Prince George Fire Rescue
Standards of Cover

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Executive Summary

The City of Prince George Fire Rescue Department (the “Department” or “PGFR”) is undertaking a review of its responses to incidents of all types within its current mandate to determine the level of service being provided. One goal is to determine whether the current standard of service is appropriate and if not, how it might be adjusted. The Department is also addressing a potential downgrade of its rating by the Fire Underwriters that could negatively affect insurance rates for commercial/industrial properties.

The Department is guided by external standards provided by the National Fire Protection Association (the “NFPA”) which propose a defined number of trained fire fighters to be able to arrive at a structure fire within eight minutes within the 90th percentile. This staffing/deployment requirement relates to the speed of fire propagation and for a 2,000 square foot home is set at 14 fire fighters including officers. The NFPA standards also outline time requirements to complete the dispatch process and for fire fighters to ‘turnout’ from the fire hall in addition to traveling to the scene.

At present the Department is not able to provide the 14 prescribed fire fighters within eight minutes; for the past three years they have not been able to achieve this a single time. This is for a couple of reasons, the most significant being that the majority of structure fires occur in the central part of the city which is responded primarily from Hall 1 and Hall 2. The total staffing from these two fire halls is eleven and requires the four staff from one of the fire halls to the north (Hall 4) or the west (Hall 3) to achieve the staffing and given travel times this has not been possible. For that reason, it is recommended that the Department fully staff another unit, probably at Hall 1 to provide the minimum staffing for structure fire responses.

The incident volume handled from Hall 1 is 52% of the entire call volume for the Department and this is coupled with the location for this fire hall away from the center of its response district. As well the fire hall no longer meets the needs of the Department and will require rebuilding. Because of its location on a small piece of property and the need to make it more central to its responses, it is recommended that it be relocated to the south of its current location.

In their report, the Fire Underwriters (the “FUS”) identified a concern with a response time deficit in the industrial area south of Hall 1 and relocation of this fire hall should provide some relief in addressing the issue. The FUS report also provides some guidance in terms of how the rating for the Department could be improved.

Fire departments in British Columbia are also required to meet a service mandate outlined in the Playbook[1]. This requires the local authority to define the level of service which for Prince George will be 'full service'. The requirements of the Playbook and the service levels are discussed in detail in the report and complying with these will require a number of actions by the Department, one of which will be to develop and utilize an enhanced training site. At present the Department has a training area at Hall 2 but it is recommended that the training site be expanded to provide all required class room space and training props as well as a live burn facility.

One option would be to construct a new, more complete, fully compliant training center in the industrial property south of Hall 1. This should allow for all of the activities including live fire training to be held; in addition, given that it would be utilized on a daily basis it would further enhance response in the industrial area.

The Department has also reviewed its ability to provide fire inspections and is considering a number of strategies including having on-duty crews conduct a number of these. Other options include development of a variable inspection frequency based on risk.

Background

The Community

The City of Prince George (the "City") is northern British Columbia's largest city, with a population of over 73,000 (2014).[2] In addition the City is a service and commercial hub for a rural population of approximately 88,043. The population is anticipated to increase to between 78,900 and 90,200 by 2025[3]. The City lies at the meeting point of the Nechako and Fraser Rivers and at the crossroads of Highway #97 and Highway #16.

The Department was established in 1914 and operates as a career fire department. The Department provides fire suppression, emergency medical services and special response services to an area approximately 318 square kilometers within the City limits.

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[1] On 14 October 2014, the Office of the Fire Commissioner (the "OFC") issued a new training standard applicable to the training of fire services personnel in the province. This new standard, entitled: *British Columbia Fire Service Minimum Training Standards: Structure Firefighters – Competency and Training Playbook* (September 2014) (the "Playbook"), was issued pursuant to and approved by the Minister of Justice under paragraph 3(3)(b) of the *Fire Services Act* (B.C.). The Playbook replaces the previous minister's order on training and is binding on all "fire services personnel" in the province

[2] BC Stats, Population Estimates, "Highlights and Summary Table (2014)" at p. 5 of 8; available at: http://www.bcstats.gov.bc.ca/StatisticsBySubject/Demography/PopulationEstimates.aspx (accessed on 10 October 2015).

[3] Official Community Plan, page 13.

The fire and emergency protection area consists of high density urban city core, large expanses of mixed suburban and commercial development, and a large industrial area which includes several pulp mills, chemical manufacturers and a petroleum refinery. Major rail lines and transport corridors run through the City, and a major rail yard lies directly adjacent to the urban city core. In addition, the City has a significant urban interface wildfire risk.

The building stock within the urban city core is largely pre-1970's construction, before there were requirements to use modern, fire resistant construction methods or sprinkler systems. The City's suburban and commercial development consists of a mixture of pre-1970's building stock and more modern construction. A detailed assessment of the fire risks is discussed later in this report. Overall the City has a very unique industrial risk profile compared to cities of a similar size.

The Purpose

In 2014 the Department undertook a Standards of Coverage Review. This comprehensive review addresses the following matters:

- the level of service the Department has provided in the past;
- the nature of the environment in which the Department delivers service;
- the levels of risk that exist within the community (life and property);
- the anticipated development and evolution of the community over the next 10 – 20 years;
- the level of service that is expected of the Department now and into the future;
- the resources (including facilities, apparatus and personnel) needed to deliver this desired level of service safely and effectively;
- how the Department's resources should be deployed to improve or provide the expected level of service; and
- how resources available to the Department will need to change in the future in order to maintain the expected levels of service.

A considerable portion of the initial work involved in a Standards of Coverage Review entails a detailed analysis of what has happened in the past as it relates to the emergency services provided by the Department. While not absolute the following is a list of example material that has been reviewed during the course of this review: incident volumes and types, response time statistics, apparatus types, fire hall locations, fire prevention activities including inspections and pre-planning, training programs and record keeping, dispatching procedures and communications. The purpose of conducting a historic review of the Department's past performance is to provide a baseline for measuring improvement or changes into the future.

After completion of the historic review, the process of determining the current and future level of service in the fire protect area begins. This involves a thorough risk assessment of the community, a review for planned expansion or anticipated changes in use, an assessment of the level of service required to meet current and anticipated future needs, and an analysis of the resources required to provide that level of service.

The service level objectives, recommendations and standards of coverage outlined within this report have been developed in accordance with these practices. In short – the historical achieved outcomes have been compared to the future anticipated outcomes (Standards of Coverage) and provide the measurable goals and objectives for the future.

Benchmarking

The benchmark departments used were Kamloops, Nanaimo. These cities were chosen for their similarity to Prince George in terms of population as well as their industrial risks. Also, due to their locations, neither department benefits from having mutual aid partners adjacent.

Kamloops and Nanaimo are composite departments with a career staff supplemented by paid-on-call staff. Prince George does not utilize volunteer/paid-on-call staff. A summary of the benchmark information is shown in Table 1.

Benchmark Item	Kamloops	Nanaimo	Prince George
Population	88,084	83,810	72,000
Fire loss 2010	$4,017,530	$4,186,426	$11,715,750
Fire loss 2011	$2,649,392	$3,410,814	$84,808,670
Fire loss 2012	$9,901,250	$1,704,500	$85,719,472
Fire loss 2013	$1,184,835	$2,687,256	$6,341,296
Fire loss 2014	$3,304,430	$2,822,515	$3,469,200
Total Losses	$21,057,437	$14,811,511	$192,054,388
Loss per Capita	**$239.06**	**$176.73**	**$2,667.42**
Engine staffing	Crew of 4[4]	Crew of 4	Crew of 4
Ladder staffing	Crew of 4		Crew of 4[5]
Total Incidents	7,529	7,067	6,075

[4] Exception is one Engine that responds with a crew of 2.

[5] Note that the Ladder is cross staffed with an Engine, thus it is either the Engine or the Ladder that responds from Hall 2.

Benchmark Item	Kamloops	Nanaimo	Prince George
Incidents/10,000 persons	**855**	**843**	**844**
2014 City budget	$189,900,000	$150,567,685	$156,833,535
Fire Department budget	$17,427,136	$17,622,051	$15,812,309
Fire Department/capita	**$197.85**	**$210.26**	**$219.62**
Number of Fire Halls[6]	7	5	4
Fire Underwriter Rated	2013	1991	2014
DPG (Residential)	N/A	1	1
PFPC (Commercial)	N/A	4	5

Table 1

From Table 1 it can be seen that in terms of responses per population that the Department responds to the median. Unit staffing levels are at, or very near to the benchmark of a minimum of four per engine or ladder. The per capita budget for the Department is only slightly higher than the two benchmark departments; the budget for the City is higher than Nanaimo but lower than Kamloops.

In fire losses for the most recent four years, the Department is significantly higher than either Kamloops or Nanaimo even discounting the major fires in 2011 and 2012.

The survey also provided data in terms of high risk properties and these are summarized in Table 2 and from this it can be shown that the Department has a similar or higher number of risk properties compared to the benchmarks.

Risk Properties	Kamloops	Nanaimo	Prince George
High-rise structures	20	4	13
Pulp mills	1	0	3
Saw mills	1	0	2
Refineries	0	0	1
Hospitals	1	1	2
Other care facilities	12	8	30
Freeways	1	1	1
Interface risk	Yes	Yes	Yes

Table 2

[6] Including paid-on-call in Kamloops and Nanaimo.

OFC Fire Loss Data

The Office of the Fire Commissioner (the "OFC") publishes an annual report which may provide some comparisons in terms of fire losses. The data published is available on the OFC website and it is for the years 2004 to 2012 inclusive. The average per capita loss over this period is shown in Figure 1.

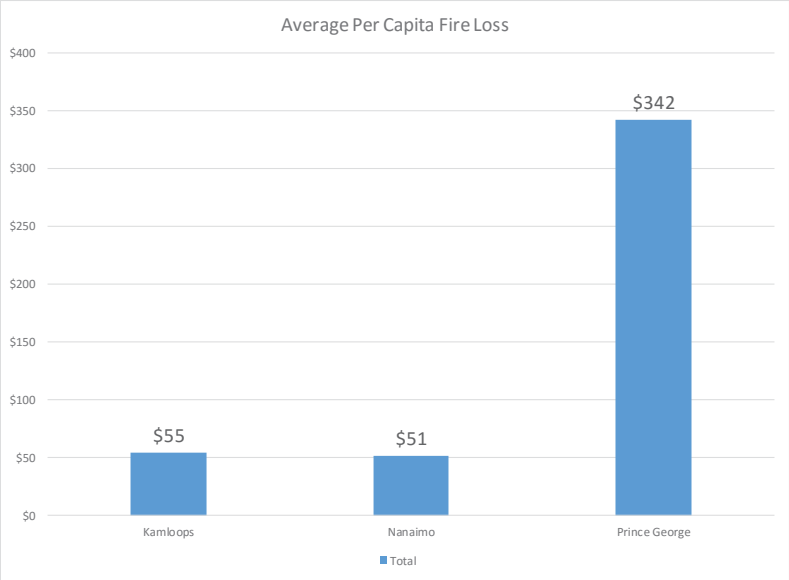

Figure 1: OFC Statistics for Fire Losses 2004 to 2012

Some caution should be used when reviewing this data as there is not necessarily full compliance with fire departments reporting fire losses. However, for the period noted each of the fire departments had reported fire losses for a total of nine years. On the basis of the OFC data it is clear that the average per capita fire loss for the Department is significantly higher than for the benchmark departments. This is consistent with the loss data in Table 1 which is for a much shorter period of time.

Mandate

The Department has been continued under and operates pursuant to *Bylaw No. 8272, 2013.* Bylaw No. 8272 is the fundamental constitutional document which underpins the Department's establishment and defines its operational mandate and administrative processes. As a starting point, it needs to be recognized that fire departments are an optional service provided by local government.[7] Unlike police and ambulance, which are established under and/or operate pursuant to provincial statutes and have a uniform range of powers across the province, a fire department only has the power and authority granted to it under the local bylaw which creates and defines its operations.

[7] The only exception to this is the City of Vancouver, which is required to maintain a fire department pursuant to the terms of the *Vancouver Charter* (B.C.).

Outside of its operating jurisdiction – which, in the case of a municipal department, typically is the boundaries of the municipality[8] – a fire department has no specific authority to act at or to respond to an incident. Care must be taken, therefore, to ensure that the Department has the full range of powers needed to respond effectively to incidents within its jurisdiction; where it is responding outside of its ordinary jurisdiction, express consideration should be given to the source of the Department's powers to respond and operate – whether in a mutual or automatic aid agreement, under a fire service contract or in support of another emergency response agency, such as Wildfire Management Branch or BC Ambulance Service.

Similarly, there is no standard range of services defined for a fire department. A department is authorized to provide only those services which are stipulated in its bylaw. Given that fire departments are the only "all hazards" response agency available to local government, we recommend that both the grant of powers and authorization to respond to incidents be very broadly cast, but that their exercise be made subject to training and the availability of necessary personnel and equipment.[9]

- The Department is currently undertaking a review of its establishment and operational bylaw and the Consultants have provided suggestions for additions and amendments accordingly. Detailed written comments were provided separately to the Department and, given that the bylaw is now being revised, will not be reproduced here.

Historical Risk Assessment

Occupational Health and Safety Program

Formal occupational health and safety programs are a requirement under the *Workers Compensation Act* (B.C.) (the "WCA") and the *Occupational Health and Safety Regulation* (B.C. Reg. 295/97, as amended) (the "Regulations"). The Department has an effective program in place and is operating a joint health and safety committee that meets the substantive requirements of the WCA and Regulations. Some minor issues were noted with the language in the health and safety program, and from the review conducted with the Department, recommendations were made to cross-reference more effectively between the program, the relevant statutory provisions and any implementing

[8] For a fire department established by a municipality, the operational boundaries are those defined in the bylaw as the boundaries of the municipality. In the case of the Department, it is the boundaries of the City of Prince George.

[9] There may also be a need for additional authorizations to provide some services – for example, first medical response services requires appropriate training and certification and an agreement with the Emergency Health Services Commission.

operational guidelines. The only real deficiency noted was that a formal annual review of the program is not conducted and recorded.

Overall, management and the union have clearly taken their occupational health and safety obligations seriously and should be commended for their attention to this critical area of fire department operations.

Civilian Death and Injury

The number of civilian deaths and injuries were reviewed from 2008 to the end of 2013 and are summarized in Table 3.

Year	Injuries	Deaths
2008	3	3
2009	0	0
2010	0	1
2011	7	3
2012	40	3
2013	37	2
Total	**87**	**12**
Average	**14.5**	**2**
Median	**5**	**2.5**

Table 3: Civilian Death and Injuries 2008 – 2013

The average number of fire related injuries per year is 14.5; the average number of fatalities is two. This type of data is quite variable, and the six-year period for which statistics were available is insufficient to draw strong conclusions. The number of injuries and deaths is normally quite low; however, several major fires in 2012 and 2013 skewed the data as shown in Figure 2. What this does demonstrate, however, is the City has a number of very high risk undertakings operating within its boundaries: the Department has to be in a position to manage those risks, in addition to the more typical residential dwelling or commercial operation. As will be discussed, this makes the Department's fire prevention efforts critical to reducing the overall risk faced by the City; it also means that it is essential the Department have in place effective pre-incident planning for all such industrial operations.

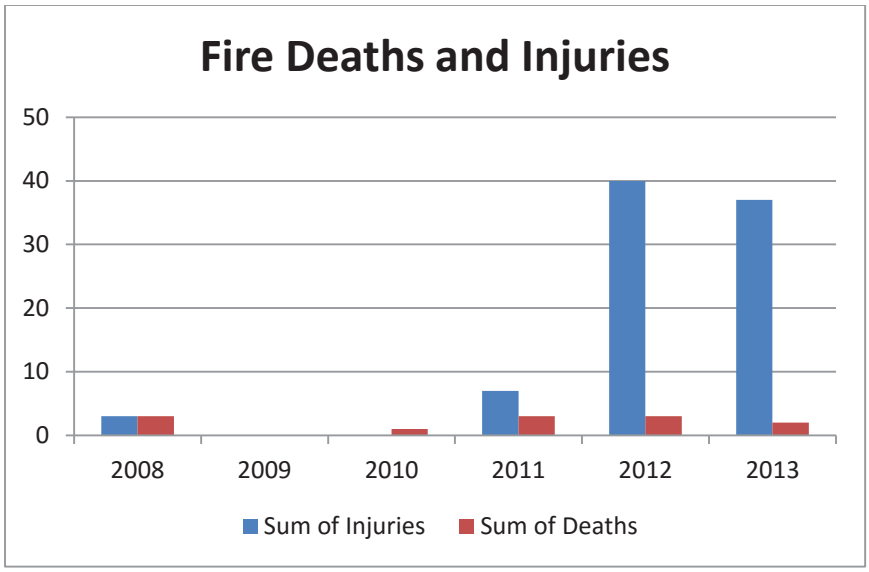

Figure 2: Fire Deaths and Injuries

Property Loss Statistics

The amount of property lost to fires is significant, and is shown in Table 4.

Year	Sum of $ Loss
2008	$110,855,295
2009	$2,168,886
2010	$2,461,364
2011	$5,664,540
2012	$85,606,070
2013	$9,639,955
2014	$9,797,435
Total	**$226,193,545**
Average	**$32,313,364**

Table 4: Fire Losses 2008 – 2014

These losses are very significant in terms of what might be seen in other departments of similar size. In five of the seven years in the period studied, losses were between $2.1 and $9.7 million; in the other two years they ranged between $85.8 and $118.8 million. By comparison, the District of North Vancouver has a reasonably comparable population and their average annual losses over this period were $2.9 million compared to the average loss of $32.3 million in Prince George.

As with the civilian death and injury statistics previously noted, the property loss statistics include two years of extremely high losses which create a high annual average over the seven-year sample period. However, it also serves to highlight both the values

at risk which the Department is responsible for protecting, and the fact that the City has operating within its boundaries a number of industrial and commercial concerns which pose significant challenges from a fire protection perspective.

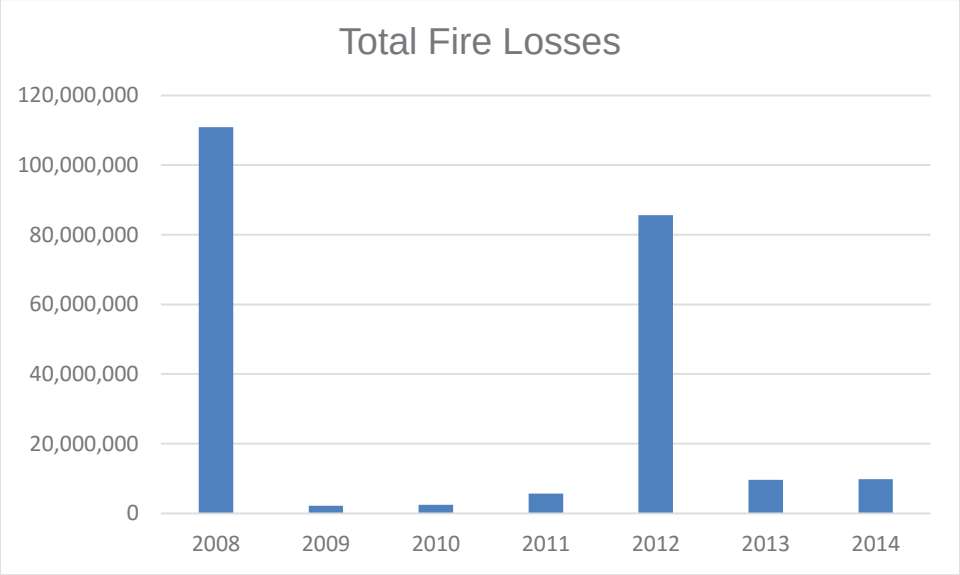

Figure 3: Total Fire Losses

Current Risk Assessment

Hazard, Risk and Vulnerability Analysis

The level of risk in Prince George was analyzed using the risk assessment model proposed by Emergency Management BC ("EMBC"). The model is called the Hazard, Risk and Vulnerability Analysis (the "HRVA")[10] and was reviewed with the Steering Committee. The complete analysis can be found at Appendix 4.

The analysis includes the development of a community profile as well as an assessment of business and industry, critical lifelines, and partnerships.

The HRVA tool kit provides a standard list of hazards and allows for additional ones to be identified. The analysis indicates the following risks need to be managed within the City. For many of these risks, the Department will be the principal emergency response agency; for others, it will be providing support to other emergency agencies. From an overall risk management perspective, it means that the Department's training of its members and officers needs to be comprehensive and well-designed. It also is essential that the Department have strong and well developed working relationships with other

[10] http://www.embc.gov.bc.ca/em/hrva/toolkit.html

emergency response agencies, including the RCMP, BC Ambulance, Ministry of the Environment and Ministry of Transportation and Infrastructure (among others). The risks identified include the following:

- Air crashes
- Dam failures, not local but upstream
- Diseases (human and animal)
- Forest fires
- Gas explosions and gas leaks
- Hazardous material accidents ("Hazmat")
- Heat waves
- Ice storms and ice fogs
- Interface fires
- Landslides, cut banks,
- Lightning
- Local flooding
- Marine accidents
- Motor vehicle accidents
- Power outages
- Rail accidents
- Rain storms
- Riots, unlikely
- Snow melt river flooding
- Snow storms
- Structural collapse
- Technological failure (computer hardware and software), including specifically for the Department in Hall 1
- Terrorism, oil refinery
- An industrial incident, mill explosion and fire, oil refinery fire or accident
- Urban fires

In terms of risk assessment, the following types of incidents were determined to be a high risk with some occurring more frequently.

- High Risk, more frequent occurrence
    - Forest fire/interface fire
    - Rail
    - Hazmat
    - Flooding, ice jam or freshet,
    - Urban fires
    - Industrial incidents
    - Major power failure/freezing rain
    - Gas explosion/leak
- High Risk, lower occurrence
    - Air crash
    - Dam failure
    - Loss of water supply
    - Major MVI, commercial trucks[11]
    - Disease, Pandemic

[11] It is noted that the Department is not registered with EMBC for road rescue.

In terms of vulnerability, the various risks were evaluated and identified the following.

Risks which threaten physical damage to infrastructure, public and private buildings, and the environment include the following:

- Forest fire: significant impact on staff and equipment; may lose highway access, may lose utilities, may lose power to pumping stations, may lose radio transmission sites like Pilot Mountain; may cause widespread damage, including to communities on the City's periphery
- Major power loss: lack of standby power with the exception of Hall 1; short term loss of power for air bottle filling, etc., may lose power to pumping stations, note the backup FOCC at Hall 2 does not have standby power
- Rail accident/fire: significant impact on staff and equipment + supplies like foam, significant impact on the economy; potential environmental damage; potential widespread damage to buildings
- Major flooding: significant impact on staffing, impact on the economy; potential for widespread damage, evacuation; can result in material property losses
- Industrial/HAZMAT incidents: may result in major evacuations of the downtown or other areas, impact on the economy, staffing
- Loss of communication (Telephone/Internet/Data): this would result from the loss of above ground or buried wiring/fibre due to fire, flood or landslides

Social impacts on individuals, families, children, community organizations and society as a whole:

- Short term and long term health issues including for firefighters
- Loss of jobs, family support
- Stress, including for fire fighters and other responders

Health issues

- Ongoing assessment, and is variable based on the nature of the disaster

Economic losses

- Job losses
- Loss of revenue not just from the direct loss, but indirect from companies that support them; loss of tax revenue to the City
- Cost to replace public infrastructure
- Economic impact if businesses choose not to rebuild

What is the likely impact of hazards on your community or agency?

- Ongoing assessment, and is variable based on the nature of the disaster

Following the vulnerability assessment, the level of mitigation was reviewed noting those items which are complete and which require further action.

Complete

- Wildfire mitigation: clearing underbrush and dead trees
- Flooding: raised the berm on River Road
- Resurrected PG IMAC
- Fire Chief is Deputy Director of the EOC
- EMR program – higher level of training provides for improved support by the Department of BC Ambulance service, ensuring better city-wide coverage medical first response services in the event of a major incident

Recommended

- Continuous review of emergency planning
- Back-up power generators for all fire halls
- Dedicated emergency program coordinator
- Revise and update the emergency response plan and regular practicing of same
- Development of clear evacuation routes based on likely threats or risks
- Improved community education for disaster planning
- Reinforce the emergency operations centre in the City by conducting regular activations/exercises
- Should have regular activations of the EOC to ensure procedures are well understood
- Acquisition of apparatus for interface fires, such as structure protection units
- Specialized training for major mitigation such as interface fires, Hazmat incidents, rail incidents, major industrial
- Regular exercises to test the planning at a local/tactical level, to enhance inter-agency responses and improve coordination with industry
- Acquire some apparatus and units with off-road capability
- Develop a community refuge and/or educate the community about “shelter in place”

The final step was to review the level of preparedness for the City and this analysis is found in detail in Appendix 4. Key issues for the Department and the City include:

- Clarifying and understanding all of the risks; assessing and prioritizing resources based on level of risk and anticipated frequency
- Conduct training and exercises
- Engage with identified partners (including industry)
- Develop common radio talk groups for all emergency response services
- Develop an evacuation plan and escape routes
- Develop an emergency operations plan for members of the Department
- Identify alternate sources for equipment and material not currently under the direct control of the Department
- Develop an integrated media plan for the City

RHAVE

The Response Analysis section of this report discusses 'actual' responses, based on the current information from the dispatch system. It could reasonably be inferred from that data that the area with the highest occurrence of structure fires, would probably also have the largest number of buildings subject to fires. However, in terms of future planning, the fire service cannot only examine what has already happened, but must also consider and plan for what might occur. One way in which this is done is by conducting an analysis of all of the principal risks within the City.

The risk analysis that was undertaken by the Department utilizing a software application called RHAVE.[12] This application is produced by the U.S. Fire Administration and is provided for the fire service in North America. It enables departments to survey their response areas and to assign relative risk values to individual buildings or structures as an aid to response planning.

The process requires a significant amount of field data to be gathered in a prescribed format and then entered into the software application which in turn develops a risk value. The review was conducted by Department staff with assistance from the Consultants. The requirements for data gathering were carefully reviewed and once staff was comfortable with the process, they continued and evaluated 169 representative properties.[13] The data was reviewed and then entered into the software application and relative risk values developed.

The risk evaluation process is complex and the weightings are focused on the type of construction, water supply, the presence of sprinklers, an evaluation of the residents (i.e., whether the residents are an at risk population), whether the property has good access, whether it has a fire alarm, whether it undergoes regular inspections, etc. In general terms the majority of properties assessed fell within the moderate range (53.8%) and a summary of the four types of risk levels present are shown in Table 5.

Risk	Count	Percentage
Low	0	0%
Moderate	91	53.8%
Significant	75	44.4%
Maximum	3	1.8%

Table 5: RHAVE categories by count and percentage

[12] Risk, Hazard and Value Evaluation

[13] This software application will stay with Department staff which may continue to evaluate additional properties and may also use this to evaluate new development proposal as an additional planning tool.

The following three figures display spatially the Moderate, Significant and Maximum risks identified through the RHAVE analysis. Also shown on the figures are fire hall locations and the existing response boundaries from each hall.

