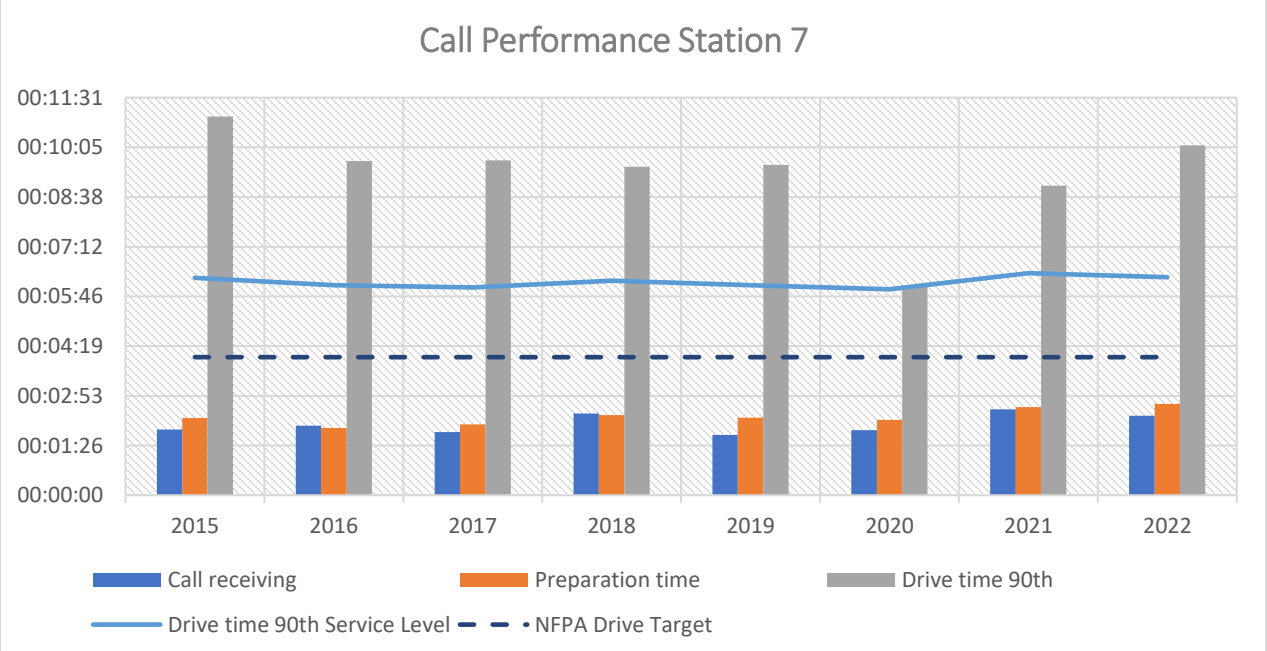
Over the 2015 to 2022 period, station 5's Drive Time and Response Time performance was up to 135 seconds and 78 seconds, respectively, better than the overall service performance, except for 2020 to 2022 when Drive Time was 13 to 22 seconds better than the overall fire department's time, and response at the 75th percentile was similar to the overall department time. We can't come to a determination as to why performance changed in 2020 – 2022. We don't believe that closing station 8 is a factor because it closed at the end of 2020 and driving time increased in 2020 while the station was still operational.

Chart 52: Call Performance Station 6



Station 6's Drive time is from 54 seconds to 92 seconds quicker than overall service performance, and Response Time at the 75th percentile ranges from 43 seconds slower to 50 seconds faster than overall service performance.

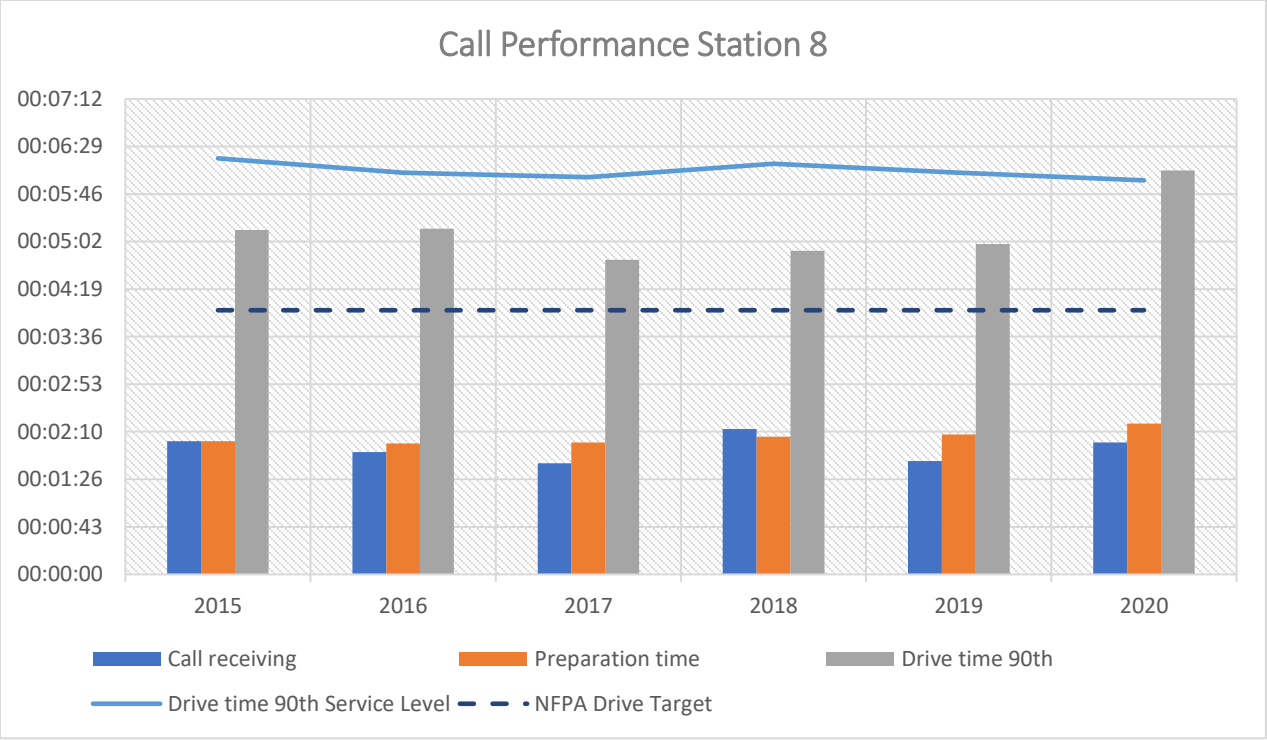
Chart 53: Call Performance Station 7



Station 7 is the outlier with respect to performance when compared to historical fire department-wide response and NFPA drive time and UK response time targets. Station 7 exceeds the fire department-wide drive time performance by 152 to 280 seconds – depending on the year – and the response time 75th percentile by between 96 seconds and 153 seconds; that is, except for 2020 where times were almost identical to the service-wide times.

Station 7 covers a large rural area and it's possible – but we can't prove – that, during peak COVID, a reduction in responses to medical incidents, vehicle collisions, and other events which offer some flexibility in determining the criticality for response, reduced travel and overall response times.