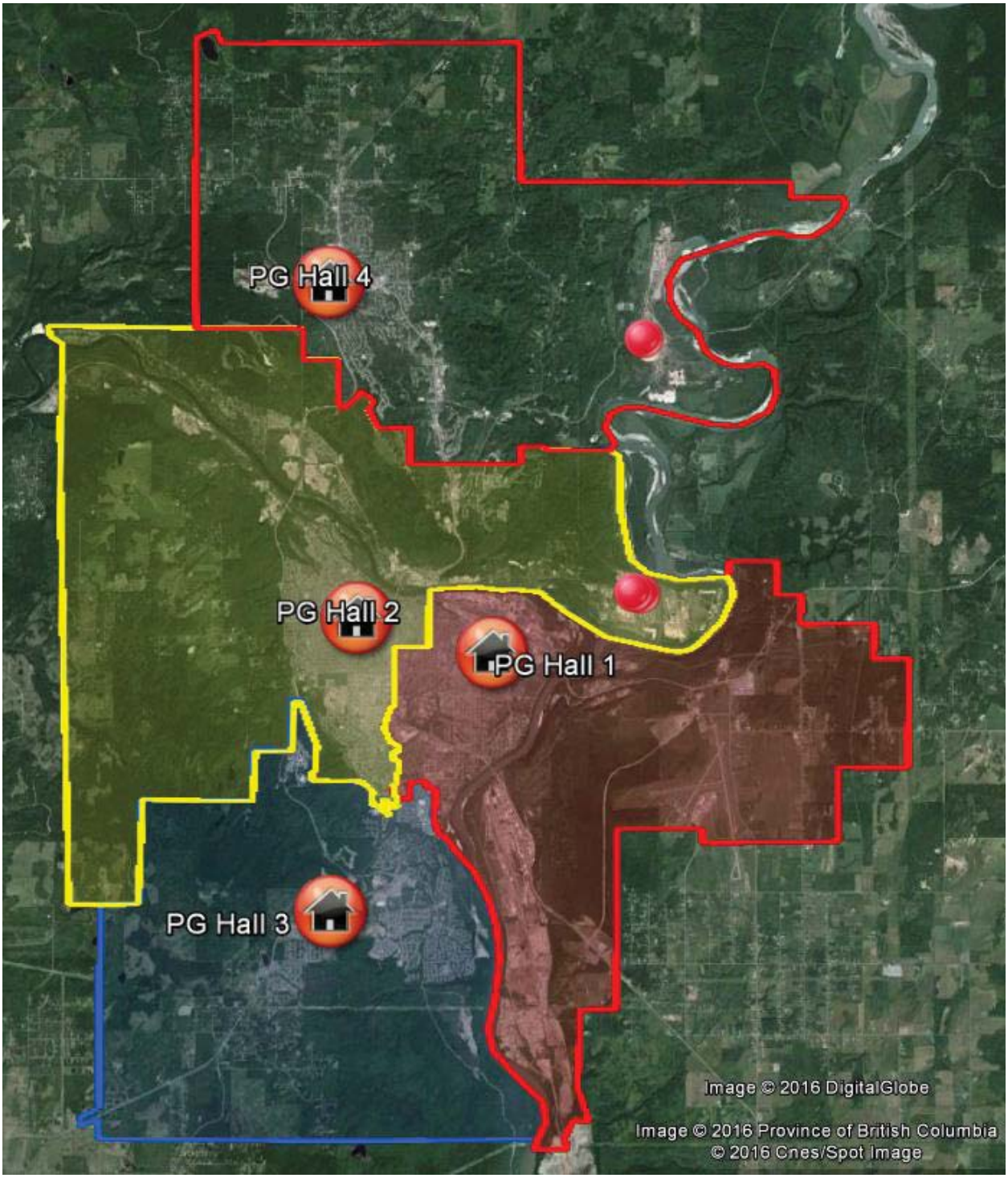

Figure 4: RHAVE Maximum Risks (red dots)

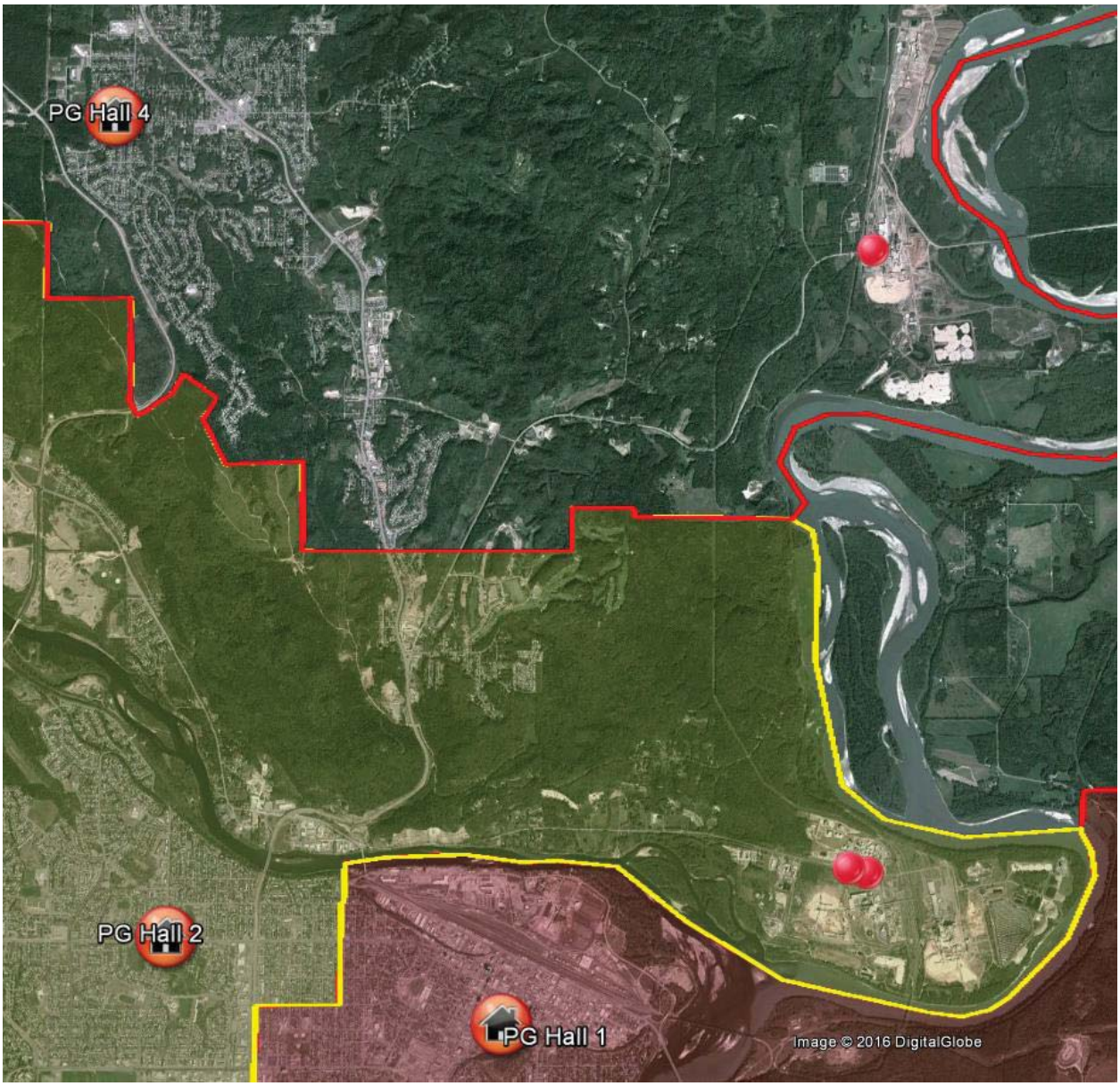

Figure 5: RHAVE Maximum Risk, Detail (red dots)

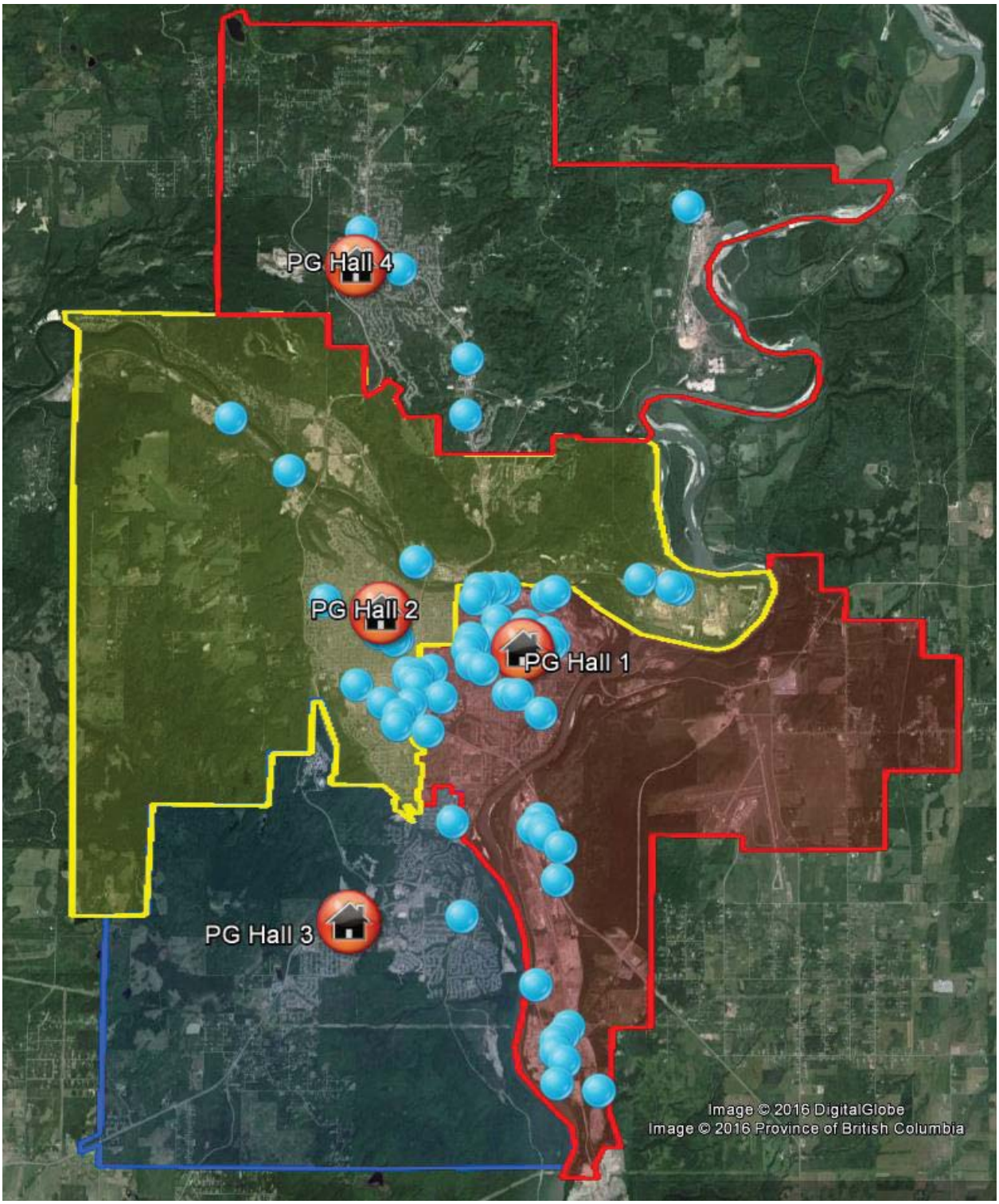

Figure 6: RHAVE Significant Risks (blue dots)

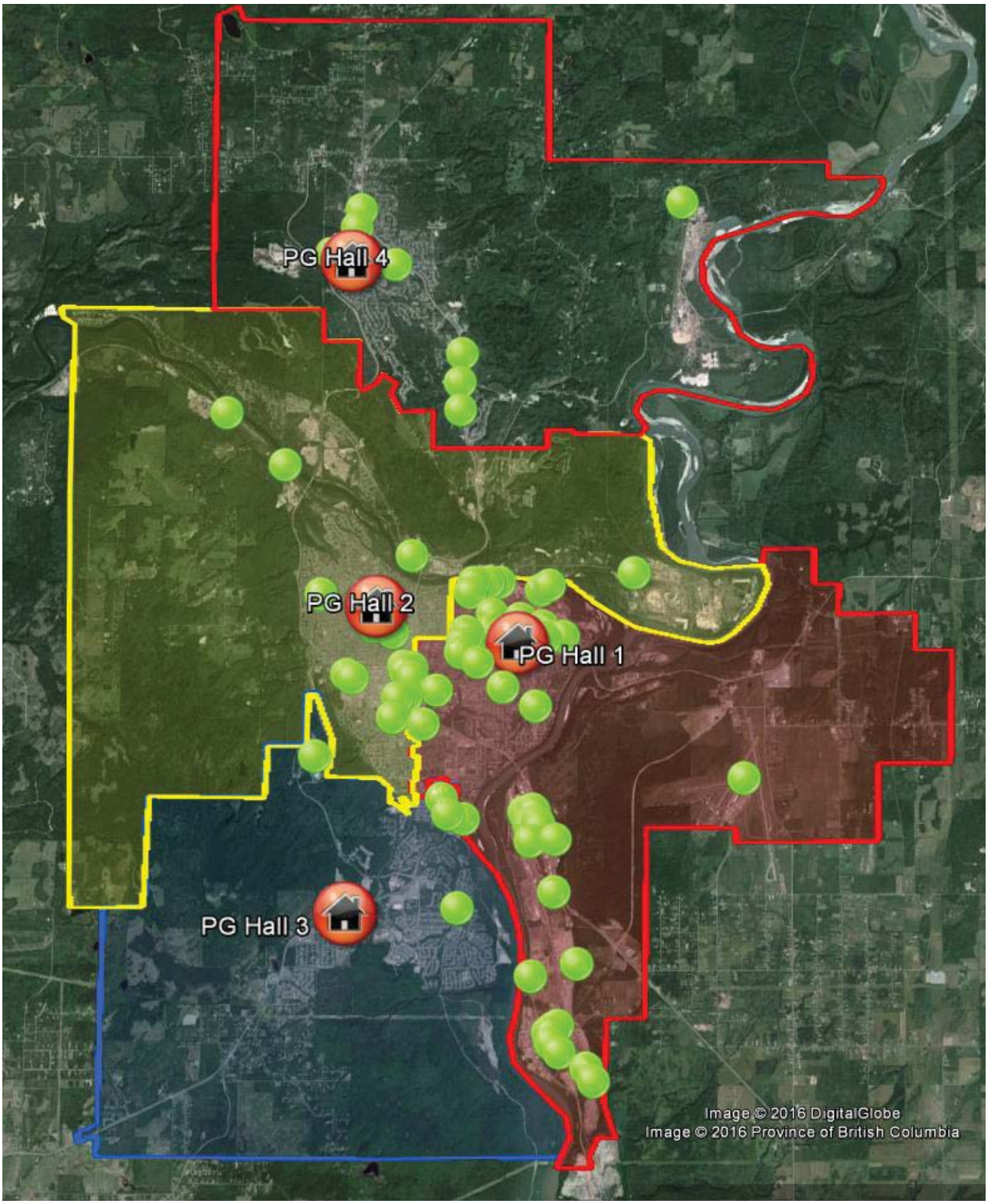

Figure 7: RHAVE Moderate Risks (green dots)

Fire Underwriters Survey

Background

In 2013, the City received an updated review by the Fire Underwriters (the "PG Review").[14] The review includes an assessment of four principal factors:

- The Department's operational capabilities;
- The water supply system in the City;
- The fire prevention and control mechanisms present in the City and operated by the Department; and
- Emergency dispatch and communications.

This section provides an overview of the role and importance of Fire Underwriters' reviews, including a brief background on the methodology employed and importance of such reviews to residents in the Department's fire service area. It also examines in some detail the results from the 2013 review, which included the possibility of a downgrade in the City's rating for its commercial and multi-family properties.

The Fire Underwriters are a national organization administered by Opta[15] (formerly, SCM Risk Management Services Inc.). It has a number of earlier incarnations – it was formerly CGI Insurance Business Services, the Insurers' Advisory Organization and Canadian Underwriters Association – but in each instance, the organization was, and we believe remains, owned or controlled by the insurance industry. For convenience, we refer to them throughout as either the "Fire Underwriters" or "FUS".

The primary purpose of the Fire Underwriters is to establish the Dwelling Protection Grade ("DPG") and Public Fire Protection Classification ("PFPC") for each community in the country.[16] The DPG rating generally applies to single family detached residences[17] while the PFPC rating covers commercial, industrial and institutional buildings and/or districts, or multi-family

[14] Fire Underwriters, "City of Prince George: Fire Protection Services Study – Final" (2013).

[15] There are various names in use, including "Opta Municipal Consulting" and, in the case of this report, "Opta Information Intelligence, an SCM Company".

[16] There is on-going consideration by the Fire Underwriters of the two types of classifications: it is possible that, in the not-to-distant future that the two ratings will be combined so that only a single rating system exists, covering both residential and commercial/multi-family properties.

[17] Under the FUS definitions, the DPG ratings generally apply to the following: "One- and Two-Family Detached Dwellings (buildings containing not more than two dwelling units) in which each dwelling unit is occupied by members of a single family with not more than three outsiders, if any, accommodated in rented rooms." Also under this system, a "typical" detached dwelling is a maximum of 3,600 square feet in size. Fire Underwriters Survey website, "Terms of Reference", http://www.fireunderwriters.ca/dpg_e.asp accessed on 31 January 2015.

residential complexes and generally is applied by the “commercial lines” arm of the insurance industry.[18]

Most residential homeowners and businesses carry fire and general perils insurance and any person with a mortgage is required to maintain such insurance by the mortgagee bank or financial institution. Where a community has a fire department which meets Fire Underwriters’ standards for performance, the cost of insurance will be significantly lower than in unprotected or less protected areas. Thus, one aspect of the cost-benefit analysis that underpins the investment required to maintain an FUS-rated fire department is the trade-off between the taxes needed to pay for the department, versus the savings residents and businesses enjoy on their respective insurance costs.

With a well-rated fire department, the saving in insurance premiums often will offset, in whole or in significant part, the costs of operating the fire department. For an individual with a house that is assessed at a replacement cost for insurance purposes of $250,000, a “protected” rating (DPG 3A or better) will generally result in cost saving on insurance of as much as $2,000 a year. For commercial properties, significant reductions in commercial insurance rates can be expected when the community obtains a PFPC rating of 7 or better. From the savings enjoyed on insurance, the tax cost of maintaining the service would then need to be deducted to determine the net direct financial benefit (or cost) of having a “well-rated” department, and the investment required to maintain such rating.

In the Prince George Review, the Fire Underwriters estimated the total savings enjoyed by local residents; they also showed a table of the savings received by commercial entities based on the PFPC rating that was received. For example, in the case of a structure with a replacement value of $400,000 the estimated annual premium in an area without fire protection was $4,200; if considered semi-protected it was $1,675 and if fully protected, $1,140. These tables are reproduced below:

[18] Fire Underwriters Survey website, “What is the PFPC” at http://www.fireunderwriters.ca/pfpc_e.asp , accessed on 31 January 2015.

Table 22 Rate Setting Estimates

Replacement Value $	Unprotected Rate $		Semi Protected Rate $		Fully Protected Rate $
100,000	1,165	60± % reduction	465	32± % reduction	315
125,000	1,470		585		400
150,000	1,750		700		475
175,000	2,040		815		555
200,000	2,300		915		625
250,000	2,790		1,110		755
300,000	3,290		1,310		890
350,000	3,750		1,495		1,015
400,000	4,200		1,675		1,140
450,000	4,655		1,855		1,260

Table 6: Estimated Residential Insurance Cost Savings: from page 110/187 of the PG Review

Table 23 Rate Estimates under the Dwelling Protection Grade System

	No Fire Department/Water Supply for Public Fire Protection	Total Rate Estimates Prior to FUS Study	Total Rate Estimates Post FUS Study
DPG 1		$9,638,976	$9,638,976
DPG 1 (Private Hydrant Protected)		$326,679	$326,679
DPG 3B		$2,228,460	$2,228,460
DPG 5	$45,020,310	$2,670,020	$2,670,020
Total	$45,020,310	$14,864,135	$14,864,135

Table 7: Aggregate of Estimated Residential Insurance Cost Savings in the City: from page 124/187 of the PG Review

Table 24 U-Rate typical percentage decreases

PFPC	U-Rate percentage decreases
PFPC 10 to PFPC 9	99.2%
PFPC 9 to PFPC 8	96.6%
PFPC 8 to PFPC 7	82.4%
PFPC 7 to PFPC 6	74.4%
PFPC 6 to PFPC 5	63.1%
PFPC 5 to PFPC 4	53.8%
PFPC 4 to PFPC 3	48.0%
PFPC 3 to PFPC 2	47.3%
PFPC 2 to PFPC 1	45.8%

Table 8: Estimated Commercial Insurance Rate Savings: from page 125/187 of the PG Review

The rating systems are described in greater detail in the next section. ***It must be stressed that the actual cost for insurance for any homeowner or business varies based on a number of individual and site-specific factors***. While the fire grading for the area has a significant impact, a host of other considerations are also involved in the setting of insurance rates, including matters specific to the individuals or properties involved, or the competitive forces at work in the region.

It also should be noted that, from the perspective of residential homeowners, the "insurance value" of a home is not the same as the "assessed value". The latter is based on an assessment of the market value; the former generally involves an assessment of replacement cost. Construction costs vary depending on location in the province, but on a conservative basis, one would have to assume at least $125 - $150/square foot for building a new home.[19] That would mean that a 2,000 sq. ft. house would cost at least $250,000 - $300,000 to replace and likely would be insured accordingly.

In relation to commercial insurance rates, as can be seen in Table 8 above, ratings improvements do not result in straight-line decreases. From a cost-benefit perspective, moving a rating from PFPC 8 down to ~PFPC 4 provides the optimal savings for business, and may well be worthy of consideration on a hard cost-benefit analysis (i.e., amount required to be invested in improving the service, versus insurance saving for owners of commercial, industrial and multi-family properties.)[20] Below PFPC 4, the amount required to be invested in the fire service to obtain the improved rating likely will outweigh any insurance savings. The table also is averaged: not all commercial entities enjoy the same level of savings at each rating level.

A further complicating factor is that the ratings applied to a community are not necessarily uniform. FUS considers a series of issues (examined further below), which include distance from the fire hall and availability of water supplies for fire suppression. Thus, the benefits may not be equally enjoyed by all ratepayers within the same fire protection area.

Methodology Employed

<u>Overall Ratings Weighting:</u> The FUS ratings are weighted against the following four areas of assessment:[21]

- Fire Department: 40%
- Water Supply: 30%
- Fire Safety Control: 20%
- Fire Service Communications: 10%.

[19] This would likely be a bare minimum. In many areas of the province, replacement costs are estimated at $150/sq. Ft. or higher.

[20] The amount of savings can also vary with the particular type of industry or commercial undertaking. See the more detailed discussion of PFPC ratings below. The table gives the average of all savings, across all industry types.

[21] This information is based on various FUS reviews we have examined in work for other clients

The assessment also involves a consideration of the principal fire risks covered by the subject department, including determination of the basic fire flow for the community (i.e., water flow requirements for the particular hazards and risks).

There are 19 separate categories of assessment within the fire department rating section. The assessment includes, among other things, a consideration of apparatus, equipment, staffing, training, operations and administration, and the location/distribution of fire halls and fire companies. In this segment of its review, FUS analyzes the effectiveness of the fire department's ability to extinguish fires in all parts of its fire protection area.

Part of that assessment includes a review of the apparatus in use and its suitability for the subject department's fire risks. In general, the Fire Underwriters set 20 years as the maximum age for front-line use of apparatus by small-medium sized communities. It also has requirements for certain apparatus types (e.g., an aerial device) depending on its assessment of the community's fire risks.[22]

The "Water Supply" section looks at the hydrant system (if present), and considers issues such as water flow, supply reliability and system redundancy, based on criteria set out in its document, "Water Supply for Public Fire Protection".[23] Where no hydrant system is present or where the hydrant system only covers a portion of the fire protection area, the Fire Underwriters look at the ability of the fire department to access, load, transport and unload water against the risks faced in the non-hydrant protected area. In such cases, the assessment is usually considered as part of the "Fire Department" analysis.

The "Fire Safety Control" category covers fire prevention programs/public education, fire inspections and building/fire code and bylaw enforcement. The Fire Underwriters will look at whether local government is making effective use of these tools in managing the level of fire risk throughout the fire protection area.

The "Fire Service Communications" category involves an assessment of dispatch services, paging systems, radio communications and related systems and infrastructure.

Changing Format and Content of FUS Reports: It should be noted that reviews by the Fire Underwriters have undergone some material changes over the last several years. The rating areas have changed somewhat, with new (or more formal) categories and scoring systems being introduced. As noted, the assessment of the "Fire Department" is now broken into 19

[22] FUS recommends an aerial device once a community has a water flow requirement that is calculated to exceed 3,300 Imperial gallons per minute or where there are five or more buildings in the community which exceed 3 stories (10.7 metres) in height.

[23] FUS, "Water Supply for Public Fire Protection" (1999), which is available at: http://www.scm-rms.ca/docs/Fire%20Underwriters%20Survey%20-%201999%20Water%20Supply%20for%20Public%20Fire%20Protection.pdf

separate sub-categories, each individually weighted and often containing further individual sub-categories within them. Although material portions of the assessment are still subjective, the scoring system used suggests a precision that can be difficult support.

Penalties: In addition, as part of this revised format, the Fire Underwriters have introduced two new "penalties" which have the effect of reducing a department's overall score: a "divergence penalty" and "special hazards" penalty. The first use of these penalties that we saw commenced with the PG Review, appear to be based on similar penalties applied by the ISO,[24] the American equivalent to the Fire Underwriters.

These penalties impacted the Department's score, resulting in a drop of more than 10% in its final assessed score.

The rationale behind the Divergence Penalty is not actually explained in the PG Review. In the more recent review conducted by the Fire Underwriters for the Northern Rockies Regional Municipality (the "NRRM Review"), it was described as follows:[25]
"Where the water supply is considerably better than the fire department, or vice versa, the better feature cannot be utilized to full value. A divergence penalty is subtracted from the total credit for differing levels of available protection between the Water Supply and Fire Department when determining the final credit score for the Public Fire Protection Classification"

How this penalty is actually calculated is not expressly stated in the any of the FUS reviews that we have seen; nor is it discussed in the background literature available on the Fire Underwriters' website. Our research suggests that the following formula is used:

[(Weighted Fire Department Score X 0.75) – (Weighted Water Score)] X 0.5

Regardless of the sign (i.e., whether the result is a positive or negative number), the result is subtracted from the overall score achieved.

In the Department's case, the calculation looks like this: [26]

[(15.67 X 0.75) – (22.70)] X 0.5 = 5.47

There are two issues to note in respect of the Divergence Penalty:

(i) The Fire Underwriters have provided no background documentation substantiating that the formula applied and the penalty that results reflect an actual real-world diminution in a fire department's operational effectiveness; and
(ii) The effect of the divergence penalty is that it increases the relative weight (importance) of the category that scored the worst. In the Department's case, this is

[24] Insurance Services Office

[25] NRRM Review at p. 125/205.

[26] See Table 18 at p. 103/187, which sets out the weighted scores and the divergence penalty.

the Fire Department score, which means that, from the perspective of improving the Department's PFPC rating, improving the score in the "Fire Department" category will have a larger overall effect on the final score than improvements in any of the three remaining categories (water supply, fire prevention/control or emergency communications).

The weighting effect can be seen in Table 9, which shows the impact on the final score of a 100-point improvement in each separate category:

Category	Points Gained	Impact on Final Score
Fire Department	100	~3.06 points
Water Supply	100	~0.88 points
Fire Prevention & Control	100	2.00 points
Emergency Communications	100	2.00 points

Table 9: Leverage Effect of Improved Scores by Category

As can be seen, the effect of improving the score in the "Fire Department" category of assessment by 100 points translates into an improvement of about 3.06 points in the final score. The reason for this leverage is two-fold: what the category is scored out of relative to their respective weights; and the effect of reducing the "Divergence Penalty". Conversely, improvements in the Water Supply score have a reduced effect, principally because this would increase the Divergence Penalty.[27]

This leverage issue will necessarily impact any strategy developed by the Department regarding how best to improve the overall PFPC rating (to achieve the "PFPC 4" score which has been awarded only provisionally, as noted below).

The second penalty category is the "Special Hazards Analysis". **This penalty has not been applied in the PG Review** (perhaps because it had not yet been developed when the review was undertaken in 2013). The NRRM Review describes this penalty as follows:[28]

> "Special hazard analysis may be applied to a community, a municipality or a fire protection area to recognize climatic factors or adverse effects upon fire control of certain environmental features that inhibit firefighting operations or contribute to fire spread.
>
> The phenomena would be expected to contribute to the propagation of the fire by damaging communication, water mains and fire stations and blocking apparatus

[27] There are some odd effects that result from the Fire Underwriters introducing minimum scores for 3 of the 4 categories of assessment. As such, even without taking into account the effect of the Divergence Penalty, a 50 point improvement in the Water Supply score does not have an equal effect on the final score as a 50 point improvement in any of the other categories.

[28] Review at p. 125/205.

response or by damaging buildings and increasing fire intensity. Credit reduction up to a maximum of 10 percent may be applied on the rate of occurrence and severity of floods, hurricanes, tornadoes, blizzards and earthquakes."

Where we have seen this penalty applied (e.g., Whistler, NRRM), the Fire Underwriters do not specifically identify what factors are taken into account. They do not explain how these risks are assessed, their individual impact rated and the final penalty determined. Rather, where it has been applied, they simply note that the municipality was "reviewed for the potential interference with firefighting…[that] climatic factors and earthquakes would have on the current public fire protection programs in place."[29] There is no actual explanation of the rating involved.

Ratings System: As noted above, FUS reviews involve two entirely separate rating systems – one for residential properties (DPG) and one for commercial/multi-family properties (PFPC).

The DPG rating is calculated on a five-point numerical scale, while the PFPC rating is based on a 10-point scale. In both cases, a "1" is the highest rating achievable. In simplest terms, the goal of an FUS review is to provide insurance companies with a grading of fire protection services provided across a fire protection area.

Insurance companies use the grading rate provided by the FUS as one of a number of factors in determining local fire protection insurance rates. It should be emphasised that the system is quite fluid, and individual insurers can and will set rates based on considerations other than the FUS ratings (either higher or lower, depending on the insurer's perception of actual risk, competitive concerns and other factors).[30] It is up to individual insurance companies to determine what weight they give the FUS grading when determining insurance rates.

DPG Rating: In essence, for residential homeowners the rating system is from 1 – 5 (where "1" is best), with a split at "3", where "3A" means there is an approved hydrant or water supply system, and "3B" means that the department relies on mobile water supplies. From the insurance industry's perspective, the ratings for residential homeowners are generally treated as follows:

[29] *Ibid.*

[30] See a list of other factors on the Fire Underwriters Survey website, "How the PFPC affects individual insurance policies" at http://www.fireunderwriters.ca/pfpc_e.asp , accessed on 27 March 2014.

DPG Rating	Insurance Status	Comment
5	Unprotected	No savings on insurance from having a fire department.
4	Semi-protected	Some savings on insurance likely will be enjoyed; in some regions, this rating and "3B" often are treated as essentially equivalent.
3B	Semi-protected	This is usually the rating level at which significant cost savings on insurance are enjoyed. This is usually the highest rating available in areas which are not hydrant-protected. Insurance savings will be in the range of 50 – 60%
3A; 3B(S)[31]	Protected	Progressively greater savings on insurance. Fully protected status typically means a savings of as much as 73% on insurance costs.
2	Protected	
1	Protected	

Table 10: Dwelling Protection Grade Ratings

In general, FUS estimates that a community which achieves fully protected status can enjoy savings on insurance of some 70%+ versus communities which are "unprotected".[32] By way of example, in a recent fire master plan we worked on two of the members of council to whom we delivered the final report exemplified the difference that the Fire Underwriters' rating makes. In that instance, the fire department's protection zone was greater than eight kilometers, so that residents outside of the eight kilometers limit did not receive the benefit of a reduced insurance rate. One councilor was paying over $3,000 for insurance, while the other was paying less than $1,000 – in relation to properties that the two agreed were otherwise broadly similar, other than the distance from the fire hall.[33]

There are some fundamental location and distance requirements for an area to receive a protected or semi-protected rating:

- residents must live within eight kilometers <u>by road</u> of a fire hall (i.e., the measurement is based on distance travelled on the existing road network, not in a straight line from the fire hall); and

[31] A rating of 3B(S) is an FUS accreditation for tanker shuttle capability, where a department is able to demonstrate its ability to maintain a specified water flow for a stipulated period of time, using tanker units. It applies to areas which are not hydrant-protected, and must be periodically renewed. This specialty rating is treated <u>by most insurers</u> as being the equivalent of a "DPG 3A" (fully protected) rating.

[32]See the Review at p. 135. Based on table 14.1-1, the savings average about 73%.

[33] The example also illustrates a problem where the financial benefits of having a fire department are not equally enjoyed by all taxpayers.

- for hydrant protected areas, the residence must be within 300 meters of a fire hydrant (or else the residence is classed based on the community's "non-hydrant protected" rating).[34]

Properties which are more than eight kilometres by road from a fire hall typically are treated as DPG 5 (unprotected). The issue of there being differential grades applies to the Department's coverage zone, as shown in the table from p. 105/187 of the PG Review:

SUB DISTRICT(S)	DPG 1985	DPG 2013	COMMENTS
Prince George - F.S.#1 - HPA[7] Prince George - F.S.#2 - HPA Prince George - F.S.#3 - HPA Prince George - F.S.#4 - HPA	1	1	Hydrant Protected – Personal Lines insured properties within 300 m of a fire hydrant on the City of Prince George water system and within 8 road km of a Prince George Fire Hall.
Prince George - F.S.#1 Prince George - F.S.#2	3B	4	Fire Hall Protected – Personal Lines insured properties not within 300 m of hose lay of a hydrant on the City of Prince George water system but within 8 road km of Prince George – F.S.#1 and F.S.#2
Prince George - F.S.#3 Prince George - F.S.#4	3B	3B	Fire Hall Protected – Personal Lines insured properties not within 300 m of hose lay of a hydrant on the City of Prince George water system but within 8 road km of Prince George – F.S.#3 and F.S.#4
Areas beyond 8km road response distance	5	5	Unprotected – Personal Lines insured properties not within 8 road km of a Prince George Fire Station

Table 11

Residential properties which are not within 300 metres of a hydrant (but are within 8 km. of a fire hall) receive a semi-protected rating. Residential properties which are more than 8 km. from a fire hall are treated as unprotected.

PFPC Rating: The PFPC rating, which is determined at the same time as the DPG rating, is based on similar factors. The impact of an improved classification varies with the industry and higher risk industries often enjoy greater savings at certain levels – for example, as the PFPC rating improves from 8 to 7.[35] Table 8 above, excerpted from the PG Review, shows the approximate effect each rating improvement will have on commercial insurance rates.

[34] This distance can be extended to 600 metres if a department is qualified by FUS as capable of "large diameter hose-lay". See: FUS, *Accreditation of Alternate Water Supplies for Public Fire Protection* (December 2010), at http://www.fireunderwriters.ca/doc/FUSBulletin-2010.12.10-AlternativeWaterSupplyAccreditation.pdf, accessed on 25 March 2014.

[35] Based on other FUS reviews, where for one department's area, industry classified as "Manufacturing (Wood)", showed a 17% insurance cost saving when moving from a PFPC 8 to PFPC 7, which contrasted with only 3 – 4% savings enjoyed by less risky undertakings.

The following factors or areas of assessment are integrated into the PFPC analysis: [36]

1. Fire Risk, including analysis of required fire flows for individual buildings, building groups and zones of similar risk (Fire Flow Demand Zones) of the community;
2. Fire Department, including apparatus, equipment, staffing, training, operations and geographic distribution of fire companies;
3. Water Supply system, including source to distribution analysis, redundancy factors, condition and maintenance of various components, and storage volume;
4. Fire Prevention and Fire Safety Control programs, including public education, codes/bylaws implementation and use of codes/bylaws in managing the level of fire risk throughout communities; and
5. Emergency Communication systems, including telephone systems, telephone lines, staffing, and dispatching systems.

The PFPC rating is essentially a benchmarking against various standards or requirements in each category and in relation to other communities.

For a commercial property, the application of the rating system depends on the distance from the fire hall and, in hydrant protected areas, distance from a fire hydrant. This can result in "split ratings" for a fire protection area. The FUS describes split ratings as follows: [37]

> "In many communities, FUS develops a split classification (for example, 5/9). Generally, the first class, (Class 5 in the example) applies to properties insured under Commercial Lines within five road kilometres of a fire station and within 150 metres of a fire hydrant. The second class (Class 9 in the example) applies to properties insured under Commercial Lines within five road kilometres of a fire station but beyond 150 metres of a hydrant. FUS assigns Class 10 to properties insured under Commercial Lines that are located beyond five road kilometres from the responding fire station."

It should be noted that newer FUS reviews, in addition to introducing more detailed ratings, are increasingly focusing on fire prevention, fire education and the importance of bylaws which support good fire protection practices (e.g., sprinklering requirements, a well-considered fire inspection program, etc.).

In the Prince George Review, the Department received the following PFPC ratings:

[36] From: Fire Underwriters Survey website, "How the PFPC grading system works", at http://www.fireunderwriters.ca/pfpc_e.asp, accessed on 1 February 2015.

[37] From: Fire Underwriters Survey website, "Split Classifications", at http://www.fireunderwriters.ca/pfpc_e.asp, accessed on 1 February 2015.

Table 21 City of Prince George Fire Insurance Grading Classifications

SUB DISTRICT(S)	PPFC 1985	PFPC 2013	COMMENTS
Prince George - F.S.#1 - HPA[6] Prince George - F.S.#2 - HPA Prince George - F.S.#3 - HPA Prince George - F.S.#4 - HPA	4	5	Hydrant Protected – Commercial Lines insured properties within 150 m of hose lay of a hydrant on the City of Prince George water system and within 5 road km of a Prince George Fire Hall.
Prince George - F.S.#1 Prince George - F.S.#2 Prince George - F.S.#3 Prince George - F.S.#4	9	9	Fire Hall Protected – Commercial Lines insured properties not within 150 m of hose lay of a hydrant on the City of Prince George water system but within 5 road km of a Prince George Fire Hall.
Areas beyond 5km road response distance	10	10	Unprotected – Commercial Lines insured properties not within 5 road km of a Prince George Fire Hall.

Table 12

Although the Department's score only qualified it for a PFPC 5 rating, the Fire Underwriters conditionally granted a PFPC 4 while the Department sought to address the issues raised in the PG Review. This conditional rating was initially granted by letter dated 18 February 2014; it was extended for a further year by a letter dated 19 February 2015.[38]

The conditional nature of the PFPC rating makes addressing the issues raised by the Fire Underwriters a matter of some urgency.

As noted above, the leverage effect which results from the application of the "divergence penalty" means that improved scores in the various areas of assessment of Fire Department operations will have the most impact on the overall score.

The Department's final scores (unadjusted for any errors in the PG Review), are shown in table 18, on p.103/187 of the PG Review:

[38] Fire Underwriters Survey to Acting Fire Chief John Iverson, "Re: Fire Underwriters Survey 2014 **[*sic*]** – City of Prince George" (18 February 2014); and Fire Underwriters Survey to Fire Chief John Iverson, "Re: Fire Underwriters Survey 2014 **[*sic*]** – City of Prince George" (19 February 2015).

Table 18 Summary of Public Fire Protection Classification Grading Areas

Area of Grading	Weight within Grading	Credit Received 2012	Relative Classifications 2012	Relative Classifications 1985	Difference in Relative Classifications
Fire Department	40	15.67	7	5	-2
Water Supply	30	22.70	3	3	0
Fire Safety Control	20	10.88	5	4	-1
Fire Service Communications	10	7.70	3	5	+2
Divergence Penalty		-5.47			
Total Credit Score		51.48			

The City of Prince George's overall credit score for the Public Fire Protection Classification in 2012 is 50.69. Table 19 indicates the credit range of each PFPC grade.

Table 13: Table 18 from the Prince George FUS Report

There is an obvious error in text under the table, which suggests the final score is 50.69, rather than the 51.48 show in the table itself. Even the latter score may have been artificially lowered through rounding errors.

However, assuming that the Department's score of 51.48 is correct, it means that it must improve by a total of 8.52 points to reach 60 points overall, which translates into a PFPC 4 rating. The following table shows approximately how many points in each separate category need to be scored in order to achieve a final score of 60 (assuming, for the sake of illustration, that one were to improve in only a single category of assessment).

Category	**Final scoring effect of a 100 point increase/category**	**Total final scoring points required to get to 60**	**Improvement required in each category to get to 60**
Fire Department	~3.06	8.52	279
Water Supply	~0.88		969
Fire Prevention	2.00		426
Communications	2.00		426

Table 14

Note: it is not possible to achieve a final score of "60" through increases solely in the water supply category (there's not enough point left to be gained in the category). Similarly, the 426 points would need to be shared between "Fire Prevention" and "Communications", unless the Department was able to score a nearly perfect score in "Fire Prevention". There are not enough points left in the Communications category alone to achieve the final score of "60" (even if the Department was able to raise its rating to 100% in this area).

As can be seen in the table above, **from the perspective of improving the PFPC rating**,[39] the Department would do well to concentrate on issues related to the Department's operational rating. Secondarily, they can also seek to improve in either the Fire Prevention and/or Fire Communications assessments. Based solely on the Fire Underwriters' scoring system, there is little or no benefit to putting extra work into improving the water supply system.

In-Service Training and Certification

Applicable Standards[40]

Office of the Fire Commissioner – Training Playbook

On 14 October 2014, the Office of the Fire Commissioner (the "OFC") issued a new training standard applicable to the training of fire services personnel in the province. This new standard, entitled: *British Columbia Fire Service Minimum Training Standards: Structure Firefighters – Competency and Training Playbook* (September 2014) (the "Playbook"), was issued pursuant to and approved by the Minister of Justice under paragraph 3(3)(b) of the *Fire Services Act* (B.C.). The Playbook replaces the previous minister's order on training and is binding on all "fire services personnel" in the province.[41] The previous minister's order, MO-368 (December 2002), has been rescinded. A second edition of the Playbook was released, with some material updates and clarifications, in May 2015[42].

The new Playbook contemplates that a fire department may deliver one of three possible levels of service, and establishes the principal minimum training required to qualify for each level of service:

> **Exterior Operations** – where a fire department does not undertake interior attack or rescue operations on a fire-involved structure or object, or operate in an environment that is "immediately dangerous to life and health".
>
> **Interior Operations** – where a fire department, in appropriate circumstances, will enter a fire-involved structure or object to undertake fire suppression activities or conduct rescue operations. Interior operations by these departments are generally to be limited to smaller structures, single family dwellings and vehicles, except where specific hazard assessments and planning have been undertaken in respect of more complex risks.

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[39] We caution that the issues raised by the Fire Underwriters do not necessarily reflect the actual strategic and operational needs of the Department, or the needs of the City (e.g., in terms of water supply).

[40] The Playbook, plus NFPA 1001 and NFPA 1021; plus any applicable NFPA standards for specialty teams and other-hazards responses as required.

[41] As that term is defined in the *Fire Services Act* (B.C.). The Playbook is not binding on fire suppression operations undertaken by Wildfire Management Branch under the *Wildfire Act* (B.C.).

[42] The Playbook requirements for each level of service are shown in Appendix 6.

Full Service – a full service department is equipped, staffed and trained to provide a full spectrum of fire services.

One of the new aspects introduced by the Playbook is an explicit requirement for the "Authority Having Jurisdiction" over a fire department expressly to set the level of service that is expected to be provided by the department. The training, organization, staffing, equipment and apparatus required to support the chosen level of service will be impacted by that determination.

The "Authority Having Jurisdiction" or "AHJ" in relation to the Department is the City. As such, the City must now set – whether under bylaw or by policy – the service level that it expects the Department to provide. Presumably, the service level chosen will be a "Full Service" department. In the second edition of the Playbook, the OFC has required that each AHJ establish a service level for its department (or departments) by 30 June 2016.

One issue with the new system is the question of what standards apply to matters not covered by the Playbook itself. Although there are several indications in the Playbook itself that the NFPA standards are expected to apply to other functions (which was what was required by the previous Minister's Order on training), [43] ambiguity now exists as to the standards applicable for a wide range of firefighter training.

Given the requirements of the *Workers Compensation Act* (B.C.), which imposes a positive obligation on employers to train workers appropriately, and given that the only recognized standards that exist in North America for the training of fire services personnel are those established by the NFPA, the better approach is to assume that those standards remain applicable to the Department's operations. Should a local government choose to adopt a different standard (or no standard at all) in relation to the training applicable to other fire service functions, if an incident occurs which relates back to training issues (as occurred in the Clearwater case[44]), that local government will be faced with the unenviable task of justifying the approach that it has taken – in circumstances where, *prima facie,* there is evidence of a problem.

As such, when the City formally implements the service level standard for the Department, it is recommended that it also require that NFPA standards form the basis of all training for the operational functions undertaken and emergency services provided by the Department.

The Playbook also establishes minimum standards for individuals providing training. The second edition clarified that no third-party certification is required for in-house trainers. Rather, they must be "qualified" in the subjects or areas that they are teaching.

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[43] The second edition did not entirely clarify the matter, though it even more clearly suggests that the appropriate standards applicable to matters not yet covered, are those set by the NFPA.

[44] The death of fire fighter Chad Schapansky in Clearwater, BC in 2004 which resulted in a Coroner's report "Judgement of Inquiry into the Death of Chad Jerry Schapansky". This report found that the Clearwater fire department lacked written operational guidelines governing interior attacks; it could also produce no training records for accredited training done by the interior attack team, rapid intervention team or fire officers in charge.

Review of Current Training Levels

A determination of required training levels is based on a departments mandate and response requirements. Currently the Department provides services at the following levels and in the following priority:

- Fire Suppression – to the full-service operations level.
- Fire Prevention – fire life safety building inspections, public education and fire investigation.
- Emergency Medical Services (EMS) – to the EMR level.
- Emergency Vehicle Driver (EVD) – in-house program conducted through the International Academy for Professional Driving (IAPD).
- Vehicle Extrication – In-house program similar to Rescue I, Instructors to Rescuer Basics & Rescue I & II.
- Hazardous Materials Response – operations level.
- Technical Rescue – high-angle rope & confined space to operations level, swift water and ice (shore based) to operations level.
- Wildland/Urban Interface – S100 with Wildfire Management Branch[45].
- Railcar Incidents – will respond, some basic training[46].
- Aircraft Incidents – will respond, no training.
- Structural Collapse – will respond, no training.
- Trench Rescue – will respond, no training, orientation only.

Appendix 5 provides a detailed listing of our review of the Departments current training programs and proficiency criteria including those delivered in-house and those delivered by external providers.

The training division considers it necessary to develop and maintain the following programs at the same, or an improved level:

- Fire suppression.
- Fire prevention.
- Fire Officer Development.
- EVD & EVO – consider achieving the requirements of NFPA 1002.
- Technical Rescue Responses – consider increasing the training in some programs:
  - Rope Rescue – to level II (technician)
  - Confined Space – to level II (technician)
  - Haz-Mat – to level II (technician)
  - Vehicle Extrication – to level II (technician)

[45] WMB has developed a course specific for structural fire fighters and members of the Department have now received this training.

[46] Training provided by CN Rail.

The difficulty in maintaining and/or increasing the level of proficiency in any area of service delivery is the challenge of maintaining these proficiencies through on-duty training.

The Department strives to meet the standards and proficiency requirements of the applicable NFPA standards for all operational skills where possible through delivery of the initial training/skills, and then the subsequent maintenance of those skills through ongoing training processes. This approach, however, is complicated due to the number of personnel on duty at any given time, and the inability to remove these members from a primary response role to permit them to conduct the necessary maintenance training.

As such, many of these training endeavors, both the initial and subsequent maintenance training are conducted on the members' 'days off' using the Accumulated Time Off (ATO) approach. This is accomplished by having the member attend work on one or more of their days off to receive the training; however, this then impacts the member's number of days off and as such is often not an option, and therefore the sessions are not well attended.

This approach also relies on the trainers working on their day off to conduct the training. Training sessions are a half-day so that member can then work their night shifts; if they were trained the whole day, they would need to have the night shift off.

Without additional funding to support training to recognized levels of proficiency, in the form of training personnel and time for members to train on shift, and to then maintain these skills, some programs may not be able to be maintained to the required proficiency levels. Without the funding to ensure the proficiencies are maintained, there will need to be consideration given to what training programs are to be continued at the desired/appropriate level and which should be discontinued, or have the proficiency/operational level reduced. This assessment will have to be made in line with the City's mandate for service established for the Department.

Analysis of any fire service standards applicable to the above training levels required to achieve the Department's response requirements must also consider any WorkSafeBC requirements.

The applicable standards and associated requirements for training and development should include the following:

- The Playbook – Training requirements for Full Service Department Operations Level;
- NFPA 1001 for Firefighter training (level II recommended);
- NFPA 1021 for Fire Officer development; and
- Emergency Medical Services (EMS) – to the training to the EMR level.

For specialty teams and other hazard responses required, the following training levels are suggested:

- Emergency Vehicle Driver and Operator (EVD & EVO) – NFPA 1002.
- High-Angle Rope Rescue – operations or technician level,
- Confined Space Rescue – operations or technician level,

- Trench Rescue – operations or technician level,
- Hazardous Materials Response – operations or technician level,
- Swift Water & Ice Rescue – operations or technician level,
- Vehicle Rescue/Auto Extrication – operations or technician level,
- Wildland/Urban Interface – S100.

In terms of the OFC Playbook, the Department is a Full Service Operations department and as such must meet the following two training requirements:

- Firefighter training – FF-I & II NFPA 1001 Standard and Hazardous Materials Operations Level NFPA 472.

- Fire Officer development – Fire Officer I (FO-I) NFPA 1021 Standard, Fire Service Instructor I (FSI-I) NFPA 1041 Standard, and ICS 200 (an integral part of FO-I)

The Department currently meets these two requirements for Firefighter and Fire Officer training. In addition, the Department currently meets and exceeds industry standards for training for the provision of Emergency Medical Services (EMS).

As can be seen in Appendix 5, the area of training for the various technical rescue responses and more specifically the requisite of on-going maintenance training, is proving difficult for the Department. Currently, while members are proficient in the specialty rescue areas such as high angle or swift water rescue when initially trained, their skills will lessen if not practiced on a regular basis. This is in part due to the problems faced by the training division having to scheduling members on their days off for re-occurring training (discussed earlier). It is imperative that if the Department is mandated to provide a specific rescue service, that a corresponding training budget is approved to ensure that the required training can be provided.

We would recommend that the Department undertake an internal review of all rescue services currently provided to determine: 1) If the service needs to be provided by the Department, 2) The required training levels necessary to provide that service, 3) The actual funding needed to provide that service including equipment, initial training and on-going maintenance training. Once these questions have been answered, the Department should seek appropriate approval and funding from Council.

The Department currently maintains its training records in its FDM records management system, and has done so since 2009. Prior to 2009 all training records were tracked either through hard copy files or using in-house designed spreadsheets. The training officer openly admits that the Department's training records prior to 2009 were not well maintained and as such they would be hard pressed to produce accurate individual records on some members' past training. The current training records are electronically tracked by individual firefighter, on a per fire hall, per shift basis. Retrieval of training data is considerably easier under the new system. The Training Office does not currently track the dispatchers' training or that of the fire

prevention office in the FDM system, although the setup of this process is currently underway. The training division does not train fire prevention officers or dispatchers.

When setting up a training records system, whether a commercial database like FDM or a hard copy filing system, it is important to understand the purpose of a training record. While it is important to record what training a member has received, it is equally important to be able to determine what training an individual has not had or has not had for a long time. The importance of maintenance training, or reviewing what has been learned in the past, cannot be overstated. In addition, as training programs change it is important to ensure you can track who has and who hasn't had the updated program. The Department is currently reviewing their records system to ensure it will meet their needs into the future.

There is not a record currently of what every person should have, as opposed to what they actually have. There is a regular training schedule for each date; mostly skills maintenance, but this could be expanded to record this on a year by year basis for each individual.

There are gaps between when a member is hired initially to when they are trained / confirmed as an officer. There are yearly performance appraisals conducted by the captains who will identify any gaps, however these are not recorded in FDM. The recertification frequency is not identified for all programs. Some is mandatory, where others to be determined by the department. The present goal for the changes is to ensure consistency and objectivity in the recording of all training for all members.

Recommendations for changes to existing training programs, including content, proficiency criteria, and method of delivery; as well as for any additional training programs not currently in place.

Our recommendations are as follows:

Recommendation: Consideration should be given to improving the training facilities. (currently fire hall setting) This should include a dedicated Department training site (possibly located in the industrial area) to simulate scenario-based common types of incidents and allow for live-fire exercises. The site should also include training rooms, required training facilities/equipment and outside props.

Recommendation: Currently most of the training provided is for firefighters; more should be provided for the fire officers. Tailor the curriculum for the positions.

Recommendation: We would recommend that the Department undertake an internal review of all rescue services currently provided to determine: 1) If the service needs to be provided by the Department, 2) The required training levels necessary to provide that service, 3) The actual funding needed to provide that service including equipment, initial training and on-going

maintenance training. Once these questions have been answered, the Department should seek appropriate approval and funding from Council.

Recommendation: To ensure competency is maintained, an annual skills maintenance training plan including evaluation models should be developed. The plan should encompass all aspects of firefighter and officer training including those skills required for specialty teams.

Recommendation: The current system of training members on their days off and accumulating days off is not working. Members are not required to attend training sessions and as such training in several specialties is often suffering (e.g., high angle and water rescue). The Department continues to respond to these events albeit with members who are not always trained as well as they need to be. This is a safety issue for both the members and the public they serve. Serious consideration should be given to either fully funding the required training or to cease providing (or significantly limit) the service.

Recommendation: That the Department consider more web based on duty training.

Fire Inspection Intervals and Code Compliance; Public Education

Prince George Fire Rescue – Fire Inspection Cycle

When the work with the Department on this section was originally undertaken, the inspection regime that applied was that prescribed under sections 26 and 36 of the *Fire Services Act* (B.C.) (the "FSA"), which required the "regular" inspection of commercial and public buildings. Subsection 26(1) of the FSA provided as follows:

> "A municipal council must provide for a regular system of inspection of hotels and public buildings in the municipality."

This obligation is then largely duplicated in subsection 36(3).[47] Since this section of the report was initially prepared, a new *Fire Safety Act* has been passed by the Province.[48] This new act will require the Department to review and potentially revise its approach to fire inspections. The impact of the new statute is considered at the end of the section on Fire Investigations, below. In terms of the recommendations, one issue to note is that the Office of the Fire Commissioner is supposed to establish standards for individuals conducting "Fire Safety Inspections" under the new act. It is not known, at this time, what those standards will be, or how they may affect duty crew inspections.

This section examines the current mandate and responsibilities of the Department's Fire Prevention Branch and identifies the principal challenges it faces in meeting its existing responsibilities, including the fire inspection schedule.

The Fire Prevention Branch (the "FPB") is currently approved for four FTE[49] positions: a Chief Fire Prevention Officer (the "CFPO")[50] and three full time inspectors.

As part of this project, the mandate for the FPB was formally identified and documented, based on the responsibilities historically assigned to this section and the collective job descriptions. This review showed that the FPB has a broad mandate covering the following matters:

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[47] Subsection 36(3) requires the regular inspection of "buildings" as defined in subsection 36(1). The terms "hotel" and "public buildings" are defined in section 1 of the FSA. There is substantial overlap between the two sections and various defined terms.