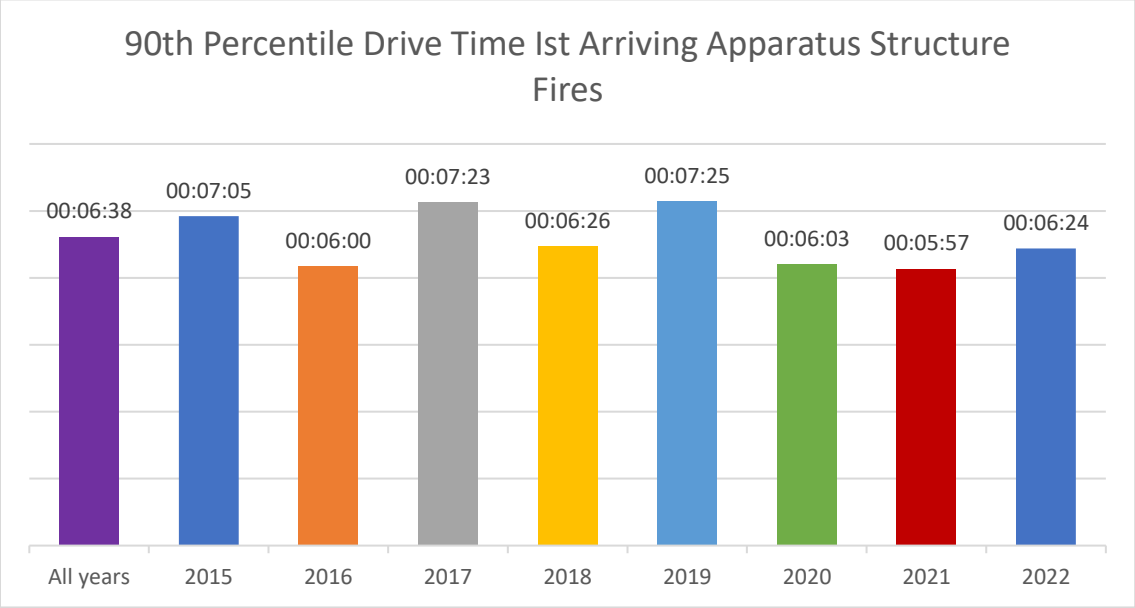
Chart 54: Call Performance Station 8

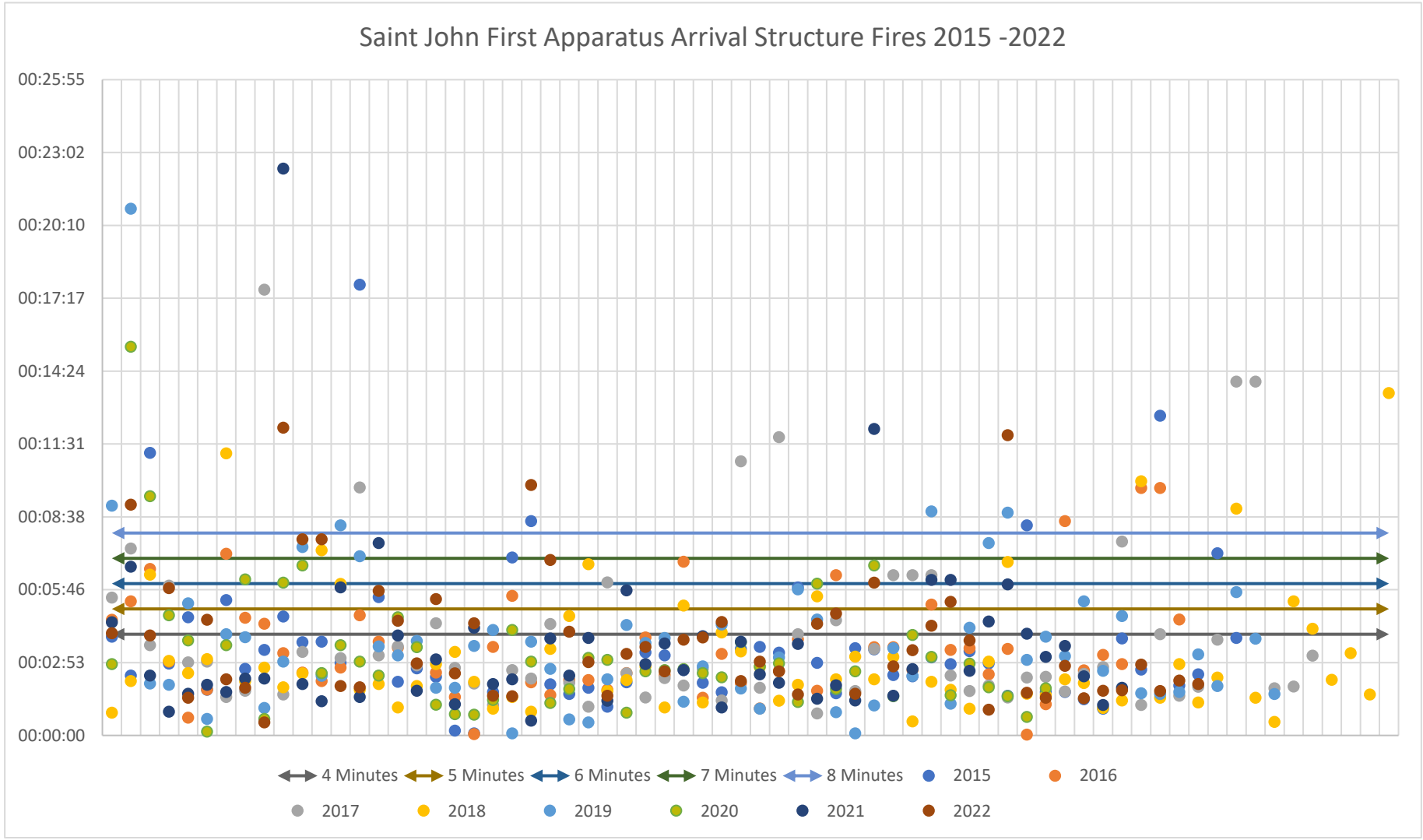


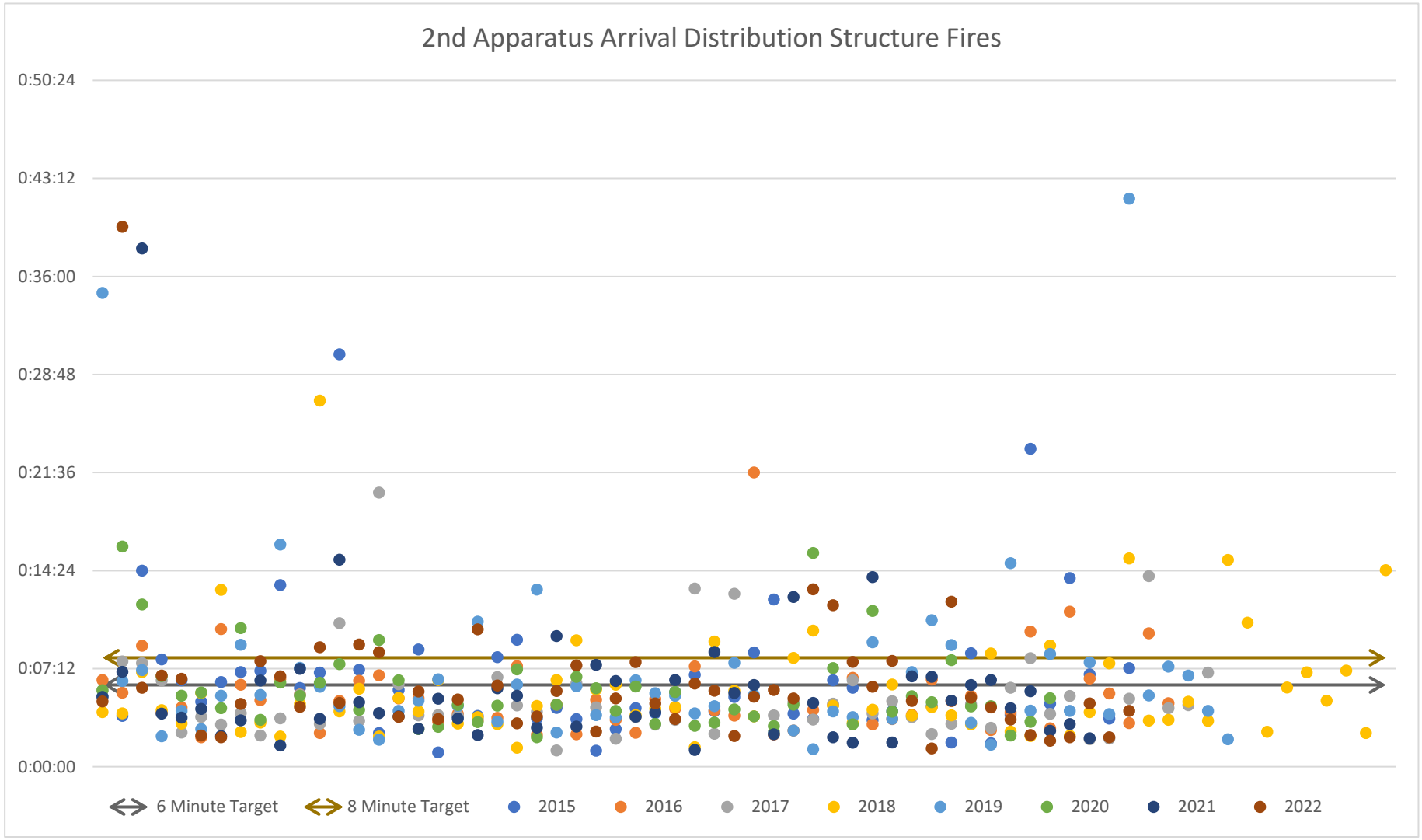
Data for station 8 extends only to the end of 2020 at which point it was closed. Station 8 performed the same or up to 78 seconds better than department-wide levels.

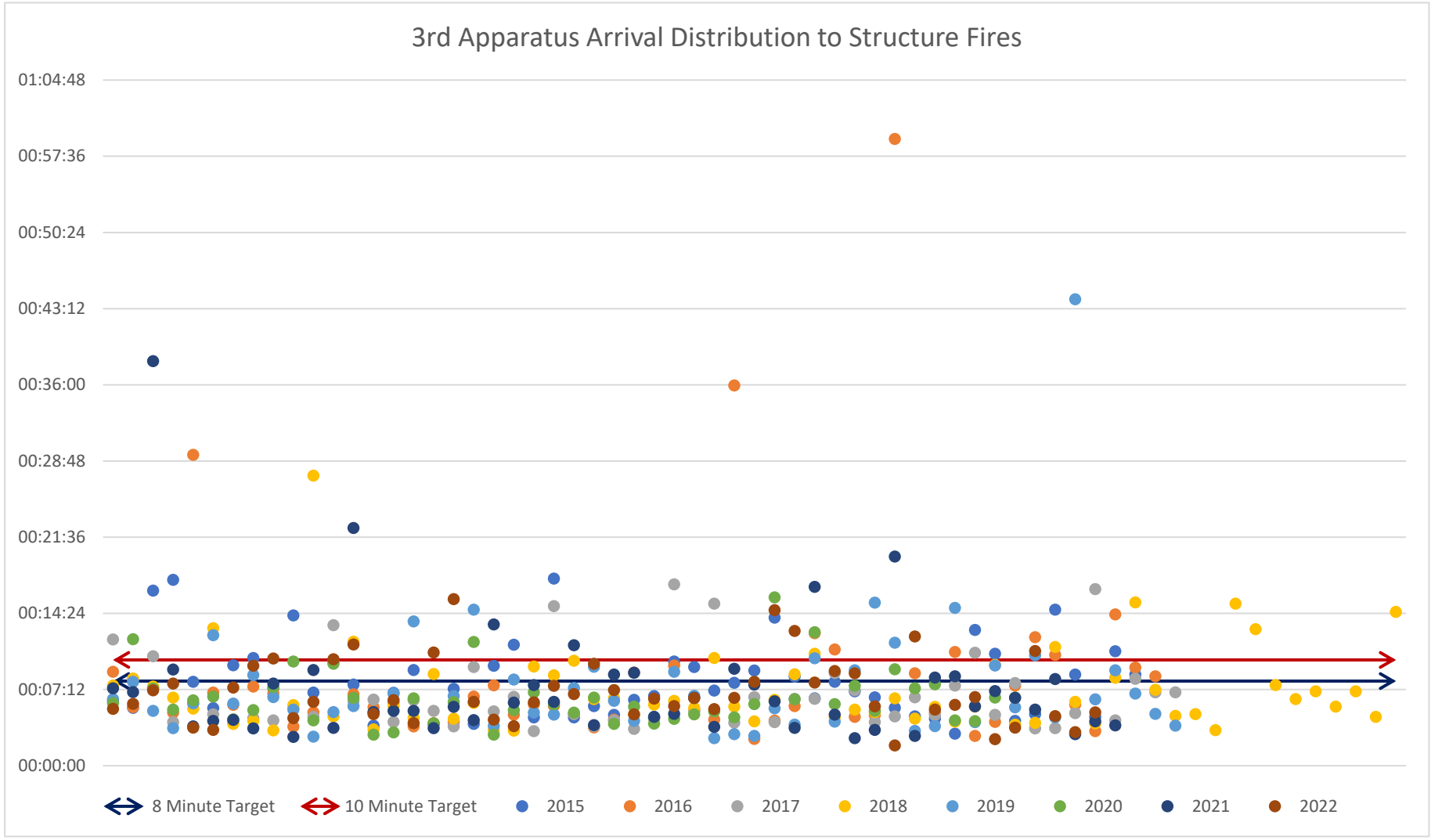
Appendix C Driving Time Distribution Charts 2015 - 2022

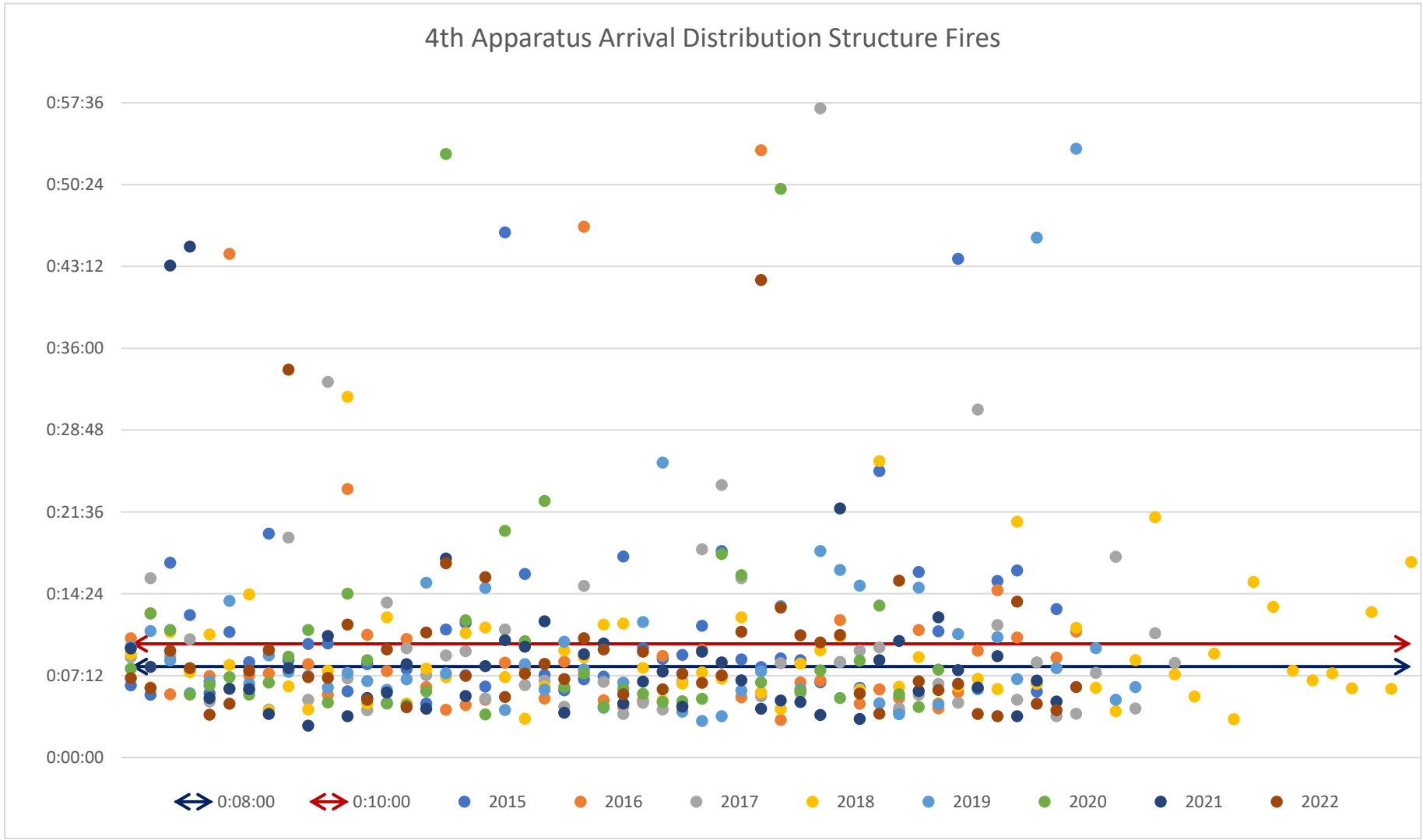
Chart 55: 90th Percentile Driving Time to Structure Fires




Saint John First Apparatus Arrival Structure Fires 2015 -2022
00:25:55
00:23:02
00:20:10
00:17:17
00:14:24
00:11:31
00:08:38
00:05:46
00:02:53
00:00:00
4 Minutes
5 Minutes
6 Minutes
7 Minutes
8 Minutes
2015
2016
2017
2018
2019
2020
2021
2022

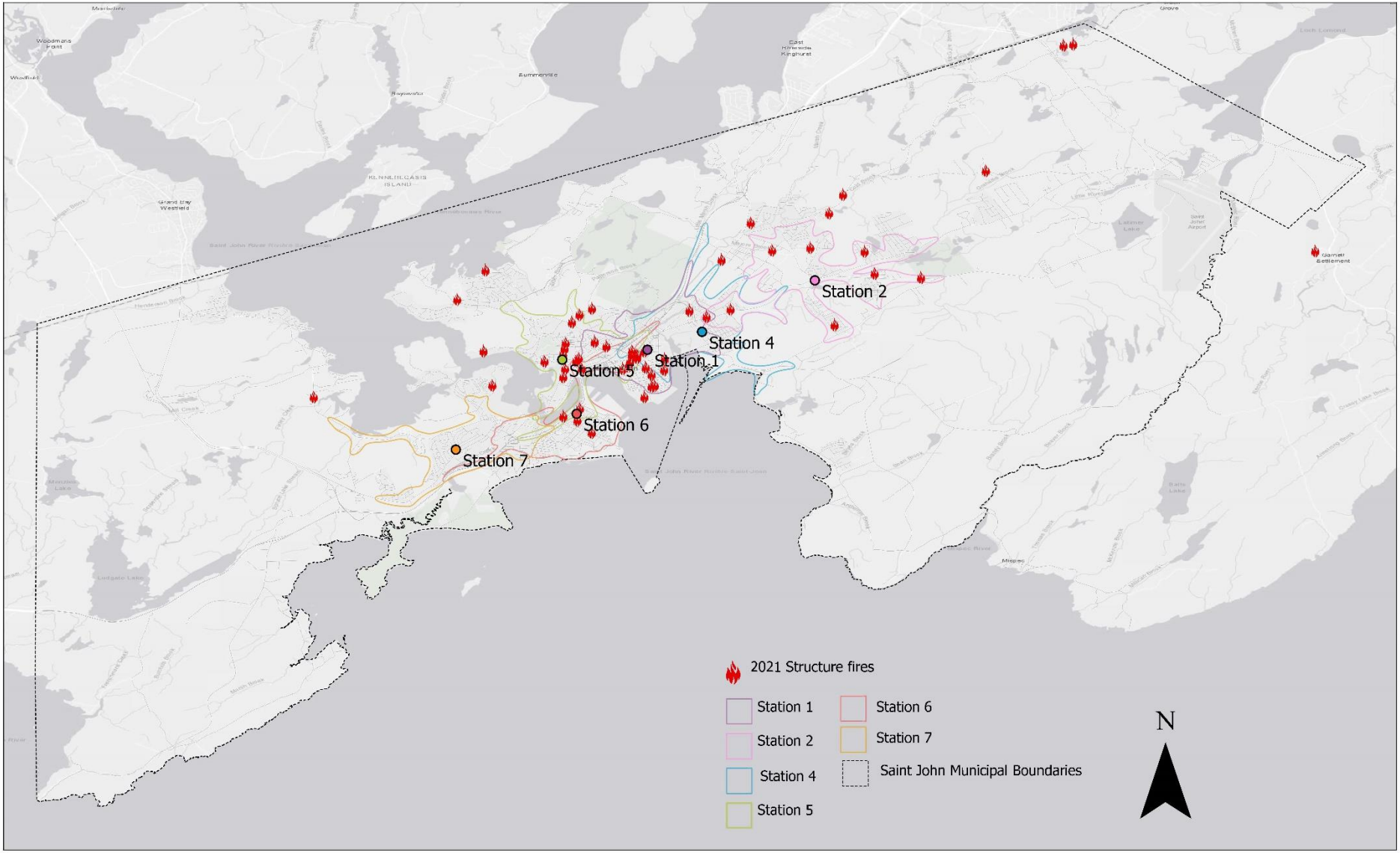

2nd Apparatus Arrival Distribution Structure Fires
0:50:24
0:43:12
0:36:00
0:28:48
0:21:36
0:14:24
0:07:12
0:00:00
6 Minute Target
8 Minute Target
2015
2016
2017
2018
2019
2020
2021
2022


3rd Apparatus Arrival Distribution to Structure Fires
01:04:48
00:57:36
00:50:24
00:43:12
00:36:00
00:28:48
00:21:36
00:14:24
00:07:12
00:00:00
8 Minute Target
10 Minute Target
2015
2016
2017
2018
2019
2020
2021
2022

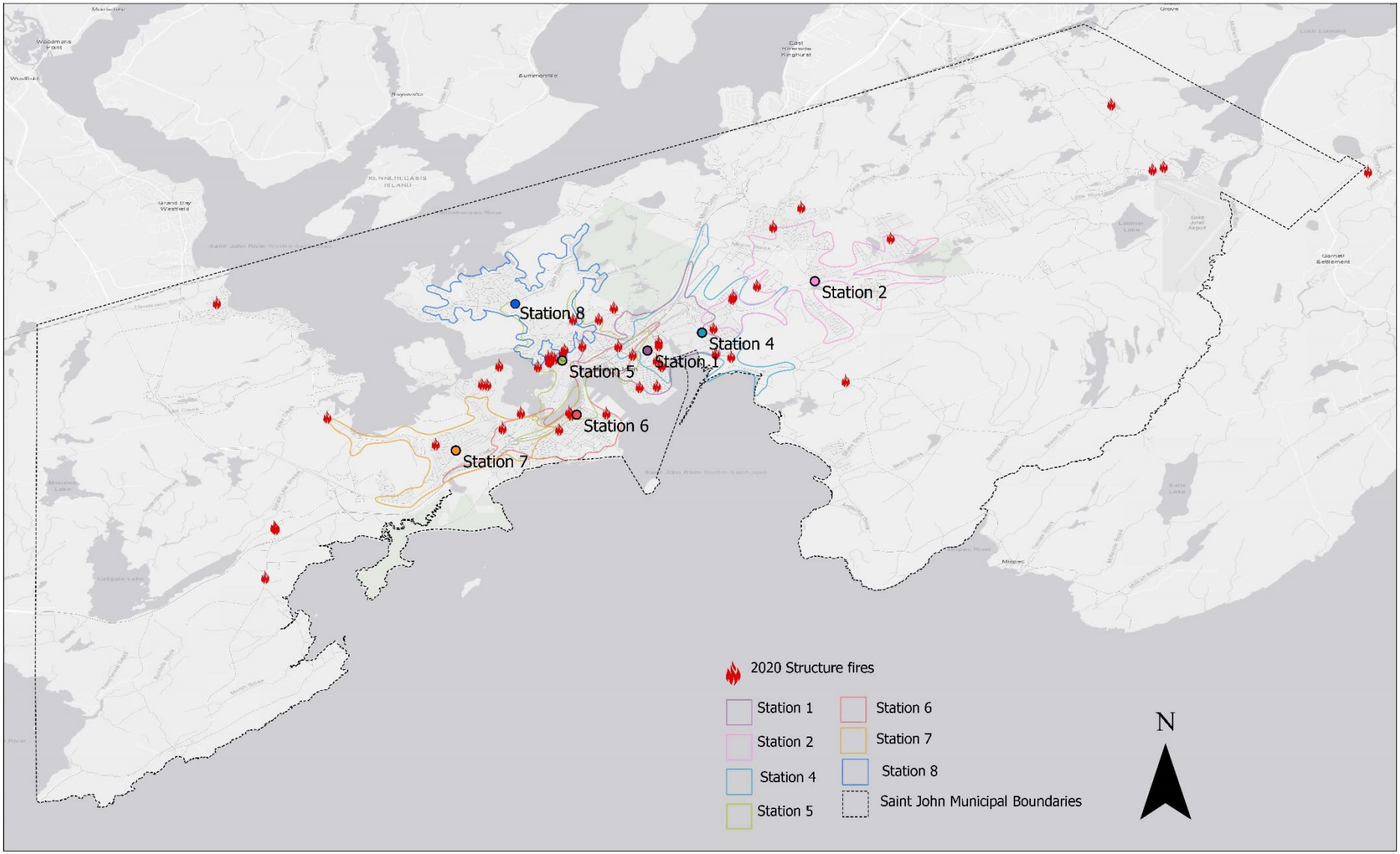

4th Apparatus Arrival Distribution Structure Fires
0:57:36
0:50:24
0:43:12
0:36:00
0:28:48
0:21:36
0:14:24
0:07:12
0:00:00
0:08:00
0:10:00
2015
2016
2017
2018
2019
2020
2021
2022

Appendix D Structure Fire Location 2015 – 2021

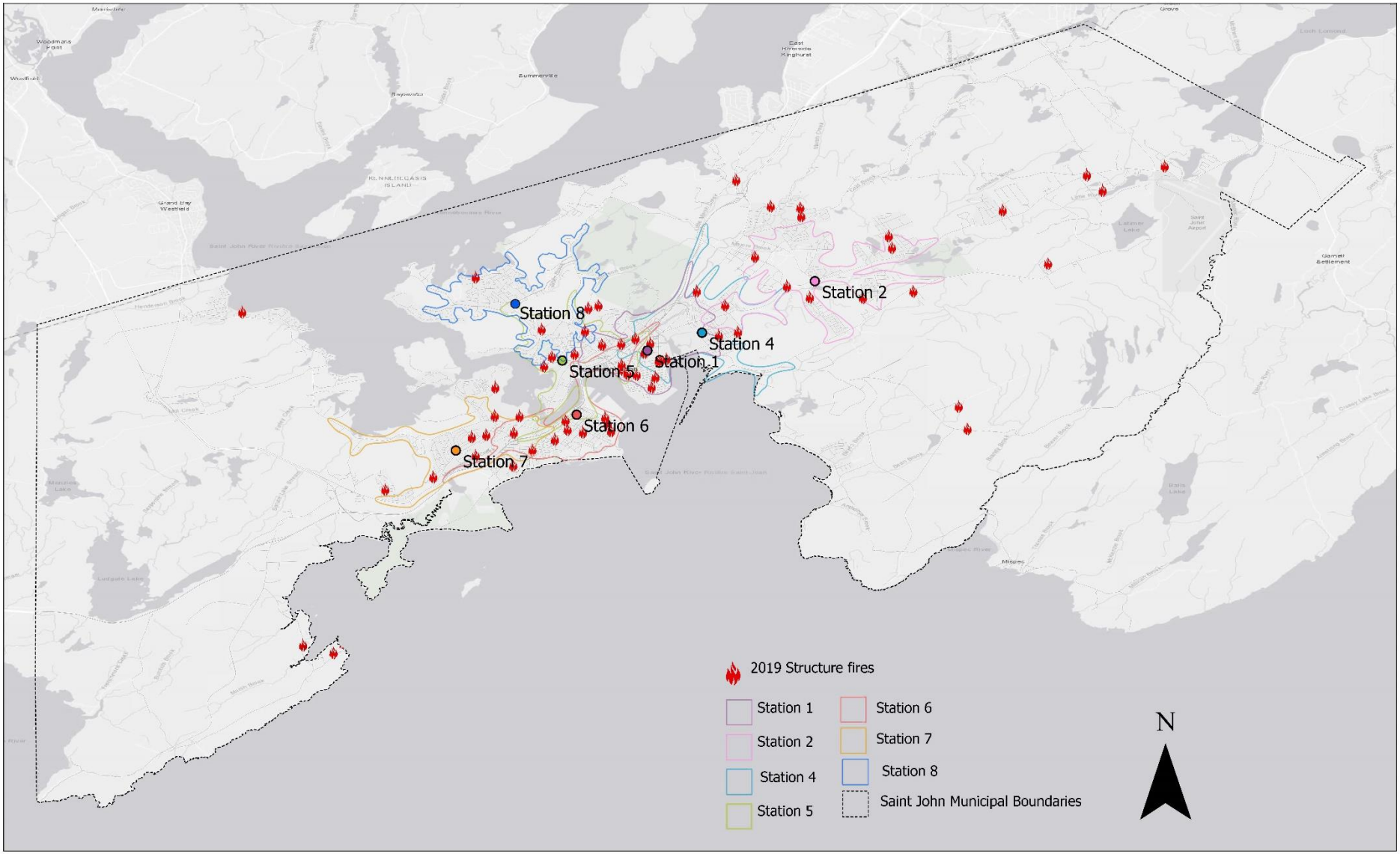
Saint John 2021 Structure Fires - 4 Minute Drive Time Contours