[48] *Fire Safety Act*, SBC 2016, c. 19. The act passed third reading on 28 April 2016 and received Royal Assent on 19 May 2016.

[49] "FTE" - Full time equivalent

[50] The CFPO is an Assistant Chief-equivalent position.

- Operation of a regular system of inspection of public buildings in accordance with the requirements of ss. 26 and 36 of the FSA and the Department's service and establishment bylaw (the "Bylaw")[51];
- Conducting fire investigations in accordance with the requirements of s. 9 the FSA;
- Review of Fire Safety Plans in accordance with s. 2.8.2.1(1) of the *Fire Code*;
- Preparation of pre-incident plans for the Department for major risks to meet the requirements of the *Workers Compensation Act* (B.C.), the Playbook[52] and the requirements of the Fire Underwriters;
- Conducting inspections on complaint in accordance with the provisions of s. 21 of the FSA and in accordance with section 7.1 of the Bylaw;
- Provision of fire safety education to the public, including:
    - To at risk populations (e.g., the elderly, school children and handicapped); and
    - Other (e.g., fire extinguisher education for adults, Fire Smart, etc.);
- Training of FPB and other Fire Department members; and
- Handling public enquiries.

The FPB is not currently conducting plan checks for new construction. Plan checks ensure that new construction meets both *Fire Code* requirements, as well as the practical operational needs of the Department (e.g., appropriate clearances for apparatus, appropriate access and placement of fire protection equipment and related systems, etc.). The existing practice, which involves the Department only conducting a review when there is final check before occupancy, does not permit changes easily to be made if problems are identified. It is recommended that this responsibility be formally added to the FPB's mandate, which will necessitate additional training for FPB personnel.

Recommendation: Expand the FPB's role to include a plan check for new construction, with a focus on major commercial, industrial, public institutional and multi-family projects, to ensure compliance with the Fire Code and with the Department's operational requirements.

Following a review of the FPB's current operational approach, it is recommended that certain changes be made to the allocation of various responsibilities and duties, in particular with respect to the role of duty crews in the conduct of fire inspections. If such reallocation occurs, it

[51] City of Prince George Fire Protection and Emergency Response Bylaw No. 8272, 2013

[52] The Playbook sets various requirements for local governments in respect of the operation of fire departments and training of firefighters and officers. One of the new requirements is the obligation to conduct pre-planning of major risks.

appears likely that, it will be able to meet the mandate as revised, though some supplemental assistance may be required to address the backlog which has built up.

Fire Inspections

The largest single responsibility for the FPB is managing the regular system of inspections of public and commercial buildings as required by the FSA and the Bylaw. The City currently has approximately 2,450 inspectable properties (the precise number varies from year to year depending on changes in occupancy, use and new construction or renovation[53]).

The FPB currently uses a three-year inspection cycle and has divided the inspections into three categories based on the property classification and the CFPO's informal discretionary assessment of risk:[54]

- Annual inspections: 646 properties;
- Biennial inspections: 901 properties;
- Triennial inspections: 902 properties.

In general, even for lower risk properties, a triennial inspection is a long cycle. The Fire Underwriters, which consider fire prevention activities as a significant aspect of their assessment of a fire department's operations, recommend that such inspections occur at least annually.[55]

This system generates some 4,191 inspections triennially, averaged over any two inspection cycles,[56] or about 1,400 inspections per year. There are 26 broad categories in a fire inspection under which a deficiency can arise. The FPB, however, only conducts a re-inspection in relation to deficiencies noted in six of those categories: water supply/hydrants; standpipes and hoses; sprinklers; fire pumps; fire alarm systems; and fixed suppression systems. If deficiencies are noted in other categories, the owner is directed to correct the problem, but follow up only occurs at the next inspection cycle for that property.

In addition to conducting inspections, the Department's inspectors are responsible for undertaking various other activities required to meet the FPB's mandate, including fire investigations, public education, fire safety plan reviews and managing the inspection schedule of the duty crews.

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[53] By way of example, when the Fire Underwriters prepared conducted its survey in 2012 – 13, data for 2011 showed 2,643 inspectable properties in the Department's database. See: FUS Review, p. 59.

[54] The numbers are based on the most current list of inspectable properties, which totals 2,449 inspectable properties.

[55] See the discussion of the Department's fire inspection program at pages 59 – 62 of: Fire Underwriters Survey, *City of Prince George: Fire Protection Services Study* (Final: 2013). For its overall fire prevention program, the Department scored only 229 out of a possible 500 points. Improving this score is important to retaining the City's existing commercial fire protection (PFPC) rating.

[56] The biennial inspection cycle generates 1.5 inspections for each property in that category in any given three year period.

Using the data from the 2010 – 2014 period, when the Department had two full time fire inspectors operating, each inspector completed on average about 290 inspections per year. However, one inspector was focused more on conducting inspections than other aspects of the role. That individual completed an average of some 350 inspections and re-inspections per year. His rate of inspection has fallen in 2015, as his duty mix was shifted to include more responsibility for fire safety plan review. At his present rate of completion, it is expected he will conduct some 300 or so inspections in 2015.

The use of duty crews in the conduct of inspections is typical for most career departments. There are excellent operational and efficiency reasons for this approach: by having the fire crews conduct the inspections of local businesses, members become familiar with the buildings in their response zones, which will help increase effectiveness if an emergency response is required. It also provides an opportunity for the crews to meet business owners and members of the community, improving the connection between the Department and the residents of the City. Finally, for most of the lower risk categories of buildings – in essence, everything that the FPB has currently categorized as requiring a biennial or triennial inspection – the inspections are generally straight forward and easily managed by the crews. This work can be conducted as part of their regular duties (many departments schedule specific days for such inspections, subject obviously to any emergency calls), reducing the need to increase staffing in the FPB. Typically, buildings in the following occupancy categories are or should be assigned to duty crews, unless special circumstances warrant having the work covered by an FPB member:

While a certain portion of the inspections are assigned to duty crews, the numbers of such inspections is low compared to other career departments. Over the course of the 2012 - 2014 calendar years, the duty crews averaged some 360 inspections and re-inspections annually, divided between Halls 2, 3 and 4, with Hall 2 handling approximately one-half of that total and the balance being divided between Halls 3 and 4. As of 1 July 2015, duty crews in Hall 1 also will begin undertaking inspection duties.

The current inspection workload for duty crews is as follows (based on all four shifts being assigned inspection responsibilities):

Hall	Number of Inspections/Year	Inspections/Shift/Month
2	180	4.5
3	90	1.875
4	90	1.875
Total	**360**	

Table 15: Inspections by Fire Hall

As can be seen, each shift in Hall 2 only is required to manage 4.5 inspections a month with the other halls managing fewer than 2. This contrasts with other departments, where it is not unusual to see 20 inspections/month required for each shift.

We would recommend that frequency of inspections be increased so that all inspections occur at least annually, and that more inspections be assigned to duty crews. All four shifts in each of

Halls 1 and 2 (where most of the inspectable properties are located) would be involved. At Halls 3 and 4, only Shifts A, B, and C would undertake inspections. The "D" Shift at Halls 3 and 4 would have responsibility for preparing certain categories of pre-incident plans (discussed in the next section below).[57]

Hall	Number of Inspections/Year	Inspections/Shift/Month
1	768	16
2	768	16
3	216	6 (A, B & C Shifts only)
4	216	6 (A, B & C Shifts only)
Total	**1,968**	**Would include re-inspections**

Table 16

The bulk of the inspectable properties are located within the coverage zones of Halls 1 and 2. As crews rotate between the halls, the workload will balance out between them.

The inspection frequency also should be considered. By transferring responsibility for the lower-risk inspections to the duty crews, it should be possible to increase the inspection rate of high hazard industrial undertakings.

Recommendation: The FPB requires a full complement of active staffing to meet its mandate and ensure the City meets its statutory obligations under the FSA. The Department should review whether some additional assistance is required to address the existing backlog in inspections.

Recommendation: The Department should review the conduct of fire inspections by duty crews and increase the number of inspections and reinspections that are assigned to such crews.

Recommendation: With the increase in the number of inspections by duty crews, the FPB should review the inspection frequency. The goal should be to ensure that all inspectable properties are reviewed at least annually; where possible, the highest risk properties should be reviewed more frequently.

Fire Investigations

Fire investigations are required to be conducted under section 9 of the FSA. The FPB investigates any fire which results in death, injury, serious property loss or where there are suspicious circumstances (typically on request of the RCMP). The CFPO is the primary

[57] The table below offers an example only of how the inspections could be assigned. The FPB will need to review the locations of the properties which can properly be assigned to duty crews and make an allocation accordingly.

investigator in the current structure, with the full time inspector conducting investigations when requested by the CFPO. Both are fully trained investigators.

A fire report must be submitted to the Office of the Fire Commissioner; investigation reports are logged and maintained by the Department. They are subject to request by the RCMP and, under FOI legislation, by insurers and property owners.

The Department is substantially up to date in its investigations and related reports.

New Fire Safety Act

The new *Fire Safety Act* replaces the FSA. It received Royal Assent on 19 May 2016. At a high level, this new statute will impact:

- Inspections of public buildings;
- Fire investigations; and
- Fire Chief and local government powers.

Fire Inspections

Under the new *Fire Safety Act*, the existing obligation to operate a regular system of inspections of public buildings[58] is replaced by the obligation to establish a risk-based compliance monitoring system for public buildings which encompasses:

- fire safety inspections; and
- fire safety assessments.[59]

Following a transition period, fire safety inspections will need to be conducted by "fire inspectors" who meet the requirements specified by regulation.[60] The City is required to specify the class of persons who will act as fire inspectors[61] – a matter which will need to be addressed when the Department's establishment and operational bylaw is updated.

As part of its obligation to operate this new risk-based system, the Department will need to conduct risk assessments of public buildings. The OFC is expected to issue regulations under the *Fire Safety Act* clarifying how those risk assessments are to be conducted, but they have not yet been promulgated.

The concept of a "fire safety assessment" is new. It amounts to a "self-inspection" of a property by the owner. Under the existing *Fire Services Act*, there has been some uncertainty about whether self-inspection systems complied with the statutory requirements. It will be up to the City to determine which public buildings are to be permitted or required to conduct self-

[58] *Fire Services Act* (B.C.), ss. 26 and 36.

[59] *Fire Safety Act*, s. 20. The term "public buildings" is defined in s. 1.

[60] *Fire safety Act,* s. 8(2). The transition period is provided for in s. 53.

[61] *Fire Safety Act*, s. 8(1).

assessments, presumably as part of the overall risk analysis that must be conducted. The new self-assessment system will have to follow a form which is to be prescribed by the Fire Commissioner under the new statute.

A new Appendix 7 has been added to this report, with some suggested language for dealing with the new system in the revised bylaw.

Fire Investigations

The requirement to conduct fire investigations is prescribed by section 25 of the new *Fire Safety Act*. Under that section, the City is required to commence a fire investigation within five days of learning of a fire that has destroyed or damaged property or resulted in death or injury. Section 23 requires the City to designate in writing persons or a class of persons as "fire investigators." As with fire inspectors, following a transition period, fire inspectors must meet the training requirements specified by regulation.[62] Those regulations have not yet been promulgated.

Powers and Authority

Under the *Fire Services Act*, powers and authority were granted principally through the mechanism of appointing fire chiefs as "local assistants to the fire commissioner".[63] In a municipality, the fire chief automatically became the local assistant. The role of local assistant, however, has been abolished.[64] In place of the powers granted to local assistants, the new statute:

- grants a fire chief (or designate) the power to order a tactical evacuation where he or she "believes that there is an immediate threat to life due to a fire or explosion";[65] and
- deems "fire chiefs," "fire investigators" and "fire inspectors" to be peace officers for the purposes of the new act.

Certain other powers are granted to both fire inspectors and fire investigators to conduct their inspections or investigations (e.g., entry on property, ability to make orders, etc.). In addition, local governments are granted the power to order a "preventive evacuation" where the local authority "believes that conditions exist on or in the premises that fire on or in the premises would endanger life."[66]

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[62] *Fire Safety Act* s. 23(2); the transition period is provided for in s. 53.

[63] *Fire Services Act*, s. 6.

[64] Under s. 55 of the *Fire Safety Act*, local assistants are required to return their badges within three months of the new statute coming into force (so, by 19 August 2016).

[65] *Fire Safety Act*, s. 13.

[66] On fire inspectors' powers, see ss. 10 and 11; on fire investigators' powers, see s. 26. The power of a "local authority" to order a preventive evacuation is set out in s. 14 of the *Fire Safety Act*.

Fire Safety Plan Reviews and Pre-Incident Planning

In practice, most commercial properties and public buildings are required to prepare a fire safety plan which conforms to the requirements of the *Fire Code*.[67] The required contents of the fire safety plan vary with the risks involved: where there are greater risks, the fire safety plan is required to cover more issues in greater detail. Under the *Fire Code*, the Department is required to "cooperate" with property owners in the development of fire safety plans.[68]

A separate, but related issue is the need to develop pre-incident plans for major risks in the City. Proper pre-incident planning is critical to improving the effectiveness of an emergency responses and enhancing the safety of responders. In addition, the Playbook suggests that such pre-incident plan is necessary for risks larger than a standard residential dwelling. These pre-incident plans map out and identify essential information for responding crews, such as: floor plans, sprinkler connections, gas connections, electrical rooms, building exits, stairways, hazards products stored within the building etc.

The information from a pre-incident plan can be presented enroute to crews through mobile work stations and such plans also can be integrated into Department training, so that crews are familiar with the major risks in their coverage zones.

The two issues – fire safety plans and pre-incident plans – however, should not be conflated: not all properties which must have fire safety plans necessarily require formal or detailed pre-incident plans to be prepared.[69] The determination of whether a pre-incident plan is required, and the detail needed in it, involves a risk assessment by the Department.

The Fire Underwriters gave the Department essentially no credit for pre-incident planning, scoring it 9 (or 6) of 200.[70] From both an operational effectiveness and safety perspective, there are compelling reasons to undertake an immediate effort to develop pre-incident plans for the City's major industrial, commercial and public building risks. This effort also will greatly assist in improving the Departments commercial insurance rating score, thereby preserving the existing PFPC rating for businesses.

This section will consider first the issues around an effective fire safety plan program, and then discusses how work on such plans should be integrated into the development of pre-incident plans.

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[67] The properties and businesses which must prepare a fire safety plan are identified in s. 2.8.1.1 of the *Fire Code*. These requirements are reproduced in Appendix A, "Fire Safety Plan Requirements".

[68] *Fire Code*, s. 2.8.2.1(1)

[69] The 2013 PG Review likely conflates fire safety plan requirements – which are an obligation of the building owner – with pre-incident plans, suggesting that 2,178 properties require "a pre-fire plan" (p. 61). It is not clear how the Fire Underwriters determined that number.

[70] In the body of the text, the score is recorded as "6"; in the summary table at the end, the score is shown as being "9". See PG Review, p. 57 (section 7.20 "Pre-Incident Planning") and p. 96 (Table 14: FD-18 – Pre-Incident Planning).

Under the *Fire Code*, a fire safety plan is the responsibility of the building owner or occupier. A property is required to prepare a fire safety plan where certain specified conditions are met – e.g., buildings used for public assembly, buildings which are required to have fire alarms, properties where combustible fuels are stored or dangerous processes (e.g., dust-producing processes) are undertaken.[71] However, as noted above, the content of the plan varies with risk. A fire safety plan for an ordinary commercial undertaking will be relatively simple. However, for a high hazard industrial operation, it can easily run to 200 pages in length, and requires careful consideration and analysis by the business owner or occupier to complete properly.[72] The Department charges a fee of $180 for fire safety plan reviews.

As noted, the obligation to prepare a fire safety plan falls on the property owner or occupier. However, under the *Fire Code*, a fire department is required to "cooperate" with business owners in connection with the preparation of their plans. There also appears to be some confusion in industry between an "Emergency Response Plan" and a "Fire Safety Plan". The former does not meet the statutory requirements of the latter. The FPB has reported that some of the larger industrial risks in the City have submitted voluminous but inadequate fire safety plans (composed principally of their emergency response plans), which consumes substantial staff time to review. In one case, it took an inspector several days to review the submitted material and the plan was wholly inadequate.

The bylaw should be reviewed and revised to:

- Reduce the risk that Department and the City will become liable for the fire safety plans which are submitted for review;
- To ensure that the plans are submitted in a format acceptable to the Department and, for more complex risks, using electronic drawings that can form the basis of a pre-incident plan; and
- For more complex risks, where plans are being submitted that are inadequate, giving the Department authority to compel the owner or occupier to have it certified by a qualified external third party before submission or re-submission.

Recommendation: In the updating of the Department's operational and establishment bylaw, ensure that there is clear language permitting the Department to require the submission of additional information with a fire safety plan, that is necessary for pre-incident planning, and that such information is submitted in an electronic format that will enable the Department readily to develop effective pre-incident plans.

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[71] For an excerpt of the requirements, see Appendix A.

[72] Even a simple plan will run to 60 – 70 pages – though most of it is highly standardized and essentially the same from property to property. The City of Esquimalt maintains a sample plan on its website that illustrates the general content required. See: City of Esquimalt: *Fire Safety Plan* at: http://www.esquimalt.ca/files/pdf/public_safety/fire_safety_plan.pdf.

Recommendation: The Department and City should consider requiring that the most significant industrial / commercial risks, which require the most detailed fire safety plans, have their fire safety plans certified by an external third party before submission for review by the Department.

At present, out of the ~2,450 inspectable properties, the FPB is uncertain as to how many are required to produce a FSP. This makes it challenging to estimate the overall workload requirement to meet this obligation.

The Department is in transition in its records keeping approach regarding fire safety plans. It currently has recorded 291 FSPs in the RMS.

With fire safety plans provided in an appropriate electronic format, it will be easier to integrate such materials into a usable pre-plan. The FPB will need to develop and implement a usable template for such preplans, one which Department members will be able to utilize. We would recommend that work on the simpler pre-plans be assigned to the D Shifts from Halls 3 and 4. Before any pre-plan goes live – i.e., is considered available for use in an emergency response – the pre-plan needs to be checked against the building in question. Again, for simpler pre-plans, this can be done by the duty crews when conducting the regular inspections. For the high hazard industrial risks or other major commercial or public assembly risks, responsibility for confirming the pre-plan information should rest with the FPB.

Pre-plans should then be subject to review and updating as part of the regular inspection of that building.

Recommendation: The FPB identify all properties in respect of which pre-incident plans should be created, and prioritize those properties based on risk.

Recommendation: The Department should develop or acquire a user-friendly electronic template for pre-incident plans. The “D” shift crew at halls 3 and 4 should be trained to develop pre-incident plans from fire safety plan data. Duty crews should be responsible for developing pre-incident plans for simpler or more straightforward risks only, as determined by the CFPO.

Recommendation: The FPB should remain responsible for developing pre-incident plans for all major industrial, commercial and institutional risks in the City.

Recommendation: Before any pre-incident plan goes live, it must be checked through a physical inspection of the property in question. Pre-incident plans should be regularly reviewed as part of the annual fire safety inspection for each property for which they exist.

Inspections on Complaint

Conducting inspections on complaint is a statutory obligation under section 21 of the FSA. Complaints are reviewed initially by CFPO, who either delegates the issue to the inspector or

manages the complaint himself. The FPB treats complaints as requiring immediate attention and strive to respond within five business days of receipt.

Unlike the regular system of inspections, inspections on complaint may relate to private dwellings. Concerns have been raised regarding the Department's right to effect entry onto private property to investigate complaints and related hazards. This issue should be clarified in the Department's operational bylaw. Local government has broad authority to order entry onto properties under section 16 of the *Community Charter* (B.C.); in addition, there are similar powers granted under the *Fire Services Act* (B.C.) to local assistants to the Fire Commissioner.[73] The revised Bylaw should specify the Department's power to make entry when investigating a complaint and the Department should develop clear policy for how such powers will be exercised. Where relevant, social service agencies and, potentially, the police, should be involved in appropriate situations (e.g., in connect with hoarders, or where there are issues which may present a risk to Department personnel).

Recommendation: The Department should ensure that its powers of entry for investigating fire hazards on complaint or where the FPB or Department members have a concern, are clearly set out in the revised establishment and operational bylaw. The Department should develop clear operational guidelines for dealing with problem properties, including coordination with law enforcement and socials service agencies, where required.

Public Relations

The Department is currently using social media (Twitter and Facebook) to communicate with the public. The Association also provides public safety information to the public.

The Department conducts safety talks with apartment owners and others but is not currently able to provide these after hours. The increased training schedule has somewhat constrained the time available for public education.

Recommendation: That the FPB be fully staffed (4 FTE's) and that personnel on long term absences are replaced on a temporary basis until their return to active duty.

Recommendation: That the FPB in cooperation with the Building Department implement a plan checking program for all new construction and major renovations in existing buildings. This may require additional training for the existing staff.

[73] It should be noted that the powers to undertake entry under the *Fire Services Act* have been constrained by regulation, which limits the right to enter a private dwelling.

Recommendation: That the City of Prince George develop a policy whereby all lower risk properties are conducted on a bi-annual basis and that all high risk properties are conducted on an annual basis.

Recommendation: That duty crews are assigned all lower risk inspections and those higher risk inspections that the Chief Fire Prevention feels are appropriate for duty crews. Those high risk buildings not assigned to the duty crews will remain the responsibility of the FPB. This may require additional training for existing staff.

Impact of Future Development

Official Community Plan

The City of Prince George's Official Community Plan (the "OCP") is contained in Bylaw 8383 adopted June 25, 2012. The OCP notes the population of Prince George is expected to increase requiring 3,600 to 7,500 additional housing units by 2025[74].

Areas of Anticipated Growth

The OCP notes proposes a shift in terms of development away from a more suburban model to a focus on the city core, specifically.

> Past trends have seen growth concentrated on the outskirts of the urban area, drawing energy away from downtown and towards new centres, and increasing reliance on automobile transport and causing problems like high infrastructure maintenance costs, high accident-related costs, and obesity. The key issue for growth management is to focus growth closer to downtown and existing neighbourhood centres, within the context of what the market can deliver.[75]

The focus on the city core is also reflected in specific policies from the OCP, as follows[76]:

> Policy 8.3.1 The City attaches a high priority to encouraging the development of downtown. As such, it should consider the effects on the downtown in the evaluation of all new commercial/retail policies or applications, resource allocation, and priorities.
>
> Policy 8.3.2 To expand the range of single-family housing options, facilitate redevelopment of areas close to downtown, and encourage attractive development, the

[74] OCP, page 13.

[75] OCP, page 92.

[76] OCP, page 106.

> City should permit narrow lot developments within areas identified in Schedule D-5: Intensive Residential Development Permit Area. These developments require development permits and require developed lane access and a maximum of 9 m wide lot.
>
> Policy 8.3.3 The City should allow and encourage office uses downtown, and restrict them outside the downtown. Office uses outside the downtown should be limited to those professional services that are regularly used by individuals, for who nearby access is important, such as insurance, banks, medical and dental offices. Office development in Business Districts is not supported, except where the office use is ancillary to the primary use.

In summary, the OCP proposes that growth and density should be directed to the city core, or close to it and this is one of the considerations for the level of service to be provided by the Department. The linkage to the Department is noted in Policy 13.4.30.

> A Fire Master Plan should be developed for fire rescue services and consider calls for service in consideration of expected population projections to: identify any fire service deficiencies, determine feasibility for and location of a new fire hall and, identify appropriate siting criteria for such use[77].

Response Analysis

Response analysis in the fire service has two aspects. One is outlined by the Fire Underwriters (the "FUS") who set a threshold in determining whether a property can be considered as protected based on the road network. Specifically, the FUS define the limit of protection for a commercial property as being one which is within 5 Kilometers of a fire hall and for a residential property one which is within 8 Kilometers.

NFPA 1710

The other perspective is that provided by the NFPA. Their measurement criteria are time-based and are the sum of 911 call handling, time for the dispatcher to pick up the phone, the time to dispatch the event, the time for the crew to 'turnout' from the fire hall and the time to travel to the scene. This sequence is shown in Figure 8 and is from the current edition of the standard[78].

[77] OCP, page 216.

[78] NFPA 1710, 2016 Edition, ORGANIZATION AND DEPLOYMENT OF FIRE SUPPRESSION OPERATIONS BY CAREER FIRE DEPARTMENTS.

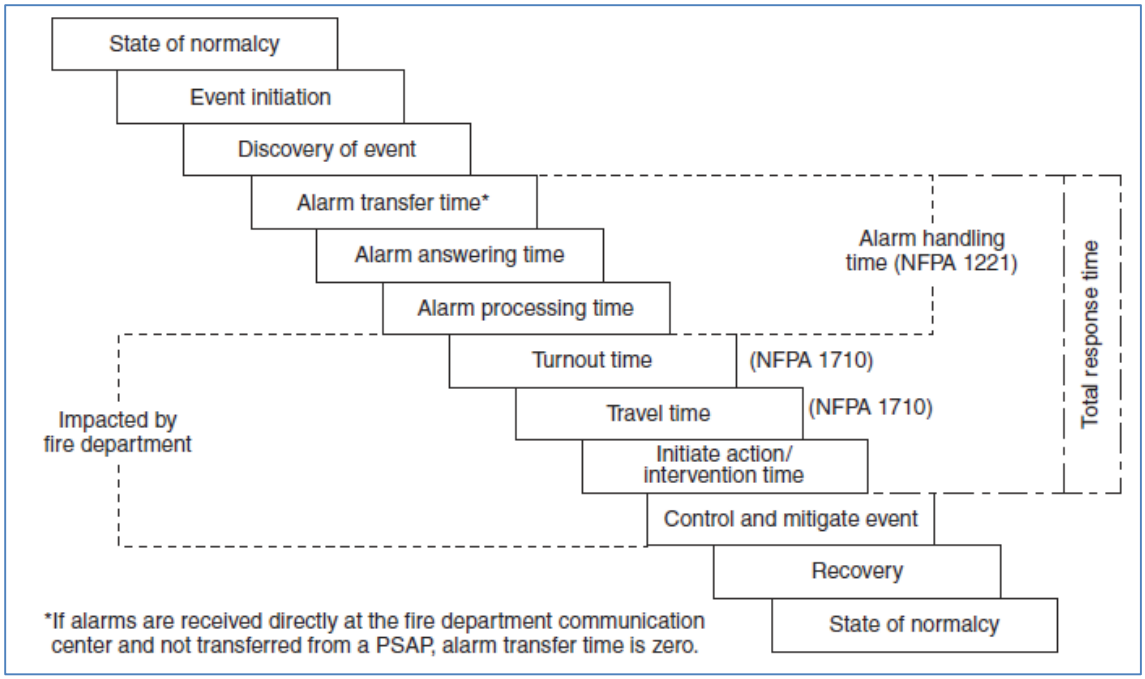

Figure 8: NFPA 1710: "Cascade of Events"[79]

The specific timeframes for turnout and travel time are described in the standard as follows.

> *4.1.2.1 The fire department shall establish the following objectives:*
> *(1) Alarm handling time to be completed in accordance with 4.1.2.3.*
> *(2) 80 seconds turnout time for fire and special operations response and 60 seconds turnout time for EMS response*
> *(3) *240 seconds or less travel time for the arrival of the first arriving engine company at a fire suppression incident*
> *(4) For other than high-rise, 480 seconds or less travel time for the deployment of an initial full alarm assignment at a fire suppression incident*
> *(5) For high-rise, 610 seconds or less travel time for the deployment of an initial full alarm assignment at a fire suppression incident*[80]

The NFPA notes these should be achieved at the 90th percentile[81].