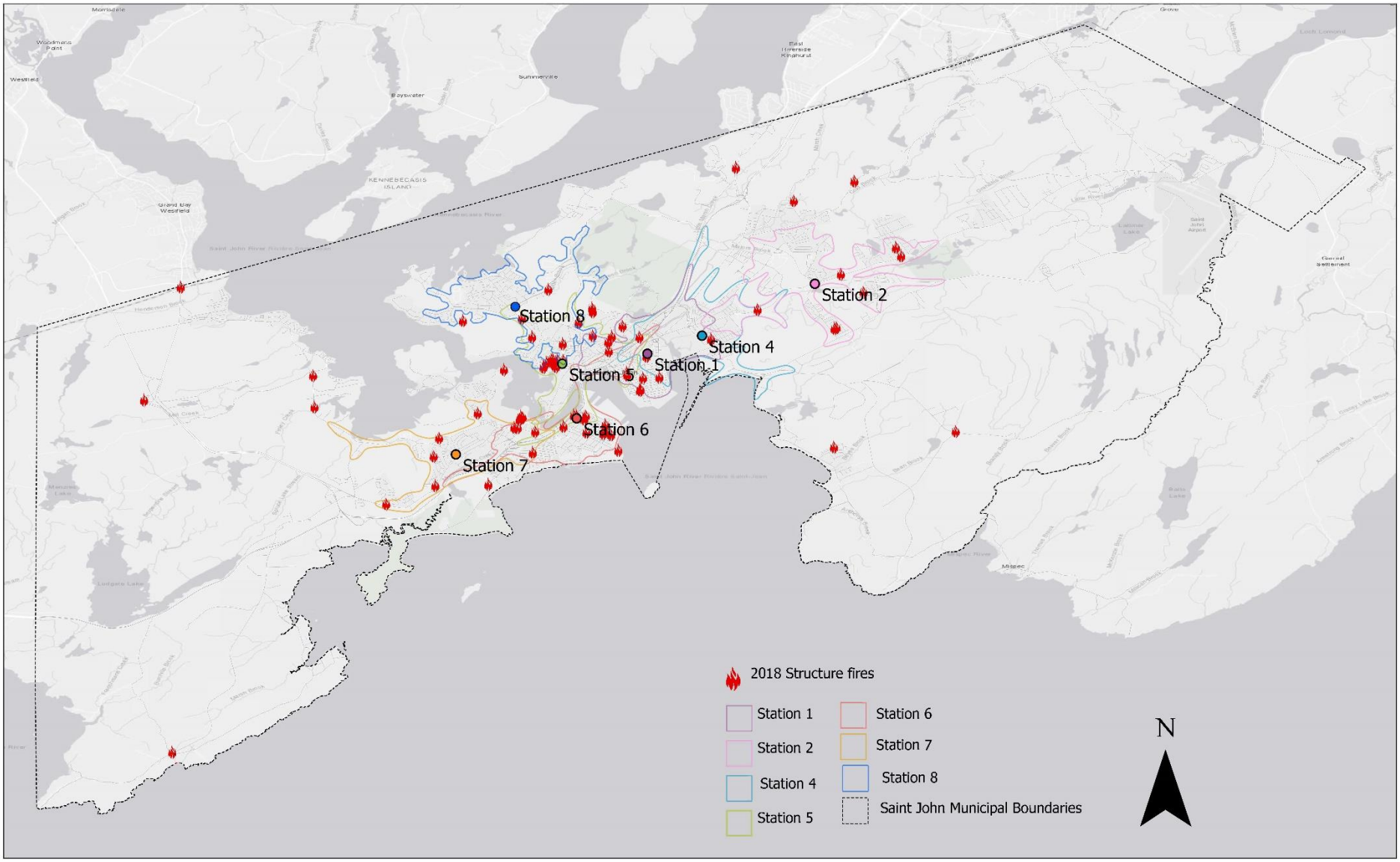
Saint John 2020 Structure Fires - 4 Minute Drive Time Contours



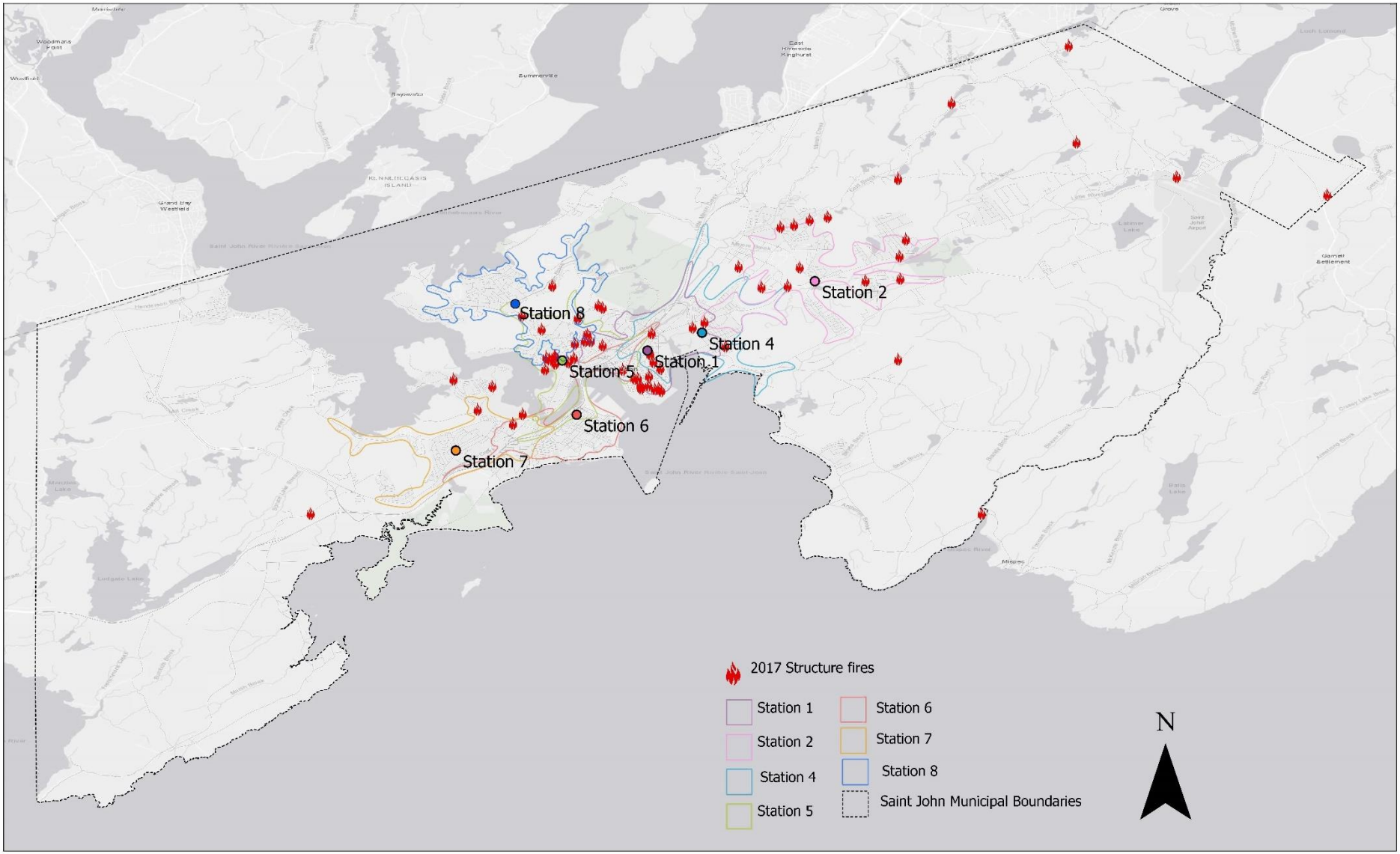
Saint John 2019 Structure Fires - 4 Minute Drive Time Contours



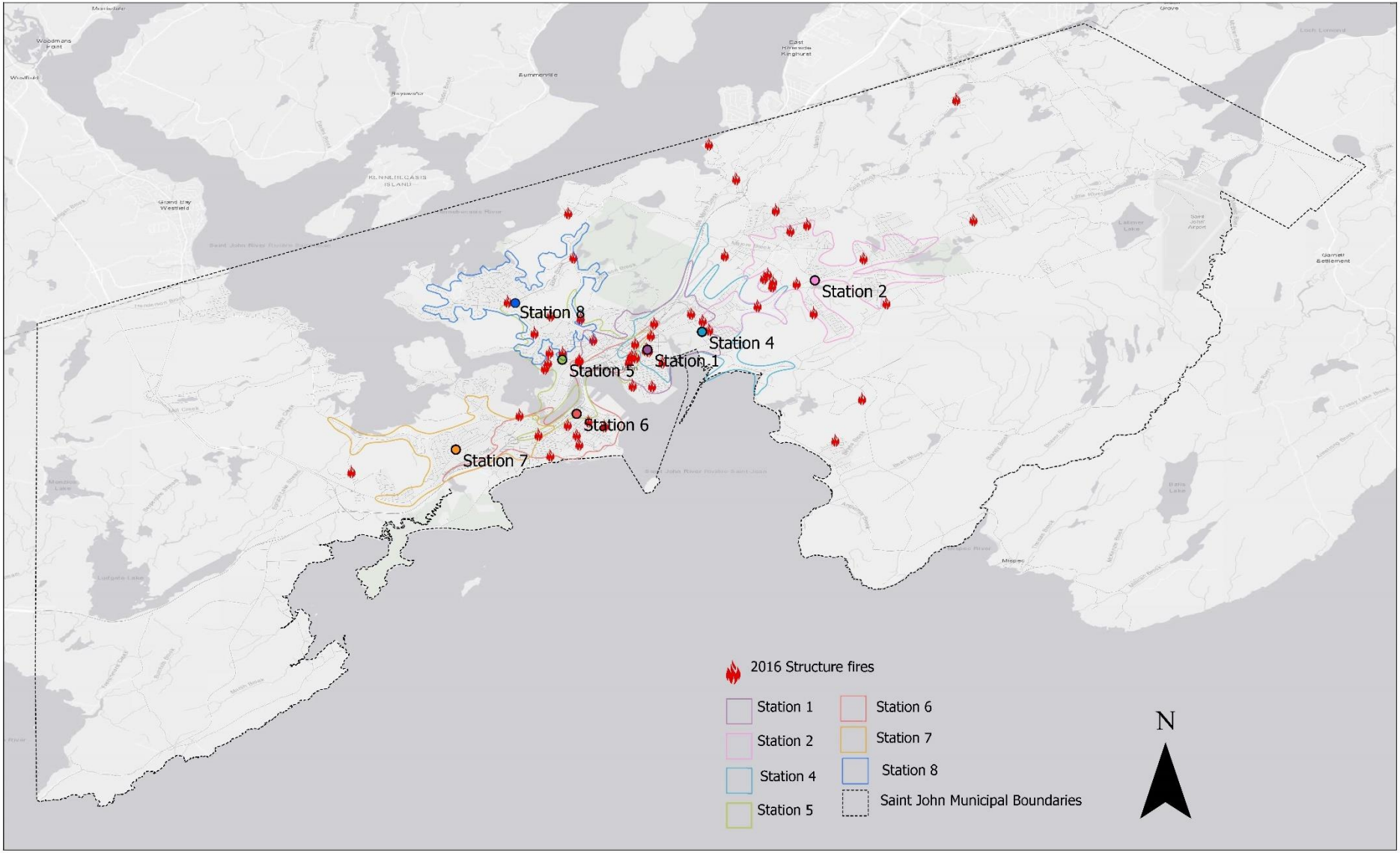
Saint John 2018 Structure Fires - 4 Minute Drive Time Contours



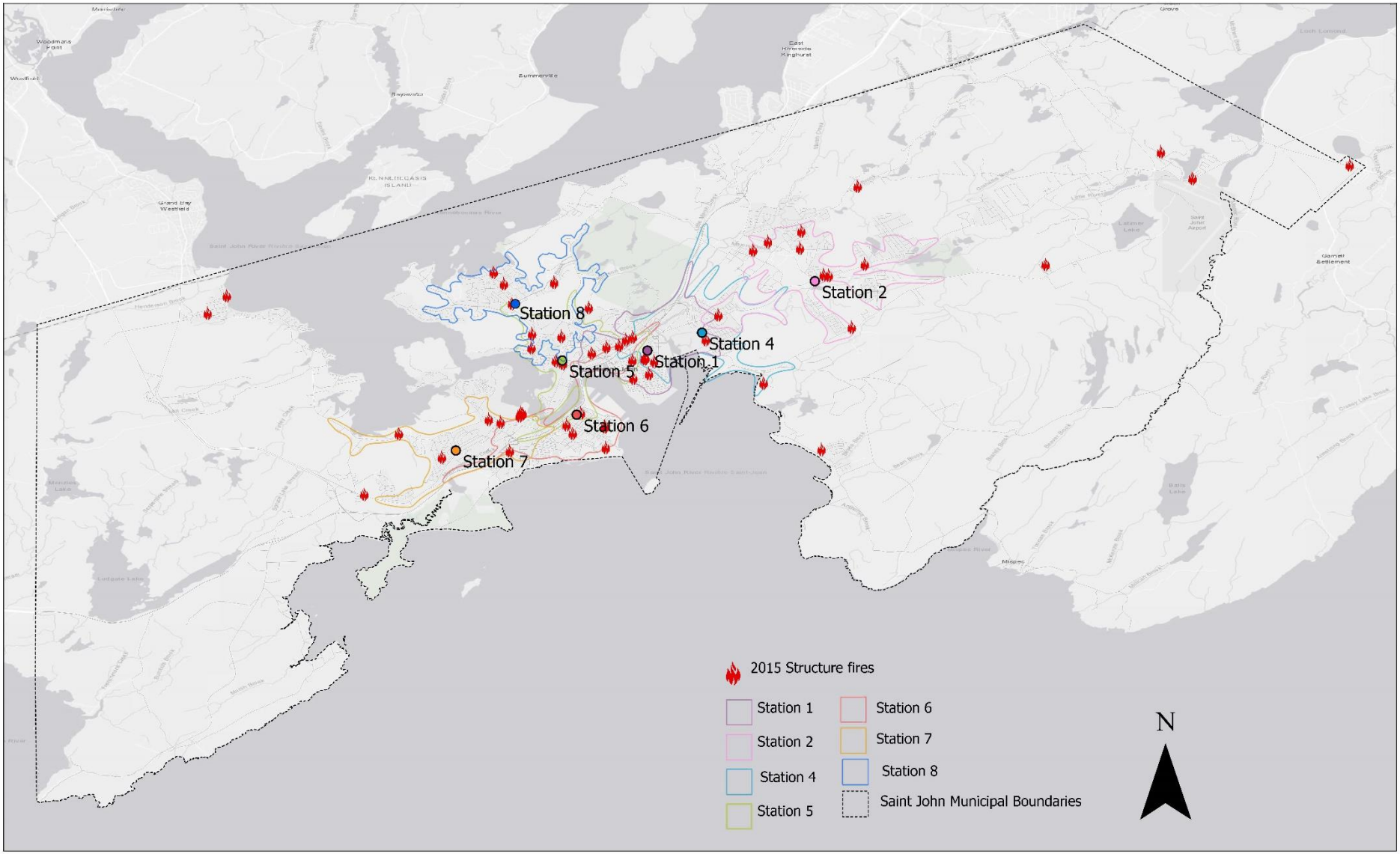
Saint John 2017 Structure Fires - 4 Minute Drive Time Contours



Saint John 2016 Structure Fires - 4 Minute Drive Time Contours



Saint John 2015 Structure Fires - 4 Minute Drive Time Contours



Appendix E Office of the Fire Marshall Incident Types

Structure or Chimney Fire includes			
Structure fire, other (conversion only)	110	**Medical Incident**	
Building Fire	111	Medical assist, assist EMS crew	311
Fires in structure other than a building	112	Emergency medical service, other	320
Chimney Fire	114	EMS call, excluding vehicle accident with injury	321
Fire in mobile property used as a fixed structure, other	120	Electrocution or potential electrocution	371
Fire in mobile home used as fixed residence	121		
Fire in portable building, fixed location	123	**Vehicle Incident**	
		Vehicle accident with injuries	322
Other Fires include		Motor vehicle/pedestrian accident (MV Ped)	323
Fire, other	100		
Cooking fire, confined to container	113	**Vehicle Incident - no injuries**	324
Incinerator overload or malfunction, fire confined	115		
Fuel burner/boiler malfunction, fire confined	116	**Extrication of victim(s) from vehicle**	352
Other appliance fire, confined to appliance	117		
Trash or rubbish fire, contained	118	**Other Extrication**	
Fire in motor home, camper, recreational vehicle	122	Extrication, rescue, other	350
Fire in portable building, fixed location	123	Extrication of victim(s) from building/structure	351
Mobile property (vehicle) fire, other	130	Removal of victim(s) from stalled elevator	353
Passenger vehicle fire	131		
Road freight or transport vehicle fire	132	**Searches**	
Rail vehicle fire	133	Search for lost person, other	340
Water vehicle fire	134	Search for person on land	341
Aircraft fire	135	Search for person in water	342
Self-propelled motor home or recreational vehicle	136	Search for person underground	343
Camper or recreational vehicle (RV) fire	137		
Off-road vehicle or heavy equipment fire	138	**Rescue**	
Outside rubbish fire, other	150	Trench/below-grade rescue	354
Outside rubbish, trash or waste fire	151	Confined space rescue	355
Garbage dump or sanitary landfill fire	152	High-angle rescue	356
Construction or demolition landfill fire	153	Extrication of victim(s) from machinery	357
Construction or demolition landfill fire	153	Water & ice-related rescue, other	360
Dumpster or other outside trash receptacle fire	154	Swimming/recreational water areas rescue	361
Outside stationary compactor/compacted trash fire	155	Ice rescue	362
Special outside fire, other	160	Swift water rescue	363
Outside storage fire	161	Surf rescue	364
Outside equipment fire	162	Watercraft rescue	365
Outside gas or vapor combustion explosion	163		

Other Fires (cont.)		**Alarms and malfunctions**	
Outside mailbox fire	164	False alarm or false call, other	700
		False call, no report	7009
Vegetation, Grass, Bush Fire	140	Malicious, mischievous false call, other	710
Natural vegetation fire, other	141	Municipal alarm system, malicious false alarm	711
Forest, woods or wildland fire	142	Direct tie to FD, malicious false alarm	712
Brush or brush-and-grass mixture fire	143	Telephone, malicious false call	713
Grass fire	170	Central station, malicious false call	714
Cultivated vegetation, crop fire, other	171	Local alarm system, malicious false call	715
Cultivated grain or crop fire	172	Bomb scare - no bomb	721
Cultivated orchard or vineyard fire		System malfunction, other	730
Cultivated trees or nursery stock fire	173	Sprinkler activation due to malfunction	731
		Extinguishing system activation due to malfunction	732
Fire Related Incidents		Smoke detector activation due to malfunction	733
Overpressure rupture, explosion, overheat other	200	Heat detector activation due to malfunction	734
Overpressure rupture from steam, other	210	Alarm system sounded due to malfunction	735
Overpressure rupture of steam pipe or pipeline	211	CO detector activation due to malfunction	736
Overpressure rupture of steam boiler	212	Unintentional transmission of alarm, other	740
Steam rupture of pressure or process vessel	213	Sprinkler activation, no fire - unintentional	741
Overpressure rupture from air or gas, other	220	Extinguishing system activation	742
Overpressure rupture of air or gas pipe/pipeline	221	Smoke detector activation, no fire - unintentional	743
Overpressure rupture of boiler from air or gas	222	Detector activation, no fire - unintentional	744
Air or gas rupture of pressure or process vessel	223	Alarm system activation, no fire - unintentional	745
Chemical reaction rupture of process vessel	231	Carbon monoxide detector activation, no CO	746
Explosion (no fire), other	240	Biological hazard, malicious false report	751
Munitions or bomb explosion (no fire)	241		
Blasting agent explosion (no fire)	242	**Other Incident Types**	
Fireworks explosion (no fire)	243	Trapped by power lines	372
Dust explosion, (no fire)	244	Rescue or EMS standby	381
Excessive heat, scorch burns with no ignition	251	Hazardous condition, other	400
		Combustible/flammable gas/liquid condition, other	410
		Gasoline or other flammable liquid spill	411
		Gas leak (natural gas or LPG)	412
		Oil or other combustible liquid spill	413
		Toxic condition, other	420
		Chemical hazard (no spill)	421
		Chemical spill or leak	422
		Refrigeration leak	423

		Carbon monoxide incident	424
		Radioactive condition, other	430
		Radiation leak, radioactive material	431
		Electrical wiring/equipment problem, other	440
		Heat from short circuit (wiring), defective/worn	441
		Overheated motor	442
		Breakdown of light ballast	443
		Power line down	444
		Arcing, shorted electrical equipment	445
		Biological hazard, confirmed or suspected	451
		Accident, potential accident, other	460
		Building or structure weakened or collapsed	461
		Aircraft standby	462
		Vehicle accident, general cleanup	463
		Explosive, bomb removal (for bomb scare, use 721)	471
		Attempted burning, illegal action, other	480
		Attempt to burn	481
		Threat to burn	482
		Service Call, other	500
		Person in distress, other	510
		Lock-out	511
		Ring or jewelry removal	512
		Water problem, other	520
		Water evacuation	521
		Water or steam leak	522
		Smoke or odor removal	531
		Animal problem, other	540
		Animal problem	541
		Animal rescue	542
		Public service assistance, other	550
		Assist police or other governmental agency	551
		Police matter	552
		Public service	553
		Assist invalid	554
		Defective elevator, no occupants	555
		Unauthorized burning	561
		Cover assignment, standby, move up	571
		Good intent call, other	600
		Dispatched & canceled en route	611
		Wrong location	621

		No incident found on arrival at dispatch address	622
		Authorized controlled burning	631
		Prescribed fire	632
		Vicinity alarm (incident in other location)	641
		Steam, other gas mistaken for smoke, other	650
		Smoke scare, odor of smoke	651
		Steam, vapor, fog or dust thought to be smoke	652
		Smoke from barbecue, tar kettle	653
		EMS call, party transported by non-fire agency	661
		Hazmat release investigation with no Hazmat	671
		Biological hazard investigation, none found	672
		Severe weather or natural disaster, other	800
		Earthquake assessment	811
		Flood assessment	812
		Windstorm, tornado/hurricane assessment	813
		Lightning strike (no fire)	814
		Severe weather or natural disaster standby	815
		Special type of incident, other	900
		Citizen complaint	911

Appendix F Community Risk Assessment

The Saint John Fire Master Plan Request for Proposal required the consultant to complete a community risk assessment and a risk level matrix which consider the following profiles:

- Geographic,
- Building stock,
- Critical infrastructure,
- Demographics,
- Hazards,
- Public safety response,
- Community services,
- Economics,
- Past loss and event history.

Worksheets relating to this requirement follow below.