The relationship between the deployment of sufficient firefighters within a defined timeframe relative to fire loss and injury has been documented by the NFPA in the most recent standard which is applicable for a career fire department. This is shown in Table 17, and from this it can be seen that controlling a fire to the room of origin results in an average dollar loss of $2,993.

[79] NFPA 1710, 2016 Edition, page 18

[80] NFPA 1710, page 8

[81] Ibid, page 9

Flame Spread	Civilian Deaths	Civilian Injuries	Average Dollar Loss per Fire
Confined fires or contained fire identified by incident type	0.000	10.29	$212
Confined fire or flame damage confined to object of origin	0.65	13.53	$1,565
Confined to room of origin, including confined fires and fires confined to object	1.91	25.32	$2,993
Beyond the room but confined to the floor of origin	22.73	64.13	$7,445
Beyond floor of origin	24.63	60.41	$58,431

Table 17

For fires which extend beyond the room of origin but which are contained to the floor of origin result in an average dollar loss of $7,445 while fires which extend beyond the floor of origin result in an average dollar loss of $58,421[82] as shown in Figure 9.

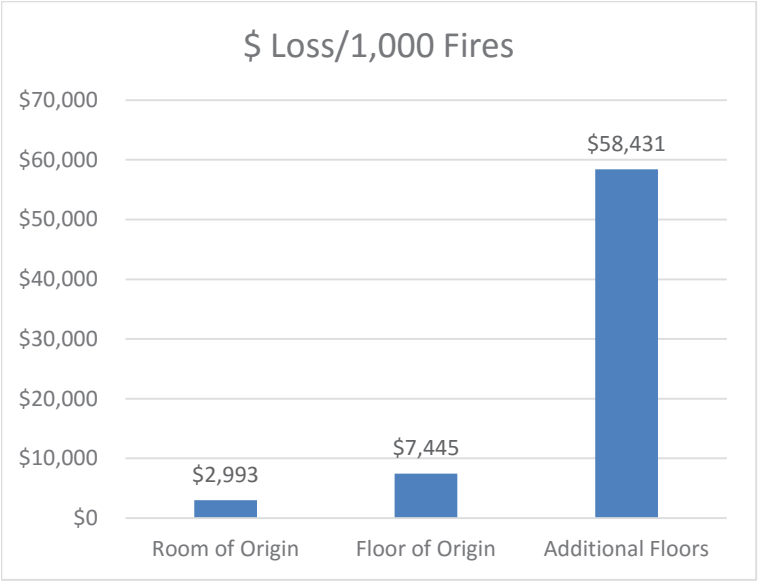

Figure 9: Average $ Loss / 1,000 Fires

[82] The data used in this table is for the United States; there is no similar aggregation of national data in Canada.

Similarly, Figure 10, illustrates that where a fire is held to the room of origin civilian fire injuries are less than half those for a fire that extends beyond the room of origin.

In the case of fire deaths, they do not exceed 1.91 per thousand fires if the fire is held to the room of origin, but where the fire extends beyond that point there are 22.73 deaths per thousand fires.

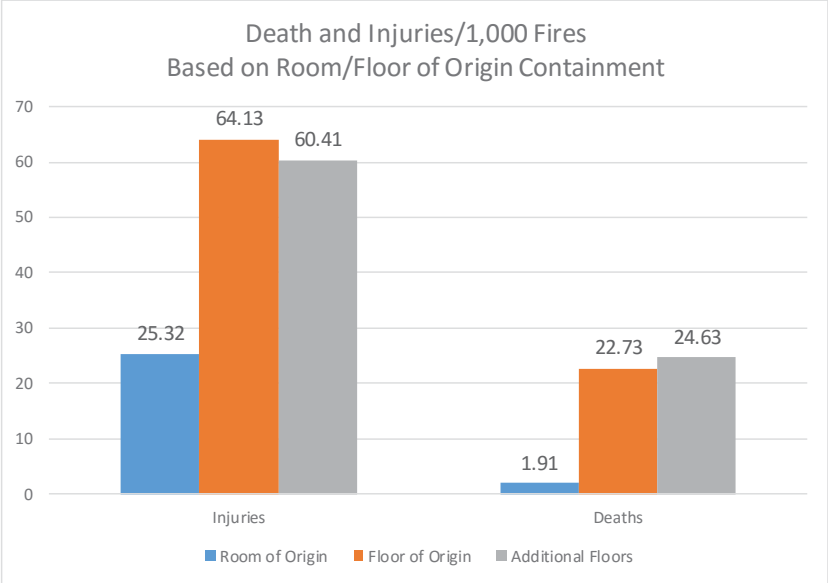

Figure 10

Analysis of response by the Department is for the period 1 January 2009 to 31 December 2014 and comprises 33,318 separate incidents as recorded by the Computer Aided Dispatch ("CAD") system. In their busiest month (July 2014) the Department responded to 592 incidents or one every 75 minutes on average. At peak hours up to 15 units may be dispatched, about one every four minutes.

A few notes on the use of data is in order. Emergency response data, by its very nature, is quite variable. The use of trend lines, therefore, should be treated as indicative and not conclusive. That being said, with a large enough data set, it becomes possible to identify trends or situations that are more conclusive (e.g., quietest versus busiest days of the week; busiest times for certain incident types, etc.), which can assist in Department planning. The data used was all that was reliably available from CAD: the Department can and should continue to track the various event types and analyze its data to determine whether problems are emerging or to track if (for example) specific prevention initiatives are having an effect.

The number of total incidents for the period is shown in the following graph. The trend line demonstrates a modest increase of approximately 6%.

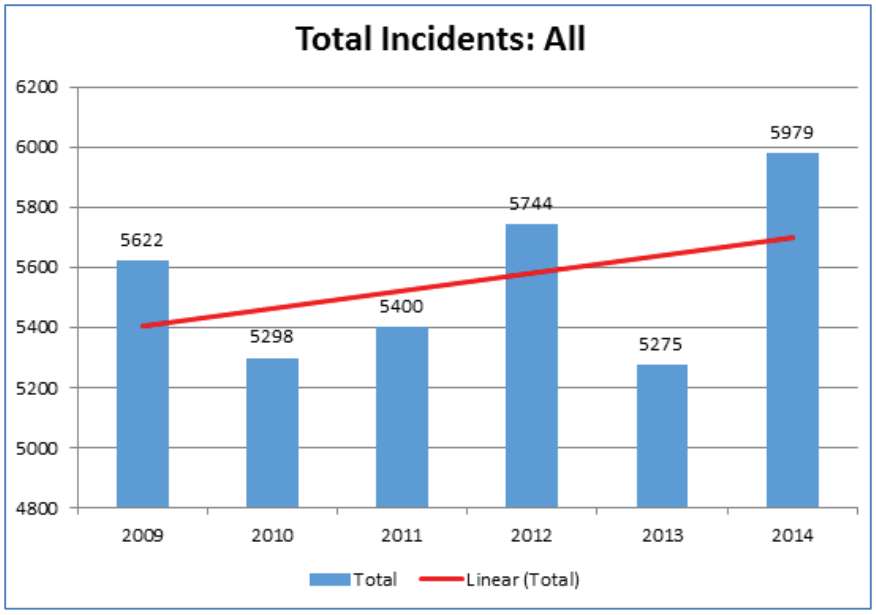

Figure 11: All Incidents (N=33,318)

The Department uses a wide range of categories for different call types. The full range of different call types is set out in Appendix 3. Where appropriate, related categories have been consolidated in the following table, which shows the Department's total response in the period from 2009 – 2014. Within this, a number of event types are showing a much more dramatic increase, some are showing relatively little change, while others are decreasing.

Incident	Count
Medical	13,439
Cancelled	7,454
Fire Alarm	2,851
Unspecified	2,434
MVI	1,702
Complaint	937
Structure Fire	625
Admin	548
Open Air Fire	546
Wildland	398
False Alarm	374
Incident not found	275
Smoke Report	274
CO Alarm	238
Vehicle Fire	227
Odour Unknown	212
Gas Leak	156
Hazmat	143

Incident	Count
Dumpster	105
Patient Not Found	86
Hydro Lines Down	75
Notification	63
Rescue	61
Transformer/Pole Fire	30
Flooding	15
Aircraft	11
Bomb	11
BBQ	9
Structure Collapse	8
Explosion	6
Substation Fire	4
911 Hang Up	1
Grand Total	**33,318**

Table 18: Incidents by Total Count

Incidents: Rising Demand

One of the incident types showing an increase is the number of structure fires as shown in Figure 12. The trend line indicates an increase of approximately 15% over the six-year period. As has been discussed above, and will be shown in a later section the average annual dollar losses for half of the period under study approached $100 million, well above other benchmark departments.

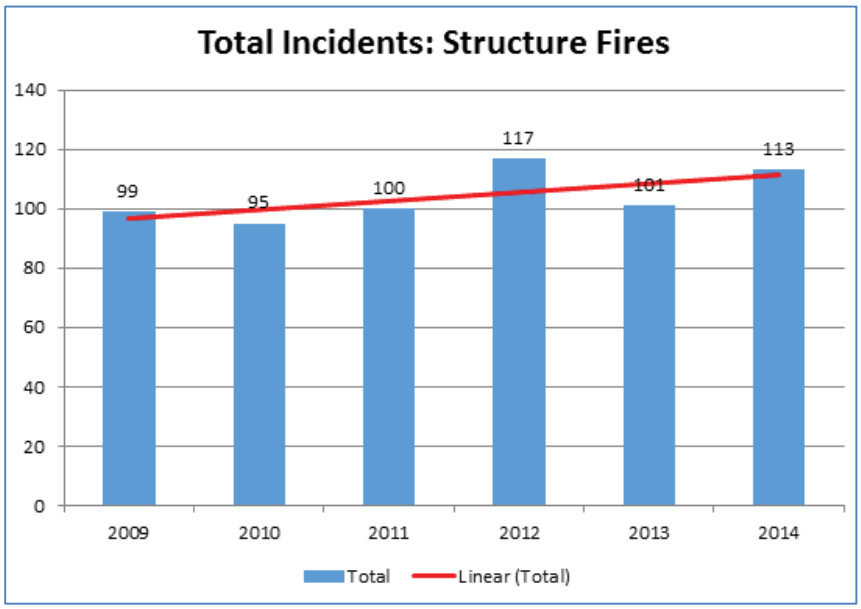

Figure 12: Structure Fires (N=625)

The number of medical/EMR responses is shown in Figure 13. This shows an interesting distribution with the two peak years being 2011 and 2012 in the range of 2,400. The years 2009 and 2010 show a lower level of responses (in the range of 2,000 per year); while 2013 and 2014 have approximately 2,200 a year.

Although it is difficult to ascertain any particular trend, in general as the population increases the medical and EMR response also can be expected to increase. In addition, with the pressure on BC Ambulance and changes to its response protocols, the Department may well find itself responding to more requests for assistance and being committed longer at some of these calls.

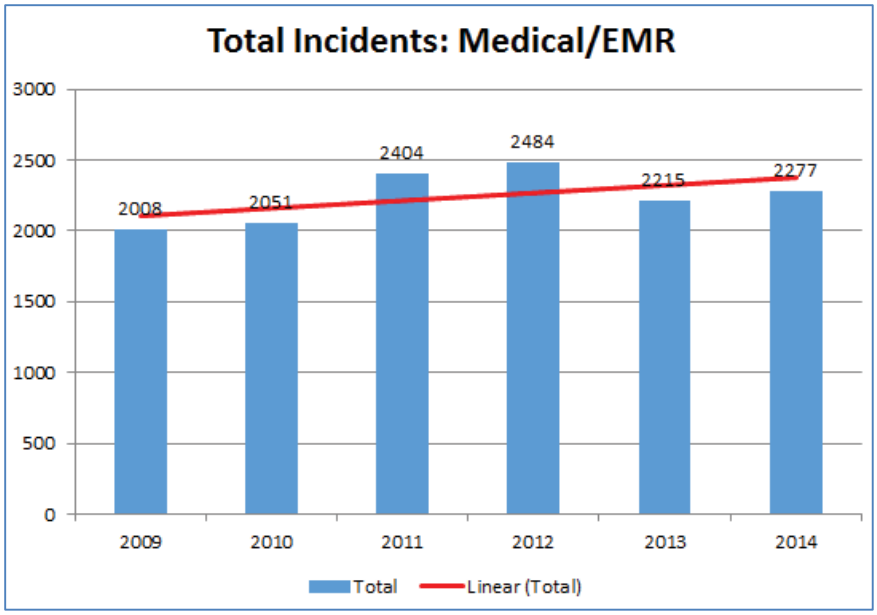

Figure 13: Medical/EMR Response (N=13,439)

The number of responses to Motor Vehicle Incidents is shown in Figure 14 and this incident type appears to be increasing over the period. If 2009 is included the trend would suggest an increase of around 15%, however without that year, the trend would be essentially flat.

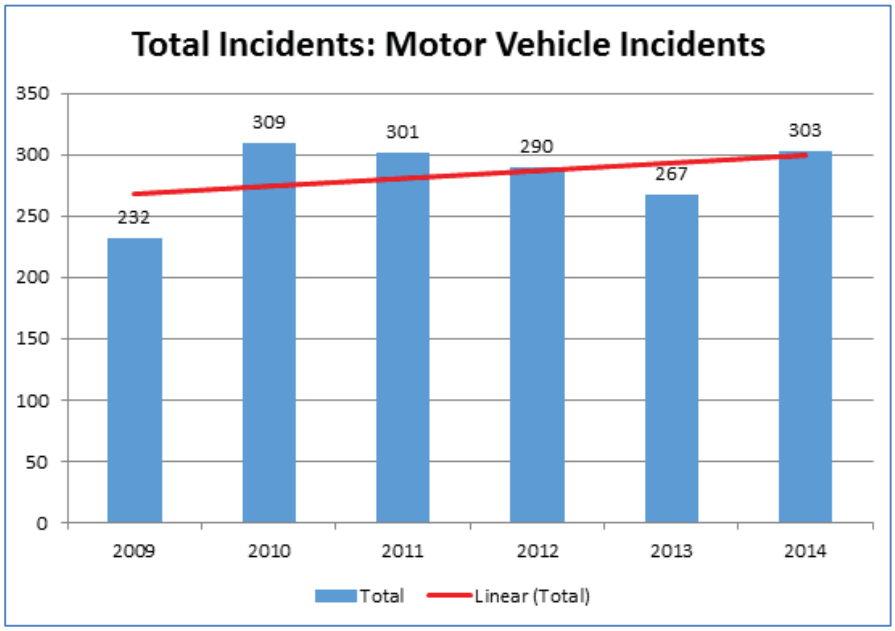

Figure 14: Motor Vehicle Incidents (N=1,702)

The number of responses for alarm system activations is shown in Figure 15 and over the period the trend line suggests an increase of approximately 15%.

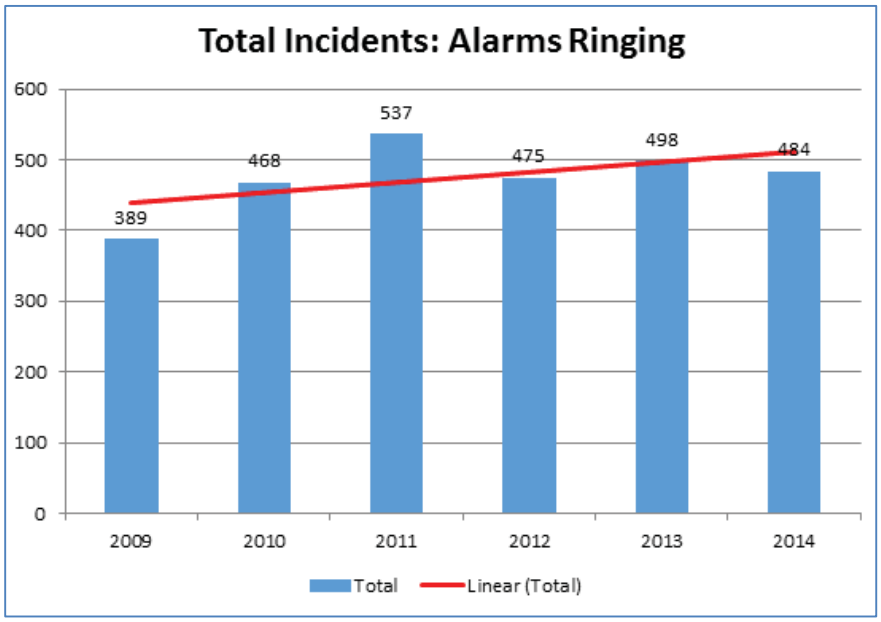

Figure 15: Alarms Ringing (N=2,851)

Incidents: Flat Demand

The number of Hazmat incidents per year is shown in Figure 16. The trend line for this period is flat however given the relatively small number of incidents (143) the data is variable and the trend may be misleading. The risks posed by these call types, moreover, are of a nature that requires significant training as well as pre-planning and coordination with other agencies (and with industry).

Hazmat incidents are high risk for both the public and for responders. With between 1.5 and 2 calls per month, depending on the year, the Department needs to ensure that its members are properly trained and equipped for managing this call type.

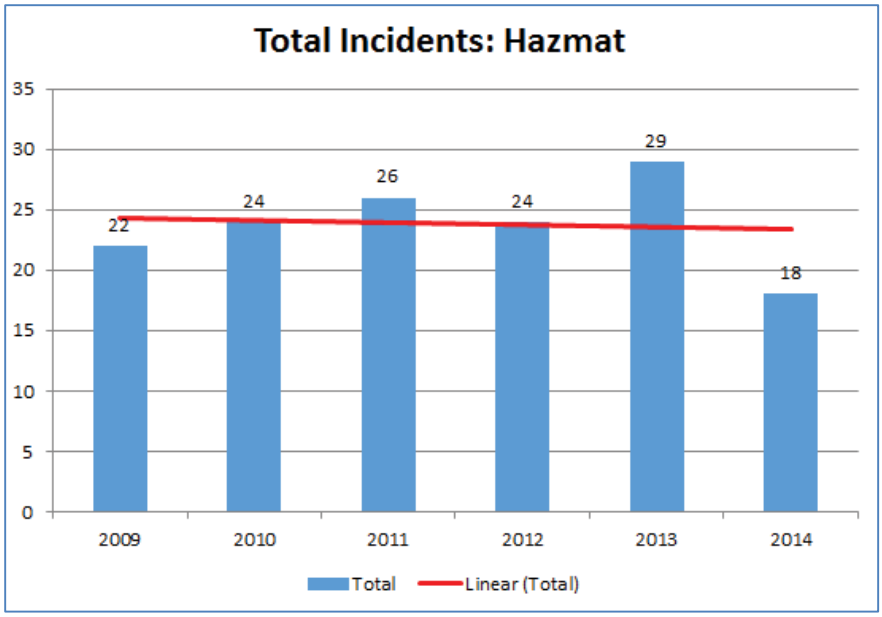

Figure 16: Hazmat (N=143)

The number of responses for a report of smoke showing is shown in Figure 17. Over the period covered by the data, the trend is essentially flat.

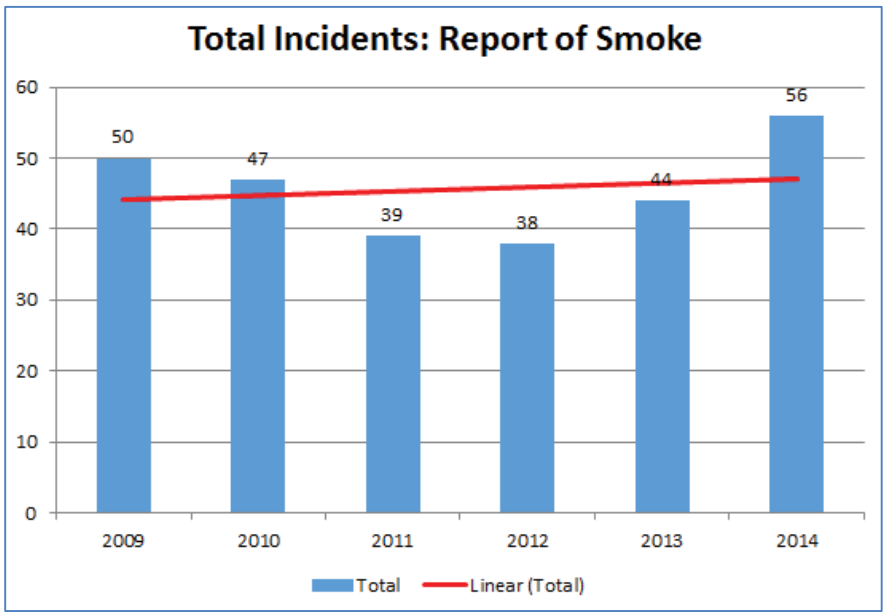

Figure 17: Report of Smoke (N=274)

Incidents: Falling Demand

A number of incidents responses show a significant decline, including fires in dumpsters as shown in Figure 18. This represents a significant decline in responses, albeit that these types of incidents are relatively infrequent overall.

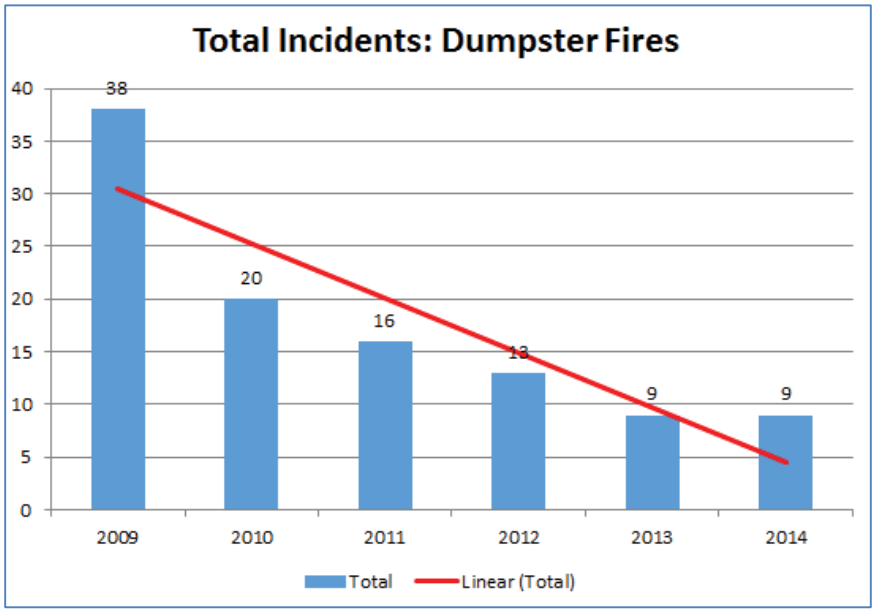

Figure 18: Dumpster Fires (N=105)

In a similar fashion, the number of false alarms shows a significant decrease over the period as shown in Figure 19 and may indicate a heightened degree of follow up by fire prevention to reduce the number of these calls for service.

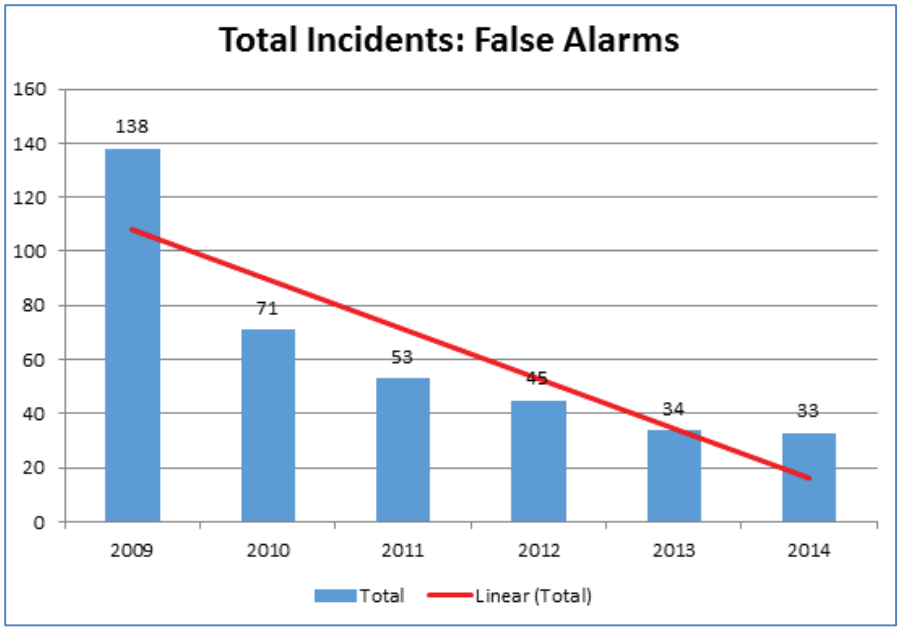

Figure 19: False Alarms (N=374)

The number of responses for vehicle fires is shown in Figure 20. This shows a significant decline, verging on 50% and this may be ascribed to a number of issues that might include somewhat safer as well as newer vehicles.

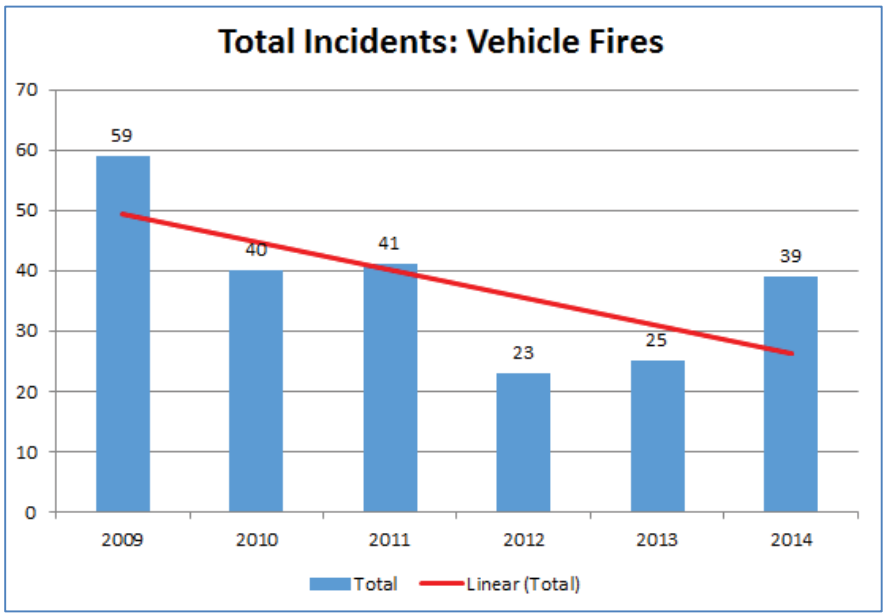

Figure 20: Vehicle Fires (N=227)

Response by Month, Day and Hour

The following section will review the Department's response by month, day and hour to illustrate the degree to which responses change during the year. In summary the Department responds

differently by volume and by type at different times of the year. Even within a single day, or a seven-day period, the Department's responses vary considerably.

Response by month is shown in Figure 21 and this shows that May is the busiest month of the year. Over the six years being reviewed, the peak months for all incidents are May, July and August. By contrast, the slowest month of the year (February) has only 75% of the call volume compared with May.

This information has value for the Department as it plans its principal activities, including major training initiatives or any other undertaking requiring a material commitment of on-duty personnel or apparatus (e.g., joint training exercises, table top exercises, etc.). Where possible these should be scheduled for months with a lower call volume as they are less likely to be disrupted by responses to active incidents.