The intent of a fire service risk management profile is usually to assess risk within the scope of legislation relating to fire service delivery; so there is an expected restriction to a fire service community risk assessment. National Fire Protection Association 1300, *Standard on Community Risk Assessment and Community Risk Reduction Plan Development* indicates in Annex A that

> *Risk assessment is the first and most critical step toward identifying and prioritizing a community's risks and targeting populations for action. The CRA is a fact-based study of local risks. The CRA is the first step in developing the CRR Plan. A good assessment will accomplish the following:*
>
> *(1) Identify specific risks affecting a community*
>
> *(2) Locate hidden, hard-to-reach, or underserved populations*
>
> *(3) Identify high-risk occupancies, populations, behaviors, and neighborhoods*
>
> *(4) Build a foundation for the development of goals, objectives, and strategies*
>
> *In the absence of staff and sufficient resources to conduct an in-depth risk assessment, at a minimum an analysis should be conducted of the local data to identify more prevalent incidents.*
>
> *These prevalent incidents would then be ranked on a risk matrix to identify probability and impact. While quantitative data are preferable to anecdotal data, an organization can use an anecdotal risk analysis.*

The worksheets that follow partially fulfill the requirement of being a fact-based study of local risks, but the Community Risk Reduction portion remains to be completed. Further, the full fire master plan report represents a risk-based analysis which goes beyond what is required by a community risk

assessment and can be used as quantifiable information to complete a community risk reduction plan.

The fire department or the municipality can also use quantified information within this report to build a risk level matrix that is partially informed by data – the missing part of the data is, as noted several times with the fire master plan, outcome data.

We continue to be available to assist the city and fire department with the remaining aspects of the community risk assessment and the community risk reduction plan since the full extent of information required, other than outcome information, is contained within this document.

NFPA 1300 Profile 3	Saint John Building Stock Profile Work Sheet							
Data Gathering				Risk				Risk
Occupancy Classification	Description	Occupancy-type Count	Occupancy %	Issues and Concerns	Risk Probability	Risk Consequences	Assigned Risk Level	Risk Treatment
Group A Assembly Occupancies	Example – halls, restaurants, schools, arenas, library's etc.	257	0.9%	potential for lightweight construction (trusses),large occupant loads, occupants unfamiliar with surroundings, noise and impairment could slow exiting	10000	1000	HIGH	
Group B Institutional Occupancies	SJRH is 1M sqft and growing, Regional Correctional Centre, Detention Facility Peel Plaza, Ridgewood, Centrecare, St. Joseph Hospital, Shannex Facility, Loch Lomond Villa	254	0.9%	occupants may need assistance to evacuate, some occupants can be detained, lower staff numbers on night shifts.	10000	1000	HIGH	
Group C Residential Occupancies	Single, semi, row, townhouse	23172	84.1%	truss /lightweight and older construction common, sleeping accommodations, many rentals, student housing	10000	100	HIGH	
	rooming ,boarding lodging, student residence, migrant worker residences	102	0.4%	Truss/lightweight construction possible, typically older building stock, transient population, impairment is common.	10000	100	HIGH	
	Multi-unit 3-6	60	0.2%	Truss/lightweight construction possible size apartment buildings, code compliance often a struggle, fires can displace many occupants.	10000	100	HIGH	

	Multi -unit 7+	14	0.1%	some Truss/lightweight construction used, group includes Highrise buildings, high occupant load, difficult to fight fires, often occupants don't self evacuate, can be either combustible or non combustible construction. Majorty of these high rise buildings do not have sprinklers. **	10000	1000	HIGH	
	Accessory apartment 2 units	3170	11.5%	Truss/lightweight construction possible, many in old building stock, many are illegal units, many have not been constructed under building permit,	10000	100	HIGH	
	Camp Ground: Rockwood Park	4	0.0%	Units close together, smoke alarms/CO alarms often non existent, impairment possible, quick fire spread likely, exposure fires a concern.	100	10	MODERATE	
	Motel, hotel ,lodge, Inn	81	0.3%	Truss/lightweight construction possible, occupants unfamiliar with surroundings, impairment possible, high occupant loads possible, limited night-time supervisory staff.	1000	100	MODERATE	
Group D Business and Personal Service Occupancies	Example – Services Occupancies, Doctors Office, Office Building.	237	0.9%	Truss/lightweight construction possible, high occupant load possible, Highrise possible, visiting occupants unfamiliar with building	10000	100	HIGH	
Group E Mercantile Occupancies	Example – Strip Malls, Shopping Centers, Retail Box Stores.	81	0.3%	Truss/lightweight construction common, high occupant load common, large open floor space common, high combustible content common	10000	1000	HIGH	

Group F Industrial Occupancies	Irving Oil Refinery, Point Lepreau Nuclear Generating Station, Irving Pulp and Paper, Irving Tissue, Irving Paper Mill, Irving Wallboard, Irving Lubricant Plant, East Terminal ship and rail, Nutrien Potash, Moosehead, Enbridge Gas 12" and 36" lines. Industrial Parks East and West. Colson Cove Power Generation, Bayside Power, Strescon Concrete, Ocean Steele, AIM recycling, Crosby Molasses, Lorneville Mechanical, Port Saint John, Canaport LNG, Canaport Bulk	102	0.4%	Truss/lightweight construction common, hazardous process common, large occupant loads common, excessive noise common, large amounts of combustible storage common, many are not sprinklered.	10000	10000	HIGH	
Farm operations		16	0.1%	Mixed farming types and farm buildings including barns, drive sheds, industrial type buildings. Light weight construction common, chemical storage common.	10000	100	HIGH	
Total		**27550**						

2021 Census Information for Saint John

StatCan indicates 33,908 private dwellings defined as a separate set of living quarters with a private entrance either from outside the building or from a common hall, lobby, vestibule or stairway inside the building. The entrance to the dwelling must be one that can be used without passing through the living quarters of some other person or group of persons.

StatCan indicates that there are 31,825 dwellings occupied by usual residents. A private dwelling occupied by usual residents refers to a private dwelling in which a person or a group of persons is permanently residing. Also included are private dwellings whose usual residents are temporarily absent on May 11, 2021.

Other StatCan Information

Household and dwelling characteristics	
Total - Occupied private dwellings by structural type of dwelling - 100% data	31,825
Single-detached house	12,750
Semi-detached house	1,035
Row house	1,930
Apartment or flat in a duplex	3,170
Apartment in a building that has fewer than five storeys	9,955
Apartment in a building that has five or more storeys	2,150
Other single-attached house	115
Movable dwelling: The category 'Movable dwelling' includes mobile homes and other movable dwellings such as houseboats, recreational vehicles and railroad cars	715

Probability Levels		Consequence Levels		Assigned Risk Level
1	Rare	1	Insignificant	Low Risk
10	Unlikely	10	Minor	Moderate Risk
100	Possible	100	Moderate	High risk
1000	Likely	1000	Major	
10000	Almost Certain	10000	Catastrophic	

3 lines of defence	No Action Taken
Yes	No Action Taken

Risk Treatment	3 lines
Avoid the Risk	Pub Ed.
Mitigate the Risk	Insp.
Accept the Risk	Resp.
Transfer the Risk	Pub Ed,Insp.
	Pub Ed,Resp.
	Pub Ed,Insp,Response
	Insp,Response

NFPA 1300 Profile 5	Saint John Community Service Agencies			
Data Gathering			Additional information	Risk Mitigation
Community Service Agency	Assistance Provided	Role at Incident	Issues, concerns, supporting activities	Possible future activities/ Required Action(s)
Service New Brunswick	Response assistance	Provides multiple services for families, individuals, seniors, youth, and children	No response assistance. Social Development is the provincial department that would assist in finding accommodations if evictions or fire at location where clients reside.	
Red Cross	Response assistance, public education	Provide temporary shelter, food for displaced persons. Provide safety and health related public education services	Red Cross assists with persons displaced because of fire or fire related incident. Excellent support.	
Saint John Y Service Club	Response assistance, public education	Assistance with displaced persons	Newcomer education, portal for Fire Prevention education to newcomers.	
Emera/ Liberty Gas	Response Assistance, investigation, inspection	Natural Gas provider	Co-respond to incidents involving a gas main break or to shut off gas at an incident. Concern with location of gas meters at certain locations, SJFD is not consulted with planning for new lines, etc.	
Saint John Energy	Response assistance, inspection	Energy provider	Respond to any incident involving line down, or when need power disconnect. Assist during major wind storms when lines are impacted. Very responsive, good relationship.	
Coast Guard	Response assistance, use of facilities for water access		Coast guard is the primary for tidal waters. Co-respond for most incidents. Communication has improved with NBTMR. Will not do body recovery.	
River Valley Ground Search and Rescue	Response assistance	Support, search and recovery	Provide additional resources and support for missing people or off-road incidents	
Alert Saint John	Marine response	Environmental water clean-up	Clean-up and mitigation of any water incident	
RST		Transportation rail and road mitigation and clean-up	Clean-up and mitigation of any transportation incident	
Salvation Army	Response assistance	Food, rehab, accommodations	Provide emergency shelter, clothing, food truck	
Saint John Transit	Response assistance	temporary shelter and transport	Provide transportation and temporary shelter at incidents.	
Community Centres				
Out of the Cold Shelter	Belyea Arena (Seasonal)			

NFPA 1300 Profile 9	Saint John Critical Infrastructure Profile Work Sheet						
Data Gathering			**Risk**				**Risk Mitigation**
Critical Infrastructure	Description	Locations	Issues and Concerns	Risk Probability	Risk Consequences	Assigned Risk Level	Risk Treatment
Electricity	Saint John Energy distribution system of lines, towers, poles and transformer facilities.	City Wide	A disruption of electrical power generation, transmission or distribution. Specifically a concern during winter months. Elderly particularly more vulnerable, especially those dependent on elevators, dialysis, oxygen.	10000	10	MODERATE	
	NB Power - Transmission, Generation and Distribution	Bayside Power, Causeway line, Colson Cove, PLNGS	NB Power interface. Transmission lines through natural gas corridor	10000	100	HIGH	
Oil and Natural Gas	Diesel Fuel Storage	Irving Oil	Uncontrolled release of oil, natural gas or both. Perhaps environmental damage. Danger to life. Shortage of petroleum products may cause economic disruptions as well as impact to emergency services.				
	Gas Distributor	Irving Oil, Liberty gas					
	Propane Centre	Harbour City, Refinery					
	Propane Filling						
	LNG	Canaport					
	Refinery	Irving Oil					
Water	Water treatment facilities	City of Saint John: Saint John Water.	Water contamination endangering the health and well being of the public. May cause illness, especially amongst those most vulnerable. Hospitals and other critical infrastructure may be impacted. Fire services may not have suppression water.	100	10000	HIGH	
Telecommunications	Bell Aliant, Rogers. East Link and other various cellular towers throughout the town.		Loss of radio, mobile or landline communications. Internet failure. Satellite based networks failure. May disrupt critical infrastructure and emergency services. No contact with 911 with potential loss of life or injuries. Possible security system failures.	10000	100	HIGH	
	Emergency services communications are provided by Saint John Public	Peel Plaza, back-up at 45 Leinster St		1000	100	MODERATE	
	Redundant traditional radio towers are located at several town sites for			10	100	MODERATE	
	Analog phone lines as failback both at						
Health Care	**Hospitals**		Disruption of health care will impact those requiring medical assistance.				
	Saint JohnRegional Hospital	400 University Avenue		10000	100	HIGH	
	CentraCare	416 Bay Street		10	10	LOW	
	St. Joseph's	130 Bayard Drive		1000	100	MODERATE	
	Retirement homes/long term care						
	Carleton Kirk Lodge	2 Carleton Kirk Place 70 beds		1000	100	MODERATE	

	Church of St. John & St. Stephen	130 University Avenue 80 beds	Long-term care facilities have residents that may require additional resources to mobilize	1000	100	MODERATE		
	Ridgewood	422 Bay Street 80 Beds		1000	100	MODERATE		
	Kennebecasis Manor	475 Woodward Avenue 70 beds		1000	100	MODERATE		
	Loch Lomond Villa	185 Loch Lomond Road 190 beds		1000	100	MODERATE		
	Rocmaura	10 Park Street 150 beds		1000	100	MODERATE		
	Tucker Hall	55 Bloom Lane 90 beds		1000	100	MODERATE		
	Turnbull Nursing Home	231 Britain Street 50 beds		1000	100	MODERATE		
Evacuation - Reception Centres	A number of evacuation / reception centres have been identified in the City of Saint John.	6 large community centre options.	**Examples:** May be unavailable for evacuees due to programming. May not be large enough for wide spread evacuations. Staffing issues. Congregate living situation during pandemic. Canadian Red Cross resources may be unavailable due to other impacted municipalities.	10	10	LOW		
Financial Institutions	Bank of Nova Scotia			1000	10	MODERATE		
	Toronto Dominion Bank			1000	10	MODERATE		
	Canadian Imperial Bank of Commerce			1000	10	MODERATE		
	Credit Unions			1000	10	MODERATE		
	Royal Bank of Canada			1000	10	MODERATE		
Wastewater and sewage treatment	Wastewater Sewage Pumping Stations		**Examples:** Disruption of treatment plants may cause environmental issue due to untreated water being returned to river. May cause illness.	1000	100	MODERATE		
Public Safety and Security	**Fire Service**		Temporary closing of emergency services stations or communication centres due to incidents such as fire, water emergencies, or structural deficiencies could force relocation of staff and equipment to backup locations. Staffing considerations can impact availability of resource.	1000	100	MODERATE		Staffing considered
	Police Service							
	911/Police Communication Unit			1000	100	MODERATE		
	Saint John Police			1000	100	MODERATE		
	Paramedic Service							
	Ambulance New Brunswick			1000	100	MODERATE		
	Emerg. Ops. Centre							
Dams	Mactaquac Dam (North of Fredericton)	St. John River	Dam failures could lead to wide spread flooding, possibly leading to fatalities and injuries.	1	10000	MODERATE		
Continuity of Government	Municipal Government Administration	???Scope	IT, Finance, Planning, Building Inspection, City Council, etc.	1	100	LOW		
	Provincial Government		Service NB, not education or health	1	10	LOW		
	Public Works Operation Centre			1				

Transportation	Emergency Maintenance of Municipal or provincial Road Infrastructure Within the City.			1000	1000	HIGH	
	Airport		May lead to widespread disruption to supply chain, emergency services, economy.	1000	100	MODERATE	
	City Transit			1000	10	MODERATE	
	Ferry			1000	1	MODERATE	
	Provincial highways			1000	1000	HIGH	
Town Facilities, Parks							
	Cemetaries		Could lead to burial delays if cemeteries are disrupted.	1	10	LOW	
	Halls, libraries, museums						
	Community Centres			1000	10	MODERATE	
	Libraries			1000	10	MODERATE	
	Museums and Cultural Centres			1000	10	MODERATE	
Non City Owned Facilities:	**Churches**			1	10	LOW	
	Marina			1	10	LOW	
	Educational Facilities			1000	1000	HIGH	
	Child care centres			1000	1000	HIGH	
	Food stores		Food shortage may lead to panic buying. Food	1000	10000	HIGH	

NFPA 1300 Profile 1	Saint John Demographic Profile Work Sheet									
Data Gathering				**Risk**				**Risk Mitigation**		
Ages of Population	# of People	% of Total Population	Identified Demographic Group	Issues and Concerns	Risk Probability	Risk Consequences	Assigned Risk Level	Risk Treatment	Gap Analysis	Implementation Plan
Age 0-14	10,180	14.6%	young children, older children, teens	Dependent on others for their safety, relatively dependant on others for their protection older children, teens may be home while caregivers are working may have limited knowledge of emergency procedures	10000	100	HIGH			
Age 14-64	45,360	64.9%	Young adults, young workers, experienced workers	many first time living on their own, many unaware of safety requirements, some immigrant or new residents, some language barrier issues, some cooking issues, some 911 activation concerns.	10000	100	HIGH			
Age 65 plus	14,355	20.5%	retirees, seniors	many dependent on others for various functions, many are living in their own homes, many are slow to react to emergencies, medical responses common, mobility issues common, cognitive impairment common, frailty, medication dependency, hearing and visual impairment common, oxygen and dialysis dependency possible.	10000	100	HIGH			
Total	69,895									

NFPA 1300 Profile 7	Saint John Economic Profile Work Sheet						
Data Gathering			Risk				Risk
Identify Occupancy	Description	Locations	Key Risk	Risk Probability	Risk Consequences	Assigned Risk Level	Risk Treatment
Manufacturing							
Irving Oil	Refinery	340 Loch Lomond Road Saint John	1067 employees	1000	1000	HIGH	
Irving Paper	Produce Paper	435 Bayside Drive Saint John	50 employees	10000	1000	HIGH	
Irving Tissue	Produce Tissue	486 Mill street Saint John	101-250 employees	10000	1000	HIGH	
Irving pulp and paper	Produce Paper	408 Mill Street Saint John	340 employees	10000	1000	HIGH	
JDI	Office Building	300 Union Street Saint John	125 Employees	100	100	MODERATE	
Healthcare	Hospital	400 University Avenue	567 Employees*** higher	10000	10000	HIGH	
	Long term care and assisted living facility 231 long term care beds		200-500 employees. Large employer in the area. Residents require assistance to evacuate.	10000	1000	HIGH	
Agriculture							
Halifax Seed	Agriculture Supply	664 Rothesay Ave	Large storage of chemicals, fertilizers	10	10	LOW	
Tourism							
Port of Saint John	influx of visitors cruise ships		40 Employees, related businesses	100	1000	MODERATE	
Hotels							
TRANSPORTATION							
FINANCIAL INSTITIUTIONS							
MUNICIPAL OPS							

* Note - Key risk employees may not be accurate

NFPA 1300 Profile 2	Saint John FD Geographic Profile Work Sheet							
Data Gathering			**Risk**				**Risk Mitigation**	
Physical Geographic Features	Description	Locations	Issues and Concerns	Risk Probability	Risk Consequences	Assigned Risk Level	Risk Treatment	
Highways		Runs east to west of the community	multiple lanes of traffic merging, high rate of speed, many incidents, specialized equipment and training required.	10000	100	HIGH		
Railways								
	Canadian Pacific Railway partners		Toxic/Chemical, crude oil, freight through town, access issues, level crossings can impede response. Special training, equipment required.					
	Canadian National Railway	North-easterly to Moncton	Toxic/Chemical freight, crude oil through town, access issues, level	100	100	MODERATE		
	New Brunswick Southern Railway	Southerly to Maine and beyond	Toxic/Chemical freight through town, access issues, level crossings can impede response. Special training, equipment required.	10000	10000	HIGH		
	NBM Railways	Easterly and throughout NB	Toxic/Chemical freight through town, access issues, level crossings can impede response. Special training, equipment required.	10000	10000	HIGH		

OFMEM Mandatory Fire/Life Safety Risk Profiles Template

Major Bridges								
		A number of bridges throughout the City of Saint John under the control of the city or province	multiple lanes of traffic merging, high rate of speed, maintenance and construction activities can impeded response, limits access to areas on opposite side of highway	10000	100	HIGH		
		Structural or safety related issues that could force a bridge to be temporarily closed can cause response delays.		10000	100	HIGH		
Major water features								
Port of Saint John		Eastern edge of City	Open body of water, special equipment and training required for water and ice water rescues. Areas could require multiple rescue techniques/equipment. Some areas not easily accessible.	10000	10	MODERATE		
Saint John River		Runs through city to the port	Open body of water, special equipment and training required for water and ice water rescues. Swift water at times of high water levels area could require multiple rescue techniques/equipment. Some areas not easily accessible.	10000	10	MODERATE		

Reversing falls		Major tourist attraction	major tourist attraction may involve large number of persons, special equipment and training required for water and ice water rescues. areas could require multiple rescue techniques/equipment. Some areas not easily accessible.	10000	100	HIGH		
Major landforms		Partridge Island breakwater, parks, cliffs	Special rescue equipment and training required, accessibility could be a concern.	10000	100	HIGH		
Wildland/urban interface	Large land tracts	watershed east and west, large urban forests	Limited accessibility to many areas makes it difficult to attend and remove injured persons and to suppress wildland fires.	10000	1000	HIGH		

NFPA 1300 Profile 6	Saint John Hazard Profile Work Sheet					
Data Gathering		**Risk**				**Risk Mitigation**
Identified Hazard	Description	Issues and Concerns	Risk Probability	Risk Consequences	Assigned Risk Level	Risk Treatment
Natural Hazards	Avalanche/Landslide	Snow or mud slides could require emergency response including rescue that requires specialized training and equipment.	1	10	LOW	
	Blizzard/Ice Storm	Severe winter storms with low temperatures, high winds and heavy snow could have the potential to slow responses and cause increased medical responses. Frozen vehicles and equipment could become an issue. Ice storms have the potential to slow responses and to cause power grid and communications disruptions.	10000	100	HIGH	
	Biological/Pandemic	Widespread incidence of disease such as SARS and COVID could have an impact on available staff. Medical calls could increase or decrease depending on the chosen protocols.	10000	1000	HIGH	
	Earthquake	Sudden release of stored energy that radiates seismic waves has the potential to damage buildings and infrastructure which could increase responses. Specialty rescue requirements could be required such as heavy rescue requiring advanced training and knowledge. Delayed response is a possibility.	100	100	MODERATE	
	Erosion	The physical process by which shorelines and/or roads are altered due to natural forces such as wind and water could cause delayed responses due to roadways being damaged so they are not useable. Rescue responses could also increase due to erosion effects.	10000	1000	HIGH	
	Flash Flood	A sudden and destructive rush of water caused by heavy rainfall could slow responses and cause special rescue situations such as water rescue.	10000	1000	HIGH	
	Forest Fire	An uncontrolled fire occurring in nature could potentially require specialty equipment needed for wildfire suppression, and specialty training. A large forest fire and increase in medical responses due to air quality and it could also trigger evacuations.	10000	100	HIGH	
	Hurricane/Post Tropical Storm/Tornado	Cyclonic /Extreme high windstorms systems with speeds between 80 km/h and 480 km/h or higher can cause severe damage to infrastructure, cause collapse, water rescue situations, structure fires, slowed response, and increased medical and specialty rescue situations.	10000	1000	HIGH	
	Thunderstorm	A system which produces violent hail, lightning, high winds, flash floods and floods could cause increased responses to fires, specialty rescue scenarios such as water rescue and could cause delays in responses.	10000	10	MODERATE	
	Drought					

	Tidal Surge	An abnormal rise of water generated by a storm, over and above the predicted astronomical tides could cause response delays and increased water rescue incidents.	10000	100	HIGH	
Technological Hazards	Aviation Incident	An accident associated with the operation of an aircraft could cause delayed response due to scene access. Special knowledge, training, and equipment could be required at an aviation incident.	100	10	MODERATE	
	Communication Failure	Widespread breakdown of normal communication capabilities could affect communication abilities of responders causing potential delays in response and safety concerns at emergency scenes.	10000	1000	HIGH	
	Dam Breach -Mactaquac	Spontaneous release of water from a barrier built to hold back the flow of water could cause increased water rescue incidents and it could slow response if the water release affects roadways.	1	10000	MODERATE	
	Engineering	Structural failure could potentially require specialty equipment and training and it could increase medical responses.	10	100	MODERATE	
	Explosion - AIM, Refinery, Natural Gas	A violent and destructive shattering or blowing apart of something as is caused by a bomb could cause an increase in medical responses and will require advanced investigation techniques.	10000	100	HIGH	
	Fuel Shortage	A shortage of combustible materials such as wood .coal gas, oil and propane could have an impact on the operation of equipment should the diesel and gas backup supply become depleted.	1	1000	MODERATE	
	Hazardous Materials	Substances or materials that can adversely affect the safety of the public , handlers or carriers, could cause difficult responses requiring special training, equipment and procedures. It can also increase medical responses and cause evacuations.	10000	1000	HIGH	
	Power Outage	An interruption of normal sources of electrical power could increase medical calls, and increase the likelihood of fires and CO incidents as the public uses non conventional heating and cooking equipment.	10000	100	HIGH	
	Rail Emergency	A rail derailment that can result in substantial loss of life or pose a risk to the environment can cause access concerns, increased medical response and require special training , and equipment during the response.	10000	1000	HIGH	
	Transportation Emergency	Any incident which prevents materials and/or users from reaching their intended destination has the potential to slow responses, and increase rescue and medical incidents.	10000	10	MODERATE	
	Structure Fire	Fires involving buildings or structures within the municipality require adequate firefighter staffing, equipment, and training and fire prevention and public education resources to minimize this risk.	10000	1000	HIGH	
Human-Caused Hazards	Terrorism /CBRN (Chemical, Biological, Radioactive, Nuclear, Explosive)	Chemical ,biological, nuclear, or explosive hazards could require specialty training and equipment. Wide spread evacuations could also result in this type of emergency incident.	100	10000	HIGH	