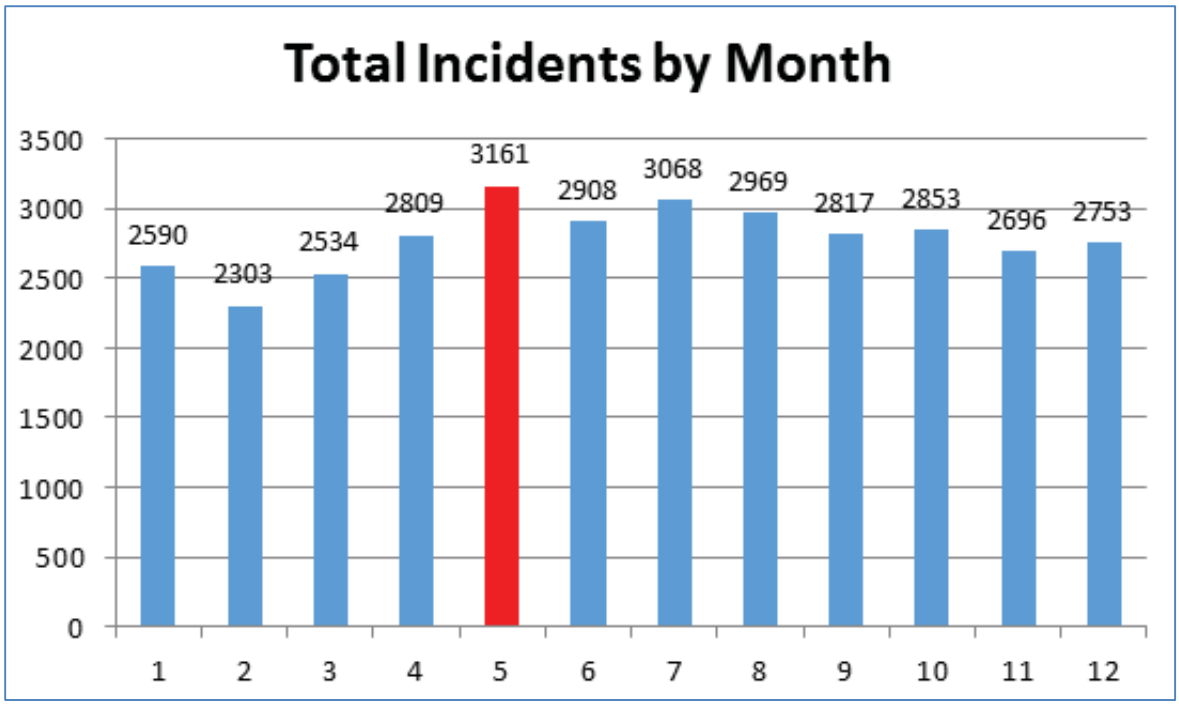

Figure 21: Total Incidents by Month

The Department's responses by day of the week are shown in Figure 22 and the result is typical of most urban fire departments, with a peak at the end of the week compared to the period Sunday through Tuesday. Similar to the previous section, the Department should consider scheduling significant training exercises, apparatus maintenance or technology changes where possible, to occur on days with a lower call volume to minimize disruption.

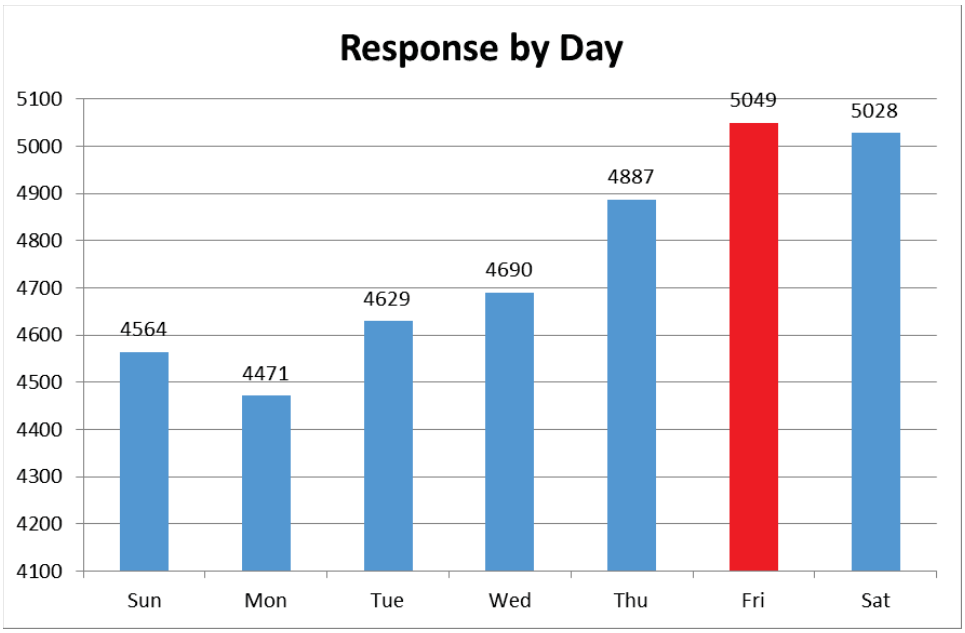

Figure 22: Response by Day of the Week (N=33,318)

Responses to all incidents by hour are shown in Figure 23. This 'curve' of responses is similar to many urban departments however the busy period from 10:00 a.m. extends longer than for most which typically see a drop off in responses around 5:00 p.m.

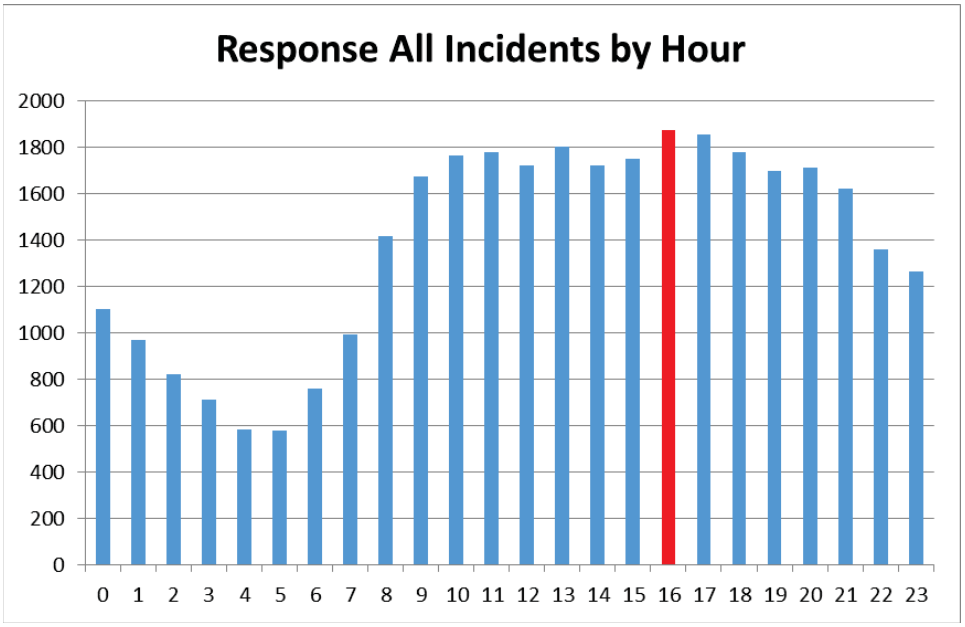

Figure 23: Response by Hour (N=33,318)

The Department's responses to incidents over a 7/24 period can be displayed in a hot spot 'map' as shown in Figure 24. This shows responses from Sunday to Saturday by hour with the count for each hour and color coded green to red by call volume from low to high.

	Sun	Mon	Tue	Wed	Thu	Fri	Sat	High	Low
Midnight	197	126	134	142	146	141	217	1103	1103
1:00 AM	187	113	121	121	128	115	186	971	971
2:00 AM	170	95	86	85	94	112	180	822	822
3:00 AM	125	102	92	81	102	74	137	713	713
4:00 AM	118	66	63	80	62	76	116	581	581
5:00 AM	84	80	70	77	88	87	93	579	579
6:00 AM	119	80	102	104	120	111	121	757	757
7:00 AM	123	143	124	144	158	147	153	992	992
8:00 AM	119	212	252	217	251	227	139	1417	1417
9:00 AM	192	230	265	272	264	261	188	1672	1672
10:00 AM	188	248	264	288	284	276	219	1767	1767
11:00 AM	230	247	264	231	285	278	246	1781	1781
12:00 PM	234	254	206	256	252	257	265	1724	1724
1:00 PM	234	252	279	252	272	285	230	1804	1804
2:00 PM	196	268	250	249	236	257	268	1724	1724
3:00 PM	251	236	263	244	251	268	238	1751	1751
4:00 PM	257	267	256	267	297	286	244	1874	1874
5:00 PM	257	236	255	277	265	277	287	1854	1854
6:00 PM	229	246	238	256	286	267	256	1778	1778
7:00 PM	249	214	219	234	252	275	253	1696	1696
8:00 PM	252	228	248	231	236	255	263	1713	1713
9:00 PM	217	222	235	211	203	275	257	1620	1620
10:00 PM	183	161	192	170	186	229	238	1359	1359
11:00 PM	153	145	151	201	169	213	234	1266	1266
High	4564	4471	4629	4690	4887	5049	5028		
Low	4564	4471	4629	4690	4887	5049	5028		

Figure 24: Hot Spot Map--All Incidents

This heat map and the ones that follow illustrate the way in which the Department requires a dynamic deployment model. In the case of all incidents, the busiest day of the week is Friday, the slowest day in Monday; the busiest hour is from 4:00 p.m., the quietest hour from 5:00 a.m. The busiest single hour is from 4:00 p.m. on Thursday.

The number of incidents at the busiest hour is more than 300% higher than the slowest hour. The busiest day (Friday) is around 14% busier than the slowest day (Sunday).

The heat map for medical/EMR response is shown in Figure 25. In this case the busiest hours are 5:00 p.m, followed closely by 10:00 a.m. The busiest day in Saturday, the quietest day is

Monday. For this incident type as well, the busiest hour is more than 300% above the slowest hour.

	Sun	Mon	Tue	Wed	Thu	Fri	Sat	High	Low
Midnight	89	48	50	55	64	55	91	452	452
1:00 AM	84	51	53	51	57	52	80	428	428
2:00 AM	82	40	33	35	34	39	80	343	343
3:00 AM	62	41	46	38	45	34	67	333	333
4:00 AM	45	29	24	42	30	37	53	260	260
5:00 AM	42	28	32	39	38	34	38	251	251
6:00 AM	40	24	35	41	51	36	42	269	269
7:00 AM	57	72	47	68	57	52	68	421	421
8:00 AM	54	75	100	71	89	74	56	519	519
9:00 AM	77	86	88	91	86	80	74	582	582
10:00 AM	84	105	103	121	112	115	92	732	732
11:00 AM	95	83	105	87	109	99	113	691	691
12:00 PM	97	96	84	97	110	101	101	686	686
1:00 PM	99	107	106	102	110	85	101	710	710
2:00 PM	65	86	95	95	94	91	119	645	645
3:00 PM	112	91	96	86	106	103	87	681	681
4:00 PM	84	86	99	85	133	105	92	684	684
5:00 PM	121	83	104	123	95	110	121	757	757
6:00 PM	87	93	90	115	105	113	103	706	706
7:00 PM	105	85	100	105	107	118	103	723	723
8:00 PM	113	106	103	101	104	98	102	727	727
9:00 PM	83	100	99	83	91	116	109	681	681
10:00 PM	81	71	88	85	70	96	110	601	601
11:00 PM	73	65	58	79	73	94	115	557	557
High	1931	1751	1838	1895	1970	1937	2117		
Low	1931	1751	1838	1895	1970	1937	2117		

Figure 25: Hot Spot Map--Medical/EMR Incidents

The heat map for MVIs is shown in Figure 26 and is similar to medical responses but does not have a peak in the morning hours. The busiest hours are at 4:00 p.m. and 5:00 p.m.

	Sun	Mon	Tue	Wed	Thu	Fri	Sat	High	Low
Midnight	8	1	0	5	2	2	10	28	28
1:00 AM	3	2	4	3	4	3	10	29	29
2:00 AM	5	1	1	0	3	1	8	19	19
3:00 AM	4	1	0	1	0	3	6	15	15
4:00 AM	2	1	1	0	1	2	4	11	11
5:00 AM	4	0	3	1	5	2	6	21	21
6:00 AM	1	1	5	3	6	3	4	23	23
7:00 AM	7	6	8	7	14	14	4	60	60
8:00 AM	1	18	17	16	14	17	1	84	84
9:00 AM	7	10	11	13	11	15	6	73	73
10:00 AM	18	9	11	10	10	14	13	85	85
11:00 AM	9	14	19	17	16	20	12	107	107
12:00 PM	16	19	14	15	14	21	14	113	113
1:00 PM	12	17	15	11	15	28	13	111	111
2:00 PM	15	16	20	23	20	13	16	123	123
3:00 PM	18	17	20	14	22	25	17	133	133
4:00 PM	10	24	23	22	18	34	13	144	144
5:00 PM	17	22	30	18	24	20	14	145	145
6:00 PM	8	16	4	10	23	18	19	98	98
7:00 PM	3	7	9	6	10	15	12	62	62
8:00 PM	14	3	11	8	8	15	15	74	74
9:00 PM	6	8	9	7	8	14	8	60	60
10:00 PM	5	3	4	10	6	8	14	50	50
11:00 PM	0	2	5	4	3	12	8	34	34
High	193	218	244	224	257	319	247		
Low	193	218	244	224	257	319	247		

Figure 26: Hot Spot Map--Motor Vehicle Incidents

The heat map for structure fires is shown in Figure 27 and is quite different from the previous examples. The busiest hours are 3:00 p.m. and 7:00 p.m., the quietest hour is 4:00 a.m. The busiest day is Tuesday, the quietest day is Wednesday.

	Sun	Mon	Tue	Wed	Thu	Fri	Sat	High	Low
Midnight	2	4	2	4	1	4	1	18	18
1:00 AM	6	4	0	2	4	4	3	23	23
2:00 AM	4	4	3	0	1	8	0	20	20
3:00 AM	4	3	5	2	5	1	9	29	29
4:00 AM	2	0	2	2	0	0	0	6	6
5:00 AM	3	3	5	2	2	3	4	22	22
6:00 AM	4	1	1	0	2	3	2	13	13
7:00 AM	3	1	4	6	3	3	6	26	26
8:00 AM	3	2	6	3	7	1	3	25	25
9:00 AM	3	1	3	3	2	2	1	15	15
10:00 AM	4	2	3	1	3	0	3	16	16
11:00 AM	2	4	4	2	2	2	5	21	21
12:00 PM	6	6	5	3	1	3	6	30	30
1:00 PM	4	8	4	5	3	3	2	29	29
2:00 PM	2	3	7	5	3	2	4	26	26
3:00 PM	3	7	7	5	6	3	10	41	41
4:00 PM	6	2	7	3	5	3	5	31	31
5:00 PM	0	9	8	2	8	6	2	35	35
6:00 PM	3	4	13	1	7	5	4	37	37
7:00 PM	10	4	4	4	5	11	2	40	40
8:00 PM	3	3	6	5	5	6	4	32	32
9:00 PM	3	5	2	3	7	1	5	26	26
10:00 PM	9	3	5	8	8	2	2	37	37
11:00 PM	3	3	6	4	5	2	4	27	27
High	92	86	112	75	95	78	87		
Low	92	86	112	75	95	78	87		

Figure 27: Hot Spot Map--Structure Fires

Comparing the busiest to the quietest hour, the peak hours are 650% busier than the slowest.

The information in these hot spot maps illustrates the degree of flexibility required by the Department. The number of medical and MVI responses is certainly larger than the number of structure fires, however the latter requires a commitment of nearly all of the Department's resources to a single incident, where most medical responses require only a single unit.

In summary, the Department's responses peak on different days and at different times, depending of the incident type as shown in Table 19.

Call volume/incident	Sun	Mon	Tue	Wed	Thu	Fri	Sat
All Incidents: peak						4 pm	
Structure fires: peak			3 pm				
FMR: peak							5 pm
MVI: peak						5 pm	
Alarms ringing: peak						6 pm	
Vehicle fires: peak		5 pm	5 pm		5 pm		
Gas leak/hazmat: peak						11 am	
Electrical fires: peak		9 pm					

Table 19: Peak Occurrence by Incidents Type and Time

Response by Hall Area

The Department's responses vary greatly by hour, day and month as noted in the previous section. They also vary significantly by fire hall area with Hall 1 being the busiest with more than 52% of all responses within their immediate area.

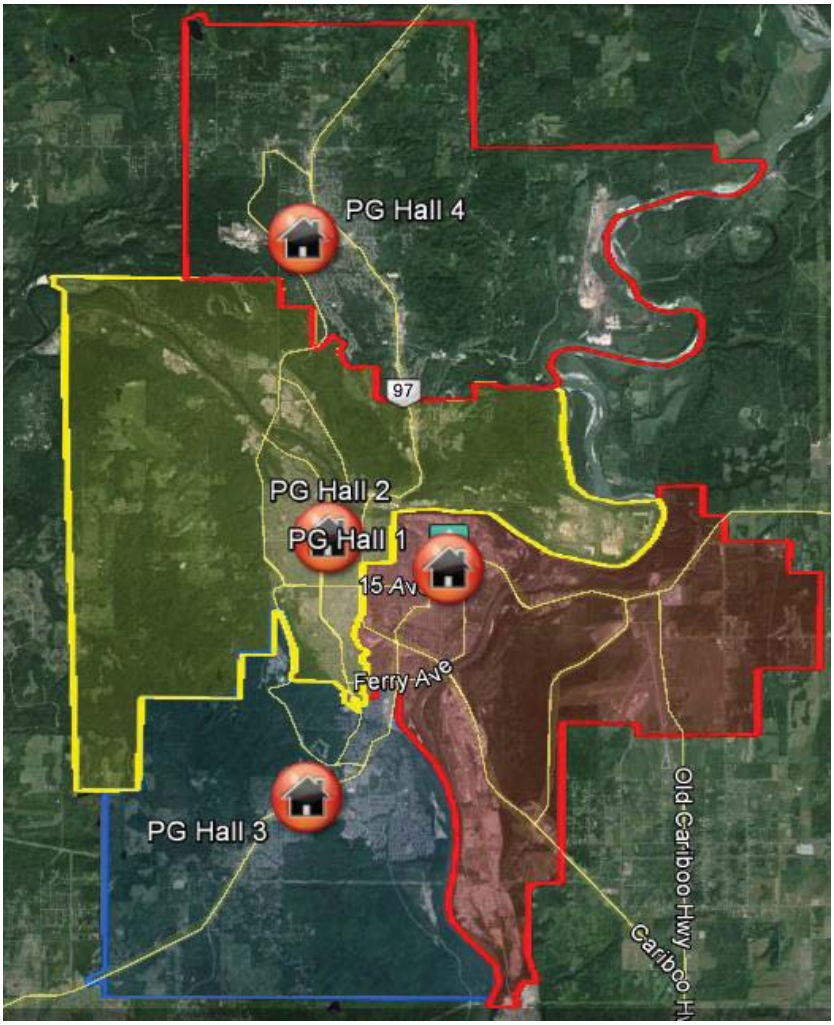

Figure 28: Prince George--4 Fire Hall Areas

The responses in Hall 1's area are shown in Figure 29 and the trend is increasing.

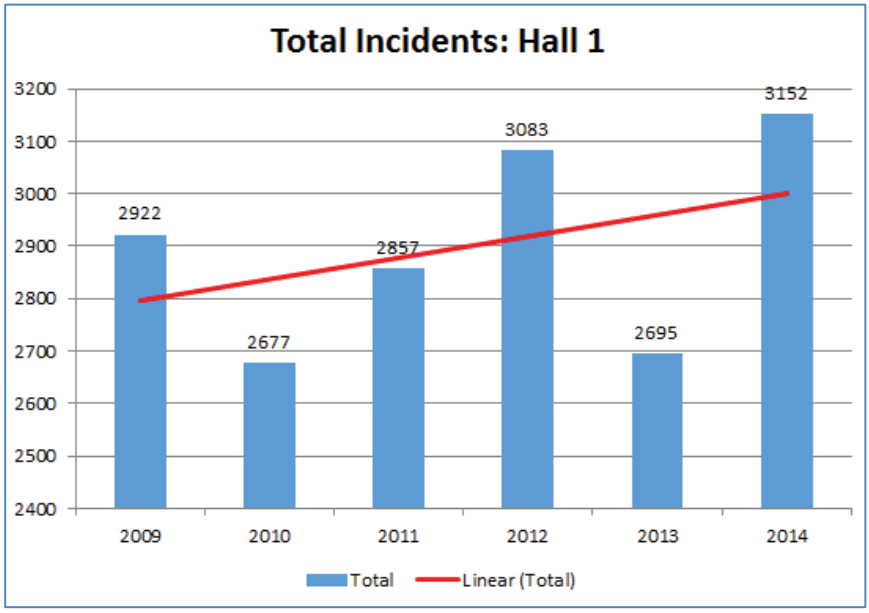

Figure 29: Hall 1 Total Responses, N=17,386

This response area includes the older, original part of the City as well as the industrial property to the south, and the area to the airport and east.

During the period the trend shows an increase of approximately 7%. Hall 1 also has the busiest fire apparatus in the Department with a utilization that is significantly higher than all other Engines.

Hall 1 is also a concern in terms of its physical condition and configuration as well as its location and this is discussed in other sections of this document.

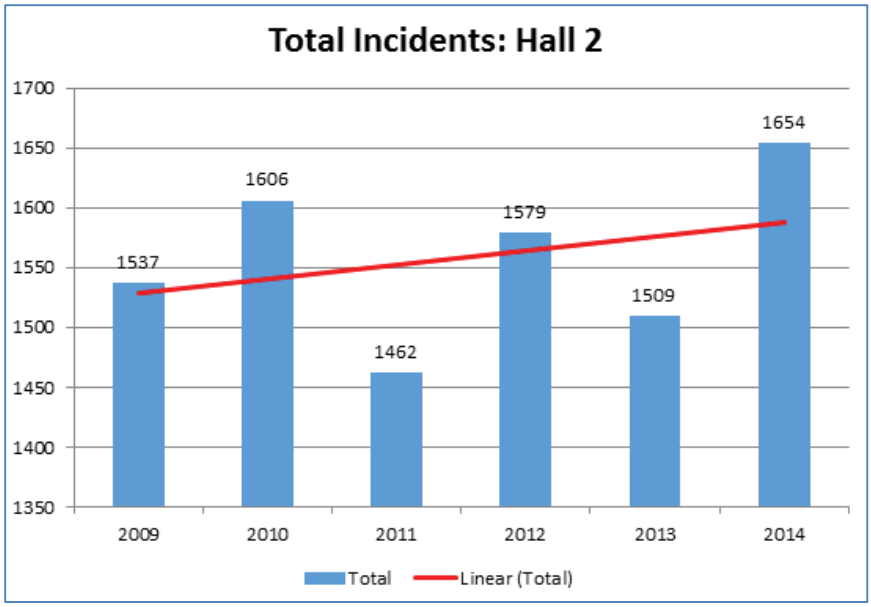

Figure 30: Hall 2 Total Responses, N=9,347

Responses in Hall 2's area are shown in Figure 30. This is the second busiest fire hall in the Department and over the period being reviewed responses have increased by approximately 3%.

Responses for Hall 3 are shown in Figure 31 and for the period, are essentially flat.

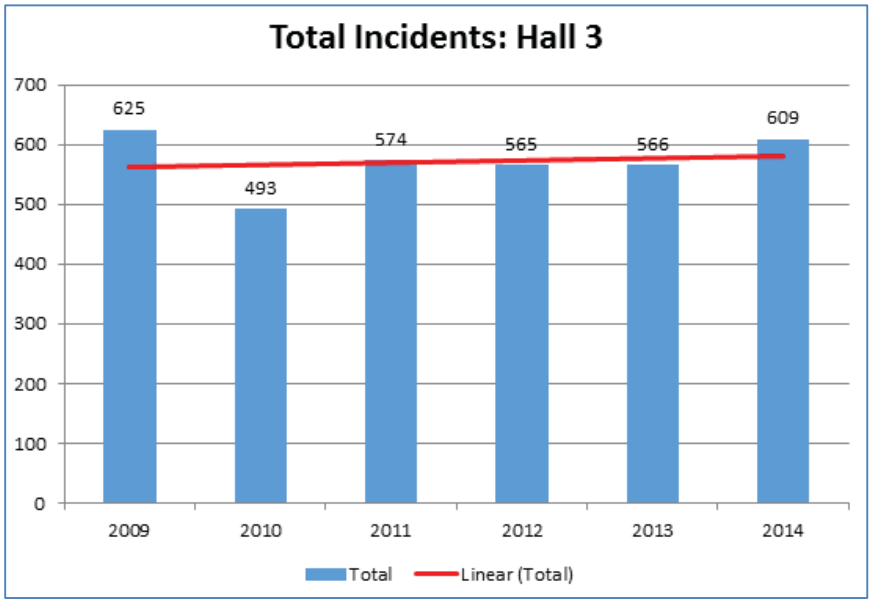

Figure 31: Hall 3 Total Responses, N=3,432

Responses for Hall 4 are shown in Figure 32 and show a general increase with a significant spike in 2014.

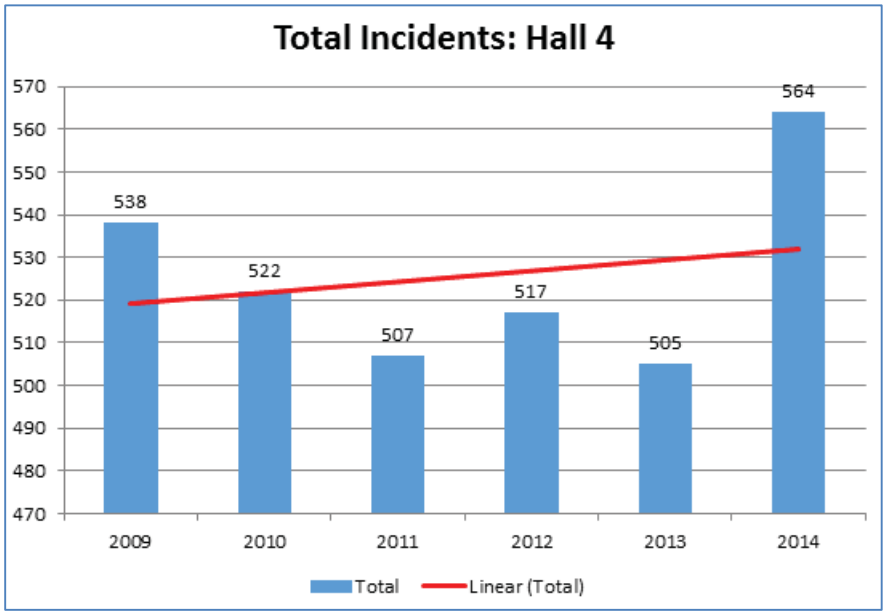

Figure 32: Hall 4 Total Responses, N=3,153

One additional consideration is the trend by fire hall area for certain event types. This will be particularly important as the response capability of the Department is evaluated in terms of apparatus allocation for its various tasks.

Structure Fires

The trend in terms of the number of fires, by fire hall area is shown in Figure 33. From this it can be seen that the area responded to by Hall 1 is the only one in which structure fires are increasing. For each of the other three fire hall areas, the incidence of structure fires is essentially flat.

In the case of Hall 1, the range of structure fire is considerable with a low of 38 to a high of 64.