	Cyber Attack	Any offensive maneuver that targets computer information systems, computer networks, infrastructures, or personal computer devices could have a negative affect on the day to day operations of the fire service and could impact emergency response.	1000	100	MODERATE	
	Mass Gathering	Any public event which gathers more than 500 persons indoors or outdoors could cause an increase in medical responses and could slow responses due to increased traffic and parking concerns.	10000	100	HIGH	

NFPA 1300 Profile 4	Saint John Public Safety Agency Work Sheet			
	Data Gathering		Additional information	Risk Mitigation
Public Safety Response Agency	Types of Incidents /Services Provided	Location	Issues, concerns/supporting activities	Possible future supporting activities/Required Action(s)
Police Services				
Saint John Police Force	Crime Prevention, law enforcement, community assistance, communications, information processing, forensics examinations, school resources, special response, public education	1 Peel Plaza Saint John NB E2L 0E1	PSCC dispatch SJP. Significant recruitment issues at Police, numerous vacancies may impact ability to respond to major incident for scene control.	
Kennebecasis Regional Police		126 Millenium Dr. Quispamsis, NB	SJ PSCC dispatch as well. Link with SJP for major incidents. Neighbouring Police Department, joint initiatives	
RCMP	Grand Bay Detachment	21 Chestnut Dr Grand Bay-Westfield NB E5K 3M1	Police neighbouring communities.	
	Hampton Detachment	530 Main St P.O. Box 5220 Hampton NB E5N 6C3	Police neighbouring communities.	
Paramedic Services				
Ambulance New Brunswick	Primary and advanced care paramedic services, public education	140 City Road	Provincial Dispatch to all medical calls. No direct interlink with Saint John PSCC. No current communication between Fire and Ambulance NB. No shared channel on TMR.	
Fire Services				
KV Fire Department	Career Fire Department	12 Civic Drive, Quispamsis, NB	Mutual aid for tankers. Ongoing discussion on regional cooperation and training.	
Simonds Fire Department	Volunteer Department.	184 Range Rd. Saint John NB	The Simonds Station is physically located in Saint John city limits. Through mutual aid we respond to everything east of Black River Rd. due to routing limitations.	
Grand-Bay Westfield Fire Department	Composite Department	615 River Valley Drive, Grand-Bay Westfield, NB	Mutual aid for tankers. Ongoing discussion on regional cooperation and training.	
Musquash Fire Department	Volunteer Department. 2 Stations	35 Malcom Meehan Rd., Musquash, NB	PLNGS co-response	
Long Reach Fire Department	Volunteer Department.	3564 Route 845, Long Reach, NB	Mutual aid for tankers and water response.	
Hampton Fire Department	Composite Department	845 Main Street, Hampton, NB	Mutual aid.	
NB Office of the Fire Marshal				

NFPA 1300 Summary Worksheet	Saint John Top Risks/Issues/Concerns /Preferred Treatments						
				3 Lines of Defence consideration			No Action
Mandatory Profiles	Top Risks	Issues or Concerns	Risk Treatment Options	Public Fire Safety Education	Fire Code Inspections and Enforcement	Emergency Response	
1. Demographic Profile							
2. Geographic Profile							
3. Building Stock Profile							
4. Public Safety Response Profile							

6. Hazard Profile	Pandemic	Diseases that impact humans such as SARS and COVID could have an impact on the available staffing should the disease becomes active in the firehalls. Medical calls could increase or decrease depending on the chosen protocalls.	Accept the Risk				
	Network system Failure/Cyber Attack	Widespread breakdown of normal communication capabilities could affect communication abilities of responders causing potential delays in response and safety concerns at emergency scenes.The major disruption of communications and the loss of data could have a substantial impact on fire operations.	Transfer the Risk				
	Blizzard/Ice Storm	Severe winter storms with low temperatures, high winds and heavy snow could have the potential to slow responses and cause increased medical responses.Ice storms have the potential to slow responses and to cause power grid disruptions.	Accept the Risk				
	Hazardous Materials Response	Substances or materials that can adversely affect the safety of the public , handlers or carriers, could cause difficult responses requiring special training, equipment and procedures. It can also increase medical responses and cause evacuations.	Accept the Risk				
	Fire and explosion	Fires involving buildings or structures within the municipality require adequate firefighter staffing, equipment, and training and fire prevention and public education resources to minimize this risk.	Mitigate the Risk				

5. Community Service Profile							
7. Economic Profile							
8. Past Loss Profile							
9. Critical Infrastructure Profile							

[a] Emergency Vehicle Accident Tables; 2010-2019 National Safety Council
[b] Interventions and controls to prevent emergency service vehicle incidents: A mixed methods review; David P. Bui, Samantha Balland, Casey Giblin, Alesia M. Jung, Sandy Kramer, Abigail Peng, Marie Corazon Ponce Aquino, Stephanie Griffin, Dustin D. French, Keshia Pollack Porter, Steve Crothers, Jefferey L. Burgess; Accident Analysis and Prevention
[c] Preventing Emergency Vehicle Crashes: Status and Challenges of Human Factors Issues; Hongwei Hsiao, National Institute for Occupational Safety and Health, Morgantown, West Virginia, Joonho Chang, Dongguk University, Seoul, South Korea, and Peter Simeonov, National Institute for Occupational Safety and Health, Morgantown, West Virginia; HUMAN FACTORS Vol. 60, No. 7, November 2018, pp. 1048–1072
[d] Improving Out-of-Hospital Cardiac Arrest Survival Rates—Optimization Given Constraints; Kevin G. Volpp, MD, PhD; Benjamin S. Abella, MD, MPhil; Journal of the American Medical Association – Cardiology.
[e] Relationship Between Emergency Medical Services Response Time and Bystander Intervention in Patients with Out-of-Hospital Cardiac Arrest; Yoshikazu Goto, MD, PhD; Akira Funada, MD, PhD; Yumiko Goto, MD, PhD; American Heart Association.
[f] Evidence-Based Optimization of Urban Firefighter First Response to Emergency Medical Services 9-1-1 Incidents; Alan M. Craig, MScPl; P. Richard Verbeek, MD; Brian Schwartz, MD; Prehospital Emergency Care.
[g] The Influence of Sociodemographic Factors on the Theoretical Effectiveness of Fire Prevention Interventions on Fatal Residential Fires; Marcus Runefors, Division of Fire Safety Engineering, Lund University, Lund, Sweden Finn Nilson, Department of Political, Historical, Religious and Cultural Studies, Karlstad University, Karlstad, Sweden and Centre for Societal Risk Research, Karlstad University, Karlstad, Sweden; Fire Technology, 57, 2433–2450, 2021.
[h] Do home fire and safety checks by on-duty firefighters decrease the number of fires? Quasi-experimental evidence from Southern Sweden; Björn Sund, Carl Bonander, Niklas Jakobsson, Henrik Jaldell; Journal of Safety Research.
[i] Comparison of causes, characteristics and consequences of residential fires in social and non-social housing dwellings in New South Wales, Australia. Nargess Ghassempoure, W. Kathy Tannous, Kingsley E. Agho, Gulay Avsar, Lara A. Harvey, Translational Health Research Institute, Western Sydney University, Campbelltown, NSW 2560, Australia, School of Health Sciences, Western Sydney University, Penrith, NSW 2751, Australia, Fall, Balance and Injury Research Centre, Neuroscience Research Australia, Randwick, NSW 2031, Australia, School of Population Health, University of New South Wales, Kensington, NSW 2033, Australia, School of Business, Western Sydney University, Parramatta, NSW 2150, Australia, Rozetta Institute, The Rocks, NSW 2000, Australia; Preventative Medicine Reports.
[j] Influence of advanced life support response time on out-of-hospital cardiac arrest patient outcomes in Taipei; Hsuan-An ChenID, Shuo-Ting HsuID, Ming-Ju Hsieh, Shyh-Shyong Sim, Sheng-En Chu, Wen-Shuo Yang, Yu-Chun Chien, Yao-Cheng Wang, Bin-Chou Lee, Edward Pei-Chuan Huang, Hao-Yang Lin, Matthew Huei-Ming Ma, Wen-Chu Chiang, Jen-Tang Sun; PLOS One.
[k] Beware a Culture of Busyness; Organizations must stop conflating activity with achievement; Adam Waytz, March – April Issue, Harvard Business Review
[l] Response Times: Myths, Measurement and Management; Jay Fitch PhD; Journal of Emergency Medical Services.
[m] Necessity of Fire Department Response to the Scene of Motor Vehicle Crashes; Deborah L. Funk, MD, NREMT-P, Jonathan F. Politis, BA, NREMT-P, Mara Earlean, MD, And Edward T. Dickinson, Md, NREMT-P
[n] Can emergency medical dispatch systems safely reduce first-responder call volume? Prehosp Emergency Care, David C Cone, Nicholas Galante, Donald S MacMillan
[o] Predicting the Need for Extrication in Traffic Accidents Reported to 911: Is Anyone Pinned/Trapped?

Chris Davis, EMD-I; Paige Dodson, MD, MPH, FAAFP; Chad Pore, MS, Paramedic; Sirilakshmi Sangaraju, MS; Meghan Broadbent, MS; Greg Scott, MBA, EMD-Q-I; Isabel Gardett, PhD; Christopher Olola, PhD

[p] Defective Designs in Airbag Technology; From the Forum: University of Tennessee Legal Journal; 2015

[q] A late and failure of airbag deployment case study for drivers of passenger cars in rear-end collisions. George-Radu Toganel and Adrian Ovidiu Soica 2017 IOP Conf. Ser.: Mater. Sci. Eng. 252 012020

[r] OSHA Hazard Information Bulletins Automobile Air Bag Safety; Safety Hazard Information Bulletin on Automobile Air Bag Safety; August 30, 1990

[s] U.S. Fire Administration Emergency Vehicle Safety Initiative; Interagency Agreement No. 2009-DE-R-103 and awarded by the National Institute of Justice (NIJ), Office of Justice Programs (OJP), U.S. Department of Justice (DOJ) to the U.S. Fire Administration (USFA).

[t] Causes and Prevention Measures of Secondary Rear-end Accidents in the Rescue of Highway Traffic Accidents; YU Qing-yuan; Kunming Fire Service Training School, Kunming 650208, China; Procedia Engineering.

[u] Reduced frequency and severity of residential fires following delivery of fire prevention education by on-duty fire fighters: Cluster randomised controlled study; Joseph Clare, Len Garis, Darryl Plecas, Charles Jennings; Journal of Safety Research.

[v] Contrary to profit-making organizations, the objective of public sector organizations is to provide accessible and qualitative services, to satisfy public needs and to use available resources effectively and efficiently. The "main objective of public sector organizations is to satisfy public interests through activity beneficial to society". … it is not possible for any organization to act effectively without having its performance measured.

The Aspects of Performance Measurement in Public Sector Organization; Procedia - Social and Behavioral Sciences 213 (2015) 314 – 320; Ingrida Balaboniene, Giedre Vecerskiene; Kaunas University of Technology, Lithuania

[w] Barriers and Facilitators for Implementation of Individualized Fire Safety (IFS) in Sweden; Johanna Gustavsson, corresponding author Gunilla Carlsson, and Margaret S. McNamee; Fire Technol. 2021; 57(5): 2707–2736. Published online 2021 May 26. doi: 10.1007/s10694-021-01138-6

[x] Swedish Vision Zero policies for safety – A comparative policy content analysis; Ann-Catrin Kristianssen a b, Ragnar Andersson a, Matts-Åke Belin c d, Per Nilsen; Safety Science Volume 103, March 2018, Pages 260-269.