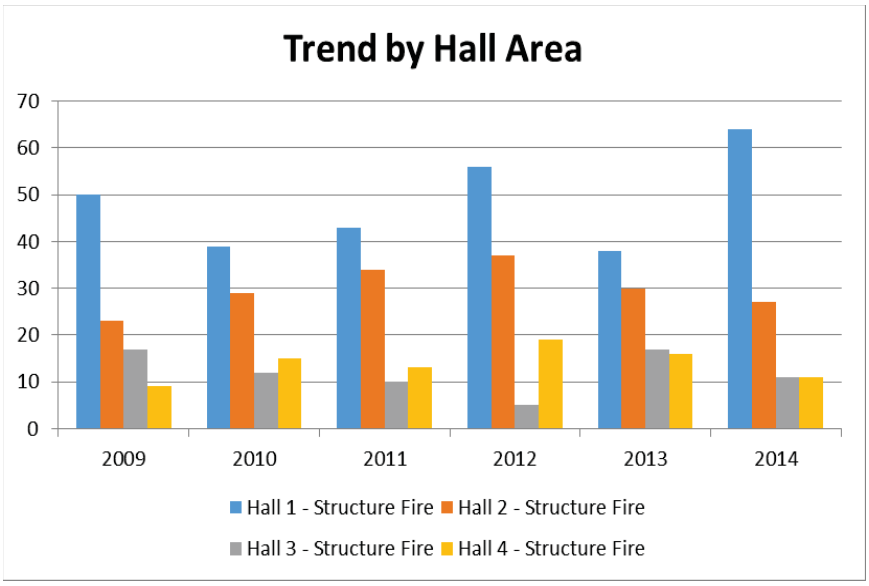

Figure 33: Response to Structure Fires, by Fire Hall Area

The response to EMR incidents is shown in Figure 34, and in this case the trend is flat across all four response areas.

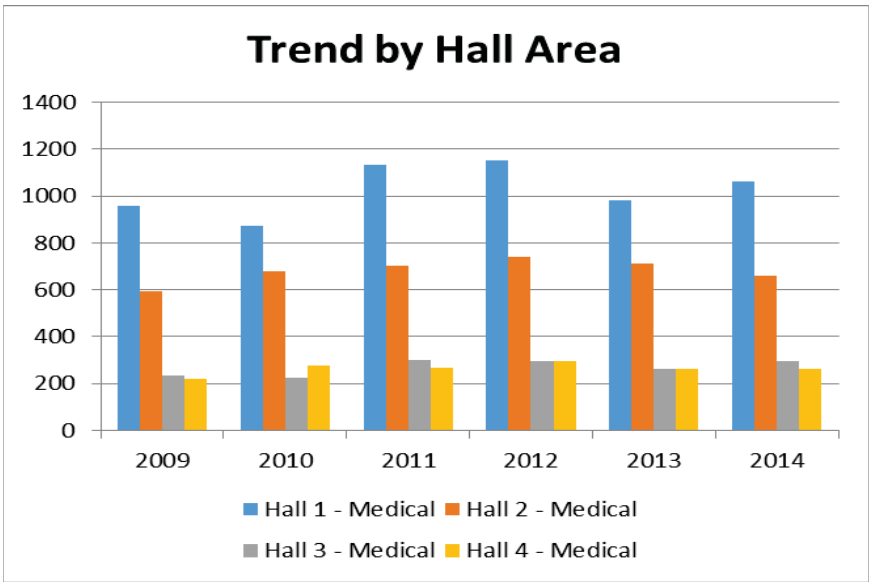

Figure 34: Response to Medical/EMR, by Fire Hall Area

Similar to EMR incidents, the trend in terms of MVI responses is flat across all four response areas.

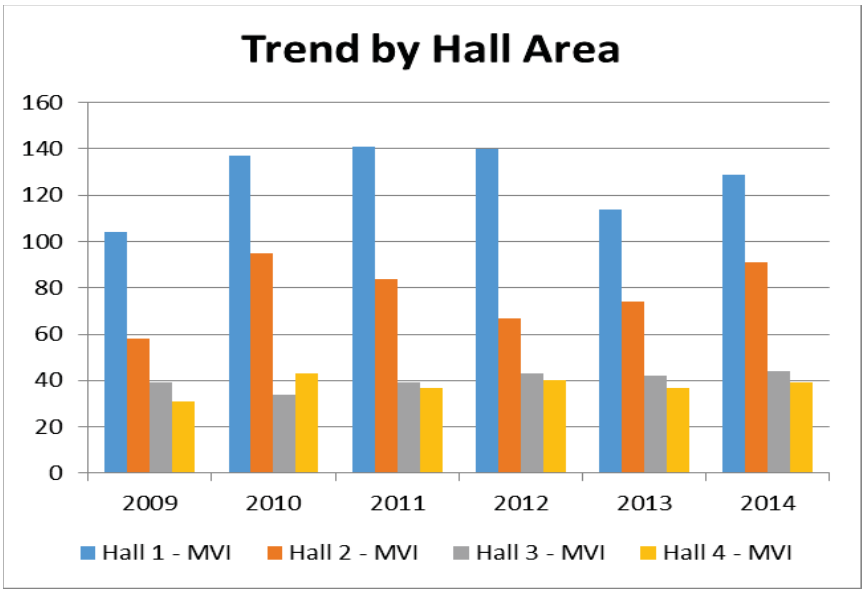

Figure 35: Response to MVIs, by Fire Hall Area

The number of calls for alarms ringing is one of the higher volume responses in terms of occurrence and the trend in these by fire hall area is shown in Figure 36. In this case the trend also appears to be flat over the period being reviewed.

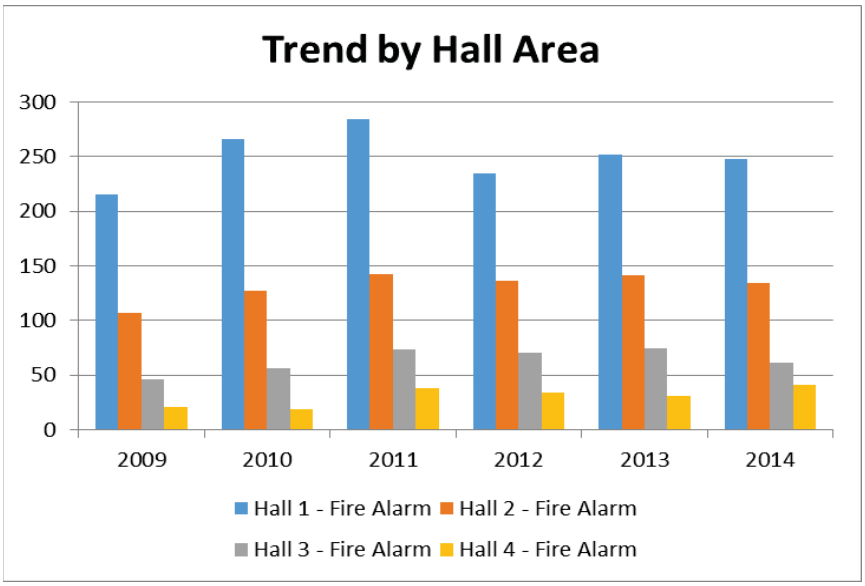

Figure 36: Response to Alarms Ringing, by Fire Hall Area

In summary, most incident types are trending reasonably flat in each of the fire hall areas. One notable exception is the case of structure fires where the trend is increasing and this will be one consideration in terms of the asset mix for each of the halls, given that structure fires require a response by virtually all of the Department's apparatus at the present time.

Response by Hall Area: 5 Year Projections

One objective of the current study is to provide recommendations with regard to fire halls and crewed fire apparatus for the next five to ten years. This will be developed based on an understanding of a number of factors including the Official Community Plan, population trends, changes in use for properties and areas, hazard assessment and response projections.

One method by which future response requirements can be estimated is by a mathematical projection based on the previous changes in call volume. There are some risks in relying on this totally as emergency response data is 'lumpy' and it cannot predict future changes in land use or change in population. That said, and given that the Department has six years' worth of data, this may provide some guidance.

Figure 37 shows the mathematical response projection for Hall 1. This estimates an annual response rate of 3,200 compared with the average for the past six years of nearly 2,900.

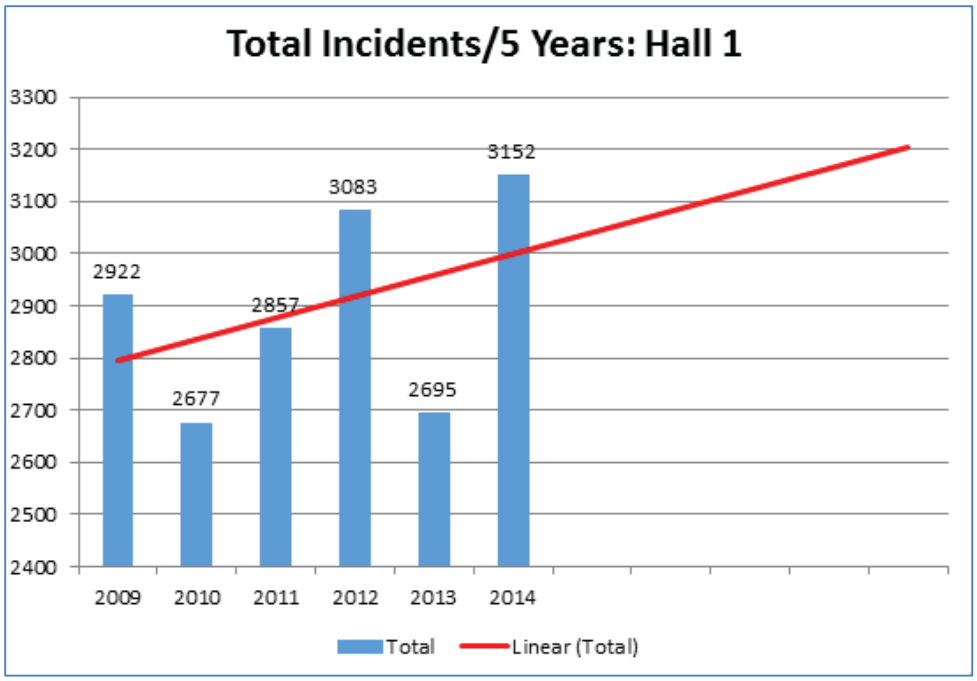

Figure 37: 5 Year Projection Hall 1 = 3,200, Average for 2009-2014 = 2,898

The five-year projection for Hall 2 as shown in Figure 38 is slightly less than Hall 1 and suggests an estimated annual response rate of 1,650. This number of responses may suggest an upward adjustment to the staffing and apparatus mix for this hall may be required.

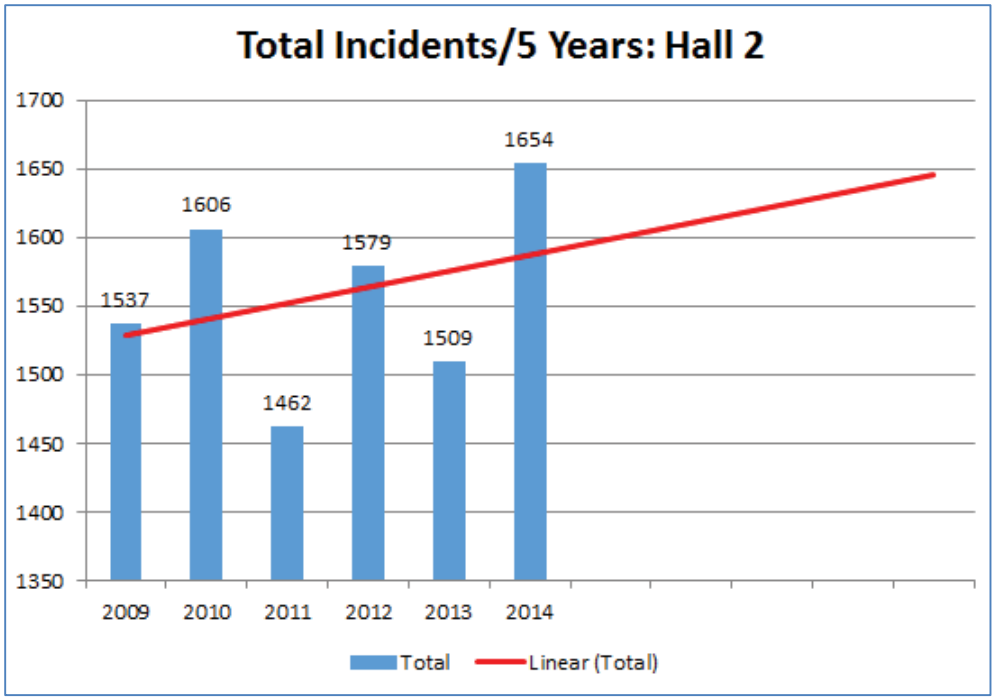

Figure 38: 5 Year Projection Hall 2 = 1,650, Average for 2009-2014 = 1,558

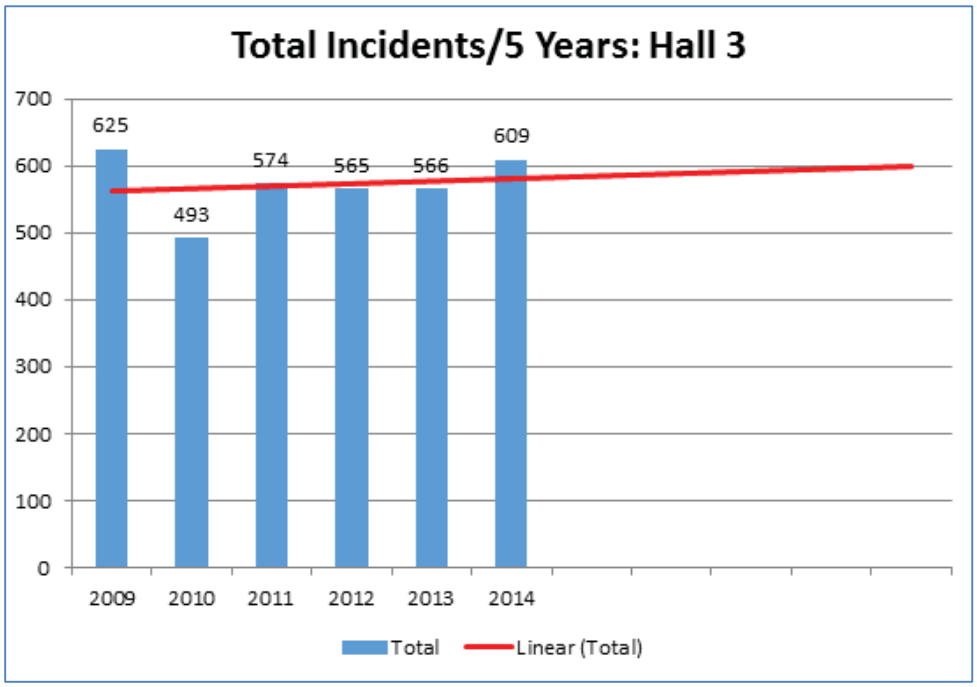

Figure 39: 5 Year Projection Hall 3 = 600, Average for 2009-2014 = 572

The five-year projection for Hall 3 is shown in Figure 39 and is essentially flat. By comparison in 2019 (assuming the projections are accurate) the responses by the Engine at Hall 1 will be five times that for the Engine at Hall 3.

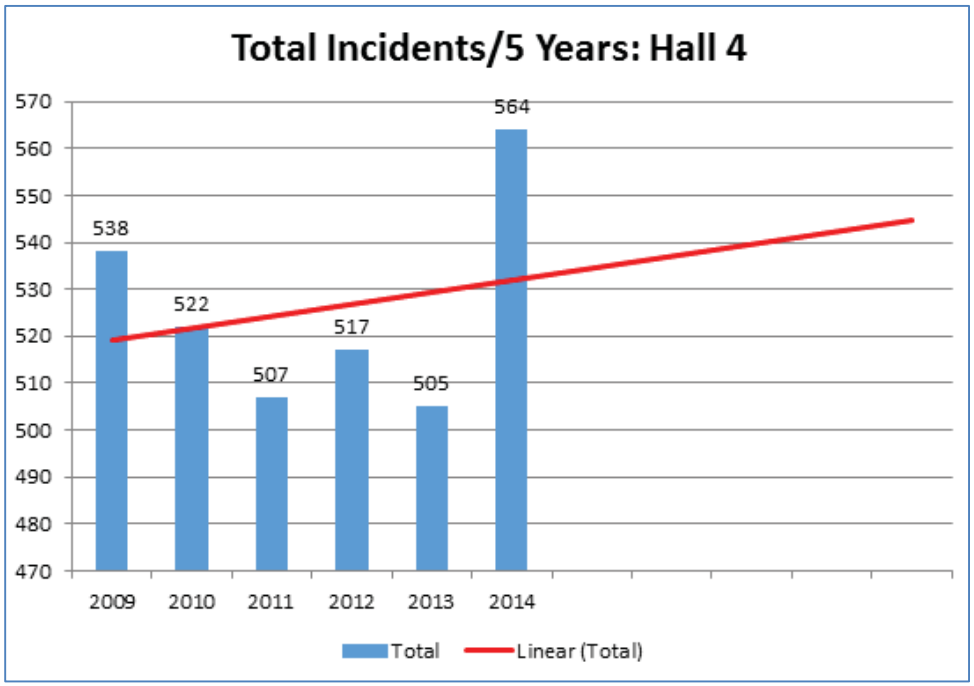

Figure 40: 5 Year Projection Hall 4 = 545, Average for 2009-2014 = 526

The response projection for Hall 4 is shown in Figure 40. There was a significant spike in responses during 2014 which materially affects the projected trend (and without which, the responses from this hall actually would be declining).

Apparatus Response and Utilization Rates

One response measure utilized by the fire service is the ability to assemble a crew within a specific timeframe for structure fires. The standard is the NFPA 1710 and departments measure their ability to provide a minimum of 14 fire fighters within eight minutes of travel time as follows:

> *A.4.1.2.1(3) This service delivery requirement is intended to have a fire department plan and situate its resources to consistently meet a 240-second travel time for the initial company fire suppression response; for other than high-rise, a 480-second travel time for the full alarm fire response assignment; and for high-rise, a 610-second travel time for the full alarm fire response assignment*.[83]

The staffing levels at Hall 1 and Hall 2 are insufficient to provide 14 fire fighters as a minimum and require the unit from either Hall 3 or Hall 4. For this reason, and given that the travel

[83] NFPA 1710, 2016 edition, page 19.

distances from Hall 3 and Hall 4 into the Hall 1 and 2 areas is significant, the Department rarely meets the standard.

Between 2009 and 2014 the Department has only achieved 14 or more fighters on scene seven times out of 248 incidents, a rate of slightly less than 3%.

Staffing Count	Occurrences
16	1
15	5
14	1
13	2
12	6
11	30
10	5
9	7
8	4

Staffing Count	Occurrences
7	58
6	31
5	16
4	62
3	9
2	4
1	7

Table 20: NFPA 1710 Compliance—Objective is 14 or more Firefighters on Scene

This data can be summarized by year as shown in Table 21 and this indicates that the success rate in achieving staffing of 14 on the fire ground within 8 minutes continues to decline.

Year	# of Structure Fires with Staffing at 14 or over	Compliance %
2009	3 out of 43	6.5%
2010	3 out of 36	8.5%
2011	1 out of 38	2.6%
2012	1 out of 46	2.2%
2013	0 out of 36	0.0%
2014	0 out of 54	0.0%

Table 21

Another response target established in NFPA 1710, is responder turnout time from the fire hall, which is the interval between when the fire crew hears the alert until the time they begin response to the scene of the emergency. This objective is stated as follows:

> *80 seconds for turnout time for fire and special operations response and 60 seconds turnout time for EMS response*.[84]

Turnout out time can be expected to vary by the incident type with the longest times expected for structure fires as the crew is required to don all of their protective equipment prior to initiating

[84] NFPA 1710, page 7

the response. Conversely we would expect that response to EMR responses to be quicker, and this reflects the guidelines in NFPA 1710.

Figure 41 shows the average turnout time for EMR calls for each Engine unit for the period being reviewed. Hall 1 has the quickest and most consistent times, ranging between 91 seconds and 99 seconds. Hall 2 is the next quickest with times ranging from 96 seconds to 110 seconds.

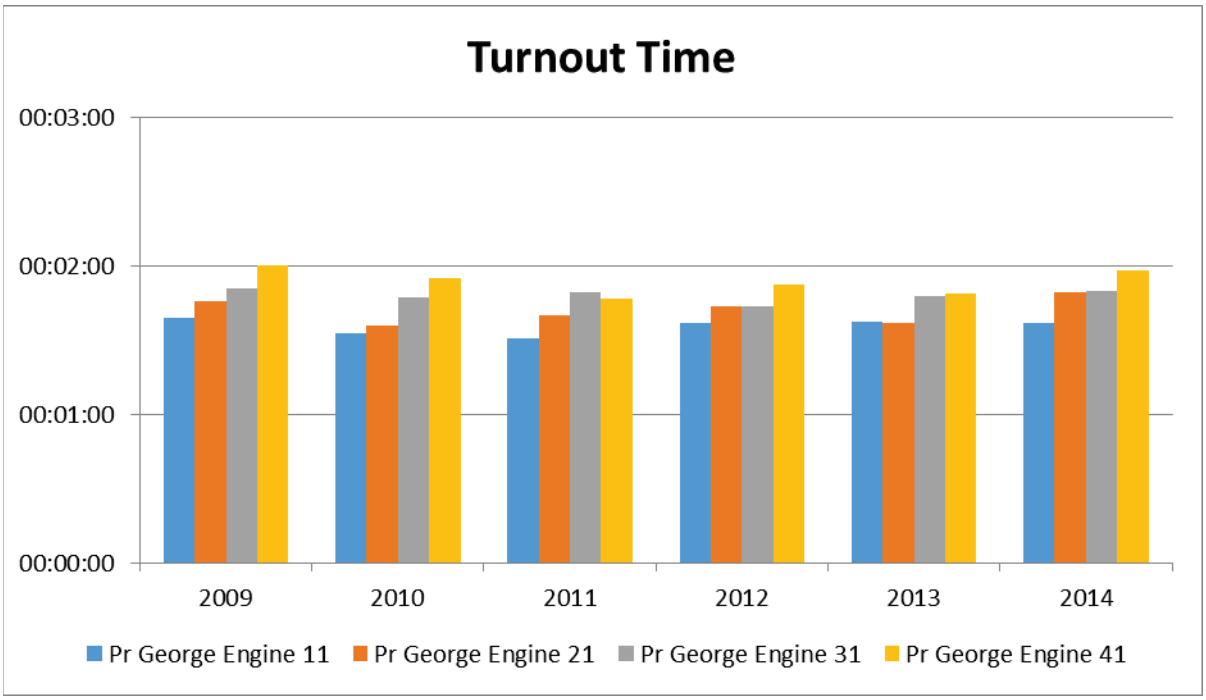

Figure 41: Turnout Time for EMR responses

The graph in Figure 42 shows the turnout time for structure fire incidents and in general the fire halls are in the same order from quickest to longer as with EMR responses. What this also indicates is the turnout time is consistently longer, by 40-50 seconds, representing the time taken to don all protective equipment prior to responding.

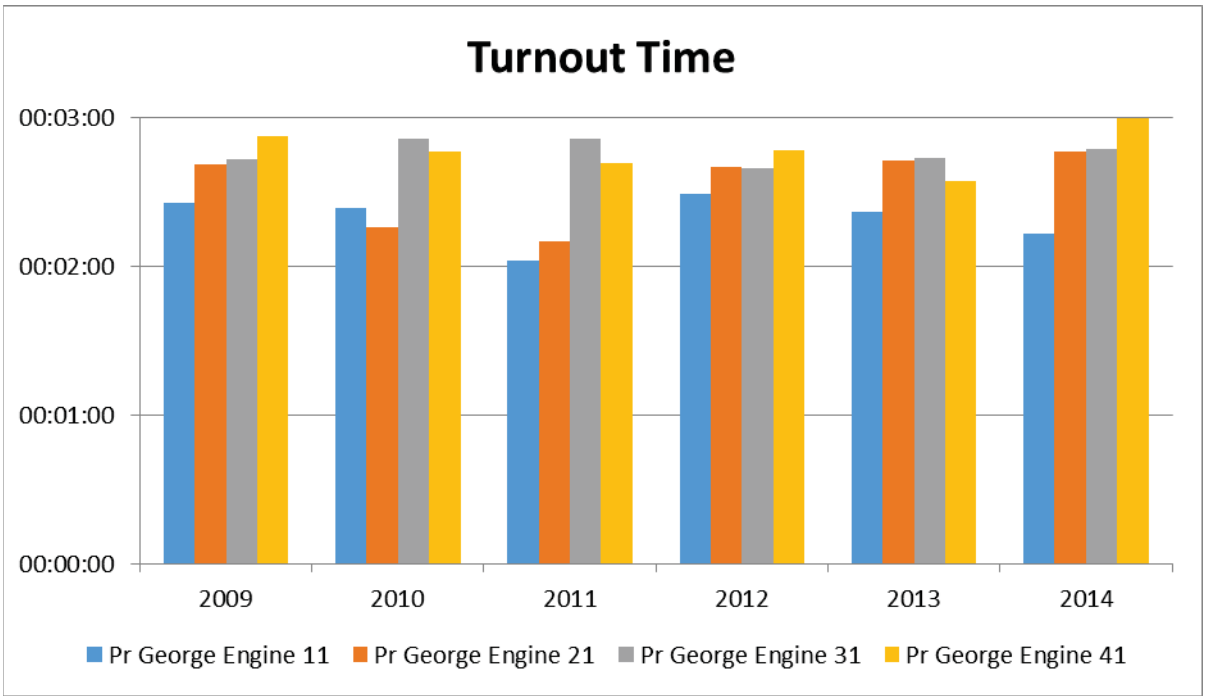

Figure 42: Turnout Time for Structure Fires

The consistent difference in turnout times between the fire halls for each incident type can be reviewed but is most likely a function of the difference in the layout of the halls; essentially the ergonomics of each. This may relate to the placement of personal protective equipment, the location of rip and run printouts, the location of portable radios and any number of factors. Hall 3 and Hall 4 are similar in design and may require more steps to initiate response than is found in Hall 1 in particular. Going forward, consideration of fire hall ergonomics will be important in terms of renovations or replacements of any of the halls.

Recommendation; Consideration should be given to improving turnout times throughout the Department. This may not be easily achievable if fire hall ergonomics are the issue, however, often a simple process of educating the crews to the importance of quicker turnout times can effect improvements.

Fire Halls: Locations and Suitability

There has already been some discussion regarding a shift of Hall 1 further south to put it more central to its response area. This would place it in the area of Victoria near 20th Avenue and may better meet the recommendations of the Fire Underwriters with regard to coverage for the

industrial property in the south. Halls 2, 3 and 4 are probably in the suitable locations for their respective response areas.

The other question to consider is whether an appropriate training site is constructed as part of new Hall 1 or developed at a different site. Discussions have been held with the Chief and Deputies in terms of recommending a location south of new Hall 1, perhaps at or near the industrial zoned properties. This would have the advantage of being more suitable for a live burn facility and would also enhance day time response to the industrial area.

Recommendation: Consider replacing Hall 1 with larger headquarters hall south of the current location.

Apparatus Recommendations

The Department is now procuring a Quint which will provide a second aerial devices and this will go some way to addressing concerns of the FUS. One further consideration that has been discussed and that is a recommendation of the report is to add a second staffed unit at (new) Hall 1.

This would address the much higher call volume at Hall 1, which alone handles >50% of all responses.

Recommendation: Consider adding a second staffed unit at Hall 1 to deal with the significant call volume at this hall. A second staffed unit would also provide a better opportunity to meet the NFPA 1710 requirements to have a minimum of 14 fire fighters on scene in 8 minutes.

Standards of Cover

The Department is a multi-response agency providing fire suppression, emergency medical response, rescue services, fire prevention and investigations as well as emergency communications. The majority of its emergency responses require one or two staffed units, while a minority of its responses are for structure fires requiring a major commitment of personnel and apparatus. This is typical for most major career departments.

The staffing requirement for structure fires is described by the NFPA 1710 standards and requires a minimum of 14 personnel, with apparatus for a fire in a single-family dwelling. Further, they require this within eight minutes of travel time. On review, the Department has not been able to achieve this response standard a single time.

The ability to arrive in a timely manner with sufficient trained personnel was described in a previous section and a major recommendation of this report is to increase staffing at Hall 1 and

Hall 2 to ensure this minimum staffing level. It is proposed that a second fully staffed unit be provided at Hall 1 increasing its complement to 11. This staffing level along with the four on duty at Hall 2 would provide the minimum staffing level in the downtown core which has the largest portion of structure fires, and where all major fires have occurred. The Department should continue to review response data and report on their degree of compliance in this regard. This would include its ability to meet the response time objective for turnout from the fire hall.

This recommendation is coupled with the replacement of Hall 1 at a location more central to its response district and built to accommodate all required apparatus and personnel.

The level of service the Department provides is Full Service as outlined by the Playbook. Council as the AHJ should confirm this level of service and provide support for the level of training and assessment to ensure this is achieved. This level of service should be regularly audited against the requirements and regularly reported to Council.

The Department provides a wide range of first medical response and rescue and this should continue. That said, the Department should regularly review its capability to respond to each of these responses to ensure that training and equipment is appropriate and that they are meeting such standards as may be identified. One example of this would be those defined by the BC Ambulance Service.

The level of fire inspections was reviewed and the Department has made major strides to meet its inspections targets in terms of frequency and quantity. The Department should monitor the impending changes to provincial legislation in terms of the new Fire Safety Act which may change its obligations for inspections and investigations.

Summary

The Department has undertaken a complete review of the services it provides for emergency and non-emergency responses as well as training, fire prevention and fire inspections. The review was conducted with the complete participation of a representative steering committee composed of members of the Department at all levels, including the IAFF. They are to be commended for their attention to the level of detail and support of the process.

The review was conducted to clarify the current levels of service and then to consider how they might be improved. For emergency responses the standards of service recommended are those of the NFPA. These standards derive from the nature of fire propagation and require the Department to dispatch and assemble a crew of sufficient size to perform rescue and fire suppression. The most serious of these event types are structure fires and the Department does not at the present time meet the required standard. For this reason, a major recommendation of this report is to increase the available staffing in the downtown core with another 4-person unit. This will allow the Department to assemble 14 firefighters, including officers within eight minutes of travel time for the majority of the structure fires it responds to.

Review of the Department's response capability included an assessment of the existing fire halls in terms of their configuration and condition. Hall 1 was identified as requiring replacement both in terms of its physical condition as well as its location. The Hall has been identified in previous reports as requiring replacement as it would not meet contemporary standards for seismic stability; as well it lacks sufficient space for required apparatus and crews as well as office and storage space. The Hall is also some distance away from its response area and when it is replaced a location further south would provide much better coverage for the majority of its calls and would provide more immediate coverage to the industrial properties south of that location.

As part of the review, the Department undertook a full HRVA assessment and is in the process of addressing the identified risks. The Department also considered its ability to provide fire inspections in a timely manner and is reviewing a number of strategies to shift some inspections to the on-duty fire crews, to consider basing some inspections based on their risk and adjusting the frequency of re-inspection in others.

The level of training was reviewed both in terms of the risk assessment as well as the Playbook. Based on the risk profile of the City, the Department must be considered as providing Full Service. The requirements for compliance with this level of service have been discussed and require the Department to provide training and assessment as defined in the Playbook[85]. Compliance will require very detailed records of training and assessment for every member of the Department. It is also recommended that the Department develop an appropriate training

[85] The detailed requirements can be found at Appendix 6: Playbook Compliance.

center including the capability for ‘live fire’ training, either at one of the fire halls or in the industrial area south of the downtown area.

List of Recommendations

Recommendation: Consideration should be given to improving the training facilities. (currently fire hall setting) This should include a dedicated Department training site (possibly located in the industrial area) to simulate scenario-based common types of incidents and allow for live-fire exercises. The site should also include training rooms, required training facilities/equipment and outside props.

Recommendation: Currently most of the training provided is for firefighters; more should be provided for the fire officers. Tailor the curriculum for the positions.

Recommendation: We would recommend that the Department undertake an internal review of all rescue services currently provided to determine: 1) If the service needs to be provided by the Department, 2) The required training levels necessary to provide that service, 3) The actual funding needed to provide that service including equipment, initial training and on-going maintenance training. Once these questions have been answered, the Department should seek appropriate approval and funding from the City.

Recommendation: To ensure competency is maintained, an annual skills maintenance training plan including evaluation models should be developed. The plan should encompass all aspects of firefighter and officer training including those skills required for specialty teams.

Recommendation: The current system of training members on their days off and accumulating days off is not working. Members are not required to attend training sessions and as such training in several specialties is often suffering (e.g., high angle and water rescue). The Department continues to respond to these events albeit with members who are not always trained as well as they need to be. This is a safety issue for both the members and the public they serve. Serious consideration should be given to either fully funding the required training or to cease providing (or significantly limit) the service.

Recommendation: That the Department consider more web based on duty training.

Recommendation: Expand the FPB's role to include a plan check for new construction, with a focus on major commercial, industrial, public institutional and multi-family projects, to ensure compliance with the Fire Code and with the Department's operational requirements.

Recommendation: The FPB requires a full complement of active staffing to meet its mandate and ensure the City meets its statutory obligations under the FSA. The

Department should review whether some additional assistance is required to address the existing backlog in inspections.

Recommendation: The Department should review the conduct of fire inspections by duty crews and increase the number of inspections and reinspections that are assigned to such crews.

Recommendation: With the increase in the number of inspections by duty crews, the FPB should review the inspection frequency. The goal should be to ensure that all inspectable properties are reviewed at least annually; where possible, the highest risk properties should be reviewed more frequently.

Recommendation: In the updating of the Department's operational and establishment bylaw, ensure that there is clear language permitting the Department to require the submission of additional information with a fire safety plan, that is necessary for pre-incident planning, and that such information is submitted in an electronic format that will enable the Department readily to develop effective pre-incident plans.

Recommendation: The Department and City should consider requiring that the most significant industrial / commercial risks, which require the most detailed fire safety plans, have their fire safety plans certified by an external third party before submission for review by the Department.

Recommendation: The FPB identify all properties in respect of which pre-incident plans should be created, and prioritize those properties based on risk.

Recommendation: The Department should develop or acquire a user-friendly electronic template for pre-incident plans. The "D" shift crew at halls 3 and 4 should be trained to develop pre-incident plans from fire safety plan data. Duty crews should be responsible for developing pre-incident plans for simpler or more straightforward risks only, as determined by the CFPO.

Recommendation: The FPB should remain responsible for developing pre-incident plans for all major industrial, commercial and institutional risks in the City.

Recommendation: Before any pre-incident plan goes live, it must be checked through a physical inspection of the property in question. Pre-incident plans should be regularly reviewed as part of the annual fire safety inspection for each property for which they exist.

Recommendation: The Department should ensure that its powers of entry for investigating fire hazards on complaint or where the FPB or Department members have a concern, are clearly set out in the revised establishment and operational bylaw. The Department should develop clear operational guidelines for dealing with problem properties, including coordination with law enforcement and socials service agencies, where required.

Recommendation: That the FPB be fully staffed (4 FTE's) and that personnel on long term absences are replaced on a temporary basis until their return to active duty.

Recommendation: That the FPB in cooperation with the Building Department implement a plan checking program for all new construction and major renovations in existing buildings. This may require additional training for the existing staff.

Recommendation: That the City of Prince George develop a policy whereby all lower risk properties are conducted on a bi-annual basis and that all high risk properties are conducted on an annual basis.

Recommendation: That duty crews are assigned all lower risk inspections and those higher risk inspections that the Chief Fire Prevention feels are appropriate for duty crews. Those high risk buildings not assigned to the duty crews will remain the responsibility of the FPB. This may require additional training for existing staff.

Recommendation; Consideration should be given to improving turnout times throughout the Department. This may not be easily achievable if fire hall ergonomics are the issue, however, often a simple process of educating the crews to the importance of quicker turnout times can effect improvements.

Recommendation: Consider replacing Hall 1 with larger headquarters hall south of the current location. This could be at or near Victoria and 20th Avenue. The fire hall should provide a minimum of four drive through bays.

Recommendation: Consider adding a second staffed unit at Hall 1 to deal with the significant call volume at this hall. A second staffed unit would also provide a better opportunity to meet the NFPA 1710 requirements to have a minimum of 14 fire fighters on scene in 8 minutes.

Appendix 1: List of Abbreviations/Acronyms

- AHJ Authority Having Jurisdiction
- ATO Accumulated Time Off
- CAD Computer Assisted Dispatch
- CFPO Chief Fire Prevention Officer
- DPG Dwelling Protection Grade
- EMBC Emergency Management BC
- EMR Emergency Medical Response
- EMS Emergency Medical Service
- EOC Emergency Operations Center
- EVD Emergency Vehicle Driver
- EVO Emergency Vehicle Operator
- FPB Fire Prevention Branch
- FSA Fire Services Act
- FSP Fire Safety Plan
- FUS Fire Underwriters
- HRVA Hazard, Risk and Vulnerability Analysis
- IAPD International Academy for Professional Driving
- NFPA National Fire Protection Association
- OCP Official Community Plan
- OFC Office of the Fire Commissioner
- PFPC Public Fire Protection Classification
- RHAVE Risk, Hazard and Value Evaluation
- WCA Workers Compensation Act

Appendix 2: NFPA 1901 Guidelines for Apparatus Replacement

Annex D Guidelines for First-Line and Reserve Fire Apparatus

This annex is not a part of the requirements of this NFPA document but is included for informational purposes only.

D.1 General. To maximize fire fighter capabilities and minimize risk of injuries, it is important that fire apparatus be equipped with the latest safety features and operating capabilities.

In the last 10 to 15 years, much progress has been made in upgrading functional capabilities and improving the safety features of fire apparatus. Apparatus manufactured prior to 1991 usually included only a few of the safety upgrades required by the recent editions of the NFPA fire department apparatus standards or the equivalent Underwriters' Laboratories of Canada (ULC) standards. Because the changes, upgrades, and fine tuning to NFPA 1901, *Standard for Automotive Fire Apparatus*, have been truly significant, especially in the area of safety, fire departments should seriously consider the value (or risk) to fire fighters of keeping fire apparatus older than 15 years in first-line service.

It is recommended that apparatus greater than 15 years old that have been properly maintained and that are still in serviceable condition be placed in reserve status and upgraded in accordance with NFPA 1912, *Standard for Fire Apparatus Refurbishing*, to incorporate as many features as possible of the current fire apparatus standard *(see Section D.3)*.

This will ensure that, while the apparatus might not totally comply with the current edition of the automotive fire apparatus standards, many of the improvements and upgrades required by the recent versions of the standards are available to the fire fighters who use the apparatus.

Apparatus that were not manufactured to the applicable NFPA fire apparatus standards or that are over 25 years old should be replaced.

D.2 How the Standards Have Changed. It is a generally accepted fact 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 had 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.

Prior to 1991, NFPA 1901 was basically a "reactive standard." If something worked well in field use for a few years, it might have been suggested for inclusion in NFPA1901. It was a very basic standard. In the late 1980s, the Technical Committee on Fire Department Apparatus decided to become proactive and to greatly enhance the value of the standard for the fire service. Task groups were appointed to develop reasonable requirements for the various components that made up a fire apparatus, and a safety task group was charged with looking at issues across the board that would improve the safety of fire fighters who use the apparatus.

The completely revised 1991 editions of the NFPA fire department apparatus standards were the result of those efforts and the full committee's strong desire to make the automotive fire apparatus standards not only more safety oriented but also more user friendly.

Contained within the 1991 edition of the fire department apparatus standards were requirements for such items as fully enclosed riding areas with reduced noise (dBA) levels to keep crew members safe and informed, seats and seat belts for all crew members riding on the apparatus, fail-safe door handles so the sleeve of a coat did not inadvertently catch a handle and open a door, and signs requiring everyone to be seated and belted. Also included were increased battery capacity to ensure starting under most conditions; improved warning lights, including intersection lights for increased visibility; removal of all roof-mounted audible warning devices to reduce hearing problems; a flashing light in the cab to warn if a cab or body door is open; a backup alarm; an automatic transmission to make it easier to drive (unless the purchaser has a specific reason for a manual transmission); auxiliary braking systems; and reflective striping.

The tip load for an aerial ladder was required to have a minimum carrying capacity of 250 lb (114 kg) when the aerial ladder was at zero degrees elevation and maximum extension. Other requirements, such as a minimum rail height, the minimum design strength of the rungs, and a minimum load carrying requirement for folding steps, were added to make the aerial ladder safer for fire fighters to use. Where a water tower was equipped with a ladder, the same requirements that applied to an aerial ladder were required of the ladder on the water tower.

The carrying capacity of elevating platforms at zero degrees elevation and maximum extension was raised to 750 lb (340 kg). Elevating platforms were also required to have handrails, breathing air available in the platform (with low-air warning capability) for at least two fire fighters, and a water curtain cooling system under the platform.

All aerial devices had to be capable of supporting a static load of one and one-half times their rated capacity in any position. A requirement for a stabilizer movement alarm and reflective striping with warning lights was added. Interlocks to prevent inadvertent movement to an unsupported side and to prevent raising the aerial device prior to the stabilizers being deployed were specified. One hundred percent non-destructive tests (NDT) became a requirement. All these requirements were included in the 1991 editions of the NFPA fire department apparatus standards

In the pump area, the standard specified that 3 in.

(75 mm) or larger valves be "slow close," that caps on intakes and discharge outlets be tested to 500 psi (3400 kPa), that an intake relief valve be provided to help manage incoming pressure, that 30-degree sweep elbows be provided on the discharges to eliminate hose kinking, and that all 3 in. (75 mm) and larger discharges be eliminated from the pump panel to reduce the possibility of injuries to the pump operator.

Fire apparatus equipped with electronic or electric engine throttle controls were required to include an interlock system to prevent engine speed advancement, unless the chassis transmission was in neutral with the parking brake engaged or unless the parking brake was engaged, the fire pump was engaged, and the chassis transmission was in the correct pumping gear.

The 1991 editions have been recognized as the benchmark from which improved and safer fire apparatus have evolved.

In 1996, many requirements were added throughout the document to improve the safety for fire fighters using the apparatus. These requirements included limiting the height of controls to 72 in. (1830 mm) above the standing position of the operator, requiring equipment in driving and crew areas to be securely fastened or in a compartment, increasing work lighting around the apparatus, and better grouping of pump controls to keep the operator away from the intake and discharge outlets. The low voltage electrical chapter was totally rewritten to require load analysis and load management if the total connected load could not be supplied by the vehicle's alternator. The requirements for warning lights were also rewritten to provide for different lighting for "calling for right of-way" versus "blocking right-of-way." Requirements for warning lights were increased to provide more visibility of the fire apparatus.

The 1999 edition of NFPA 1901 added requirements to further increase the safety for the users. In the body area, the minimum step surface size, slip resistance, and load-carrying capabilities were increased. Handrails were required to be slip resistant, and reflective striping was required on all four sides of the apparatus. To ensure the capability for continuous operation at fire scenes, a 2-hour, maximum load electrical test for line voltage systems was implemented.

The 1999 standard also required more secure mounting of equipment in the driving and crew compartment, minimum performance and pre-delivery testing of foam systems, and design of fill stations for breathing air cylinders to totally contain a rupturing cylinder.

The 2003 edition continued to refine the requirements in the driving and crew riding areas, increasing the head height at seating positions, bright-red seat belts, reflective material inside each cab door, automatic door-open lights, and more secure mounting of SCBAs in seat backs, all aimed at reducing fire fighter injuries. The test protocol for slip resistance of standing and walking surfaces was better defined. Because of the size of emergency vehicles, a label was required to remind operators of the height, length, and weight of the apparatus.

D.3 Upgrading Fire Apparatus. Any apparatus, whether in first-line or reserve service, should be upgraded in accordance with NFPA 1912, as necessary, to ensure that the following features are included as a minimum:

(1) Fully enclosed seating is provided for all members riding on the fire apparatus.

(2) Warning lights meet or exceed the current standard.

(3) Reflective striping meets or exceeds the current standard.

(4) Slip resistance of walking surfaces and handrails meets the current standard.

(5) A low-voltage electrical system load manager is installed if the total connected load exceeds the alternator output.

(6) The alternator output is capable of meeting the total continuous load on the low voltage electrical system.

(7) Where the gross vehicle weight rating (GVWR) is 36,000 lb

(16,000 kg) or more, an auxiliary braking system is installed and operating correctly.

(8) Ground and step lighting meets or exceeds the current standard.

(9) Noise levels in the driving and crew compartment(s) meet the current standard, or appropriate hearing protection is provided.

(10) All horns and sirens are relocated to a position as low and as far forward as possible.

(11) Seat belts are available for every seat and are new or in serviceable condition.

(12) Signs are present stating that no riding is allowed on open areas.

(13) A pump shift indicator system is present and working properly for vehicles equipped with an automatic chassis transmission.

(14) For vehicles equipped with electronic or electric engine throttle controls, an interlock system is present and working properly to prevent engine speed advancement at the operator's panel, unless either the chassis transmission is in neutral with the parking brake engaged, or the parking brake is engaged, the fire pump is engaged, and the chassis transmission is in pumping gear.

(15) All loose equipment in the driving and crew areas is securely mounted to prevent its movement in case of an accident.

D.4 Proper Maintenance of Fire Apparatus. In addition to needed upgrades to older fire apparatus, it is imperative that all fire apparatus be checked and maintained regularly to ensure that they will be reliable and safe to use. The manufacturer's instructions should always be followed when maintaining the fire apparatus. Special attention should be paid to ensure that the following conditions, which are particularly critical to maintaining a reliable unit exist:

(1) Engine belts, fuel lines, and filters have been replaced in accordance with the manufacturers' maintenance schedule(s).

(2) Brakes, brake lines, and wheel seals have been replaced or serviced in accordance with the manufacturers' maintenance schedule.

(3) Tires and suspension are in serviceable condition, and tires are not more than 7 years old.

(4) The radiator has been serviced in accordance with the manufacturer's maintenance schedule, and all cooling system hoses are new or in serviceable condition.

(5) The alternator output meets its rating.

(6) A complete weight analysis shows the fire apparatus is not over individual axle rating or total GVWR.

(7) The fire pump meets or exceeds its original pump rating.

(8) The water tank and baffles are not corroded or distorted.

(9) If the apparatus is equipped with an aerial device, a complete test to original specifications has been conducted and certified by a certified testing laboratory.

(10) If so equipped, the generator and line voltage accessories have been tested and meet the current standard.

D.5 Refurbishing or Replacing Fire Apparatus. Fire department administrators and fire chiefs should exercise special care when evaluating the cost of refurbishing or updating an apparatus versus the cost of a new fire apparatus. Apparatus that are refurbished should comply with the requirements of NFPA 1912, *Standard for Fire Apparatus Refurbishing*. A thorough cost–benefit analysis of the value of upgrading or refurbishing a fire apparatus should be conducted. In many instances, it will be found that refurbishing costs will greatly exceed the current value of similar apparatus.

Some factors to consider and evaluate when considering whether to refurbish or replace a fire apparatus include the following:

(1) What is the true condition of the existing apparatus? Has it been in a major accident, or has something else happened to it that would make spending significant money on it ill advised?

(2) Does the current apparatus meet the program needs of the area it is serving? Is it designed for the way the fire department operates today and is expected to operate into the foreseeable future, or is the apparatus functionally obsolete? Can it carry everything that is needed to do the job without being overloaded?

(3) If the apparatus is refurbished, will it provide the level of safety and operational capability of a new fire apparatus? Remember, in many cases, refurbishing does not mean increasing the GVWR, so it is not possible to add a larger water tank or additional foam agent tanks or to carry massive amounts of additional equipment. Enclosing personnel riding areas might add enough weight to the chassis that existing equipment loads need to be reduced to avoid overloading the chassis. An aerial ladder that does not have a 250 lb (114 kg) tip load rating at zero degrees elevation and maximum extension cannot be made stronger.

(4) What is the anticipated cost per year to operate the apparatus if it were refurbished? What would the cost per year be for a new apparatus? Do not forget insurance costs, downtime costs, maintenance costs, depreciation, reliability, and the safety of the users and the public. At what rate are those costs rising each year? Are parts still readily available for all the components on the apparatus? A refurbished 15-year-old apparatus still has 15-year-old parts in it. How long could the fire department operate without the apparatus if it suddenly needed major repairs?

(5) Is there a current trade-in value that will be gone tomorrow? Most apparatus over 12 years old have little trade-in value. Are there creative financing plans or leasing options that can provide a new fire apparatus for little more than the cost of refurbishing or maintaining an older apparatus?

D.6 Conclusion. A fire apparatus is an emergency vehicle that must be relied on to transport fire fighters safely to and from an incident and to operate reliably and properly to support the mission of the fire department. A piece of fire apparatus that breaks down at any time during an emergency operation not only compromises the success of the operation but might jeopardize the safety of the fire fighters relying on that apparatus to support their role in the operation. An old, worn-out, or poorly maintained fire apparatus has no role in providing emergency services to a community.

Appendix 3: Consolidated Incident Types

Initial Incident Type	General Type
911 Hang Up	911 Hang Up
Admin Call Records	Admin
Aircraft Emergency Landing	Aircraft
Aircraft Fire	Aircraft
Aircraft Standby	Aircraft
Ambulance - Notification	Notification
Assist	Medical
Barbeque Fire	BBQ
Bomb Threat	Bomb
Burning Complaint	Complaint
Cancelled On Arrival	Cancelled
Cancelled On Route	Cancelled
Carbon Monoxide Alarm	CO Alarm
Chimney Fire	Structure Fire
Complaints	Complaint
Dispatcher Test	Admin
Dumpster	Dumpster
Duty Officer Notification	Notification
Electrical Fire - Substation	Substation Fire
Explosion	Explosion
False Alarm	False Alarm
Fire Alarms - Commercial	Fire Alarm
Fire Alarms - False	Fire Alarm
Fire Alarms - Residential	Fire Alarm
Flooding	Flooding
HazMat1 - Low Risk	Hazmat
HazMat2 - Mod Risk	Hazmat
HazMat3 - High Risk	Hazmat
Hydro - Notification	Notification
Hydro Lines Down	Hydro Lines Down
Incident Not Found	Incident not found
Isolated Fire	Structure Fire
Kitchen Fire	Structure Fire
List Assist	Medical
Medical Aid	Medical
MVI1 - Motor Vehicle Incident	MVI
MVI2 - Multiple Vehicles	MVI

MVI3 - Entrapment; Motor Vehicle Incident	MVI
MVI4 - Entrapment; Multiple Vehicles/Patients	MVI
Natural Gas Leak	Gas Leak
Odour Unknown	Odour Unknown
Open Air Fire	Open Air Fire
Patient Not Found	Patient Not Found
Pedestrian Struck	Medical
Police - Notification	Notification
Rescue - Confined Space	Rescue
Rescue - High Angle	Rescue
Rescue - Low Risk	Rescue
Rescue - Water	Rescue
Smoke Report - Inside	Smoke Report
Smoke Report - Outside	Smoke Report
Structure Collapse	Structure Collapse
Structure Fire - Large	Structure Fire
Structure Fire - Small	Structure Fire
Terasen Gas - Notification	Notification
Transformer/Pole Fire	Transformer/Pole Fire
Vehicle Fire	Vehicle Fire
Wildland - Interface	Wildland
Wildland - Large	Wildland
Wildland - Small	Wildland

Appendix 4: Hazard, Risk and Vulnerability Analysis

Community Profile

What kind of community (or agency) do you live (or work) in? For example: size, demographics (age, socio-economic status, ethnic background, languages, disabilities) etc.

- Size,
    - 318.26 square kilometers
- Demographics (age, socio-economic status, ethnic background, languages, disabilities)
    - 2011 population 71,974[86] with 88,043 in the metropolitan area
    - median age is 33.9, compared to 38.4 for British Columbia
    - socio-economic issues
        - substantial transient population
            - those who are working in the region; also those not working or passing through
        - hub for social services for the region
        - low income housing, distributed
        - ethnic minority groups, with language issues
        - homeless population
        - high income, large homes
        - post-secondary education centre for the northern region
        - development in the north-east and north-west will affect the economy and population mix
    - ethnic background
        - first nations, Caucasian, mix of others
    - English, south Asian, and others

Business and Industry

What businesses and industries support your community or agency? How critical are they and what would happen if they were lost because of a disaster?

- Forestry, logging, sawmills, pulp mills, silviculture
    - Pulp mills are huge employers, they require transportation and support companies such as Chemtrade. They are very important economically, they are also high-risk
    - This industry supports not just Prince George, but a large area outside of the city

[86] Source: www.CivicInfo.bc.ca

    - The Prince George Fire Department has a recent history with a number of significant fire losses including Canfor and Lakeland
    - These facilities are located very near the centre of the city
    - A number of explosions at pellet mills in the recent past
    - Recycling facilities, mostly related to paper products
    - Lakeland review demonstrated a need for more regular training events with response partners to improve operations and communications
- Oil refinery, transportation
    - Husky provides all or most of the refined product for the North and North-west
    - Directly employ 120
    - Have had a number of fires in the piping and the refinery
    - 2014 tabletop identified a number of operational and communications deficiencies
- Chemical plants to support other industries
    - Principally for the pulp facilities within Prince George and within the larger region
    - Have had calls to Peroxychem; also at Chemtrade,
- Northern Health
    - Very large employer, multiple locations throughout the city
    - This is the only hospital within 100 KM for this area
    - Cancer clinic, with nuclear medicine
- Education, with the college and university
    - UNBC, has a chemical storage facility a recent incident with picric acid that required the Canadian military
    - Significant employer
    - Residences, with day care
    - Student population includes a number from outside of the city and region
    - Wood waste power generation plant
    - College of New Caledonia, within the city, multiple sites; focus on trades training
- Transportation, CNR
    - Inland container port
    - Increased traffic through Prince George to and from the west coast;
        - Task: to determine the growth in rail traffic through Prince George; this should also include an assessment of grade levels, crossing and turns
    - Challenges to engage with them about content
    - Prince George Fire has had incidents with content spillage
    - Recent document describes the incidence of rail accidents; it is particularly noteworthy that dangerous good accidents are increasing over previous years and that the highest number of accidents occur at level crossings
    - Need for table top/scenario exercises
- Government
    - Large employer
    - Support local, provincial, regional and federal government activities
- Construction

    - Present but mostly residential; also road construction
    - Multiple contractors operating in Prince George supply services within the city and within the region including major industries such as forestry, mining and petroleum
- Airport
    - New tank farm
    - Future plans might include a cargo hub, but this has not yet happened (distribution warehouse/waste disposal under construction)
    - Planes, terminal buildings
    - Runway is designated as an emergency stop for larger transcontinental planes; one reason for the very long runway which is the third longest in Canada
    - Is an international airport
    - Small airplane maintenance
    - Training airport
    - Regional air tanker base for forestry
    - Note the 'accord' is dated and needs to be reviewed
    - PG Fire attends for standby, but without training and equipment
- Retail, with a large number of people travelling to here to shop
    - Commercial hub for the region
    - Major, big box retailers
    - Older commercial section in the downtown area

Critical Lifelines

What infrastructures are critical lifelines for your community or agency? Which elements of infrastructure are most vulnerable and what would be the impact of the partial or total loss of each or all of these elements of infrastructure?
In the case of most of these, the impact of a loss is huge

- Rivers
    - Fraser and Nechako; small amounts of boat traffic, as well there is recreational use which may lead to a request for rescue
    - Flooding is a low risk except in the original parts of the city;
- Bridges
    - Two bridges, One road to the pulp mills and the refinery
    - John Hart
    - Foothills
    - Simon Fraser
    - Yellowhead
    - Rail
    - Cameron Street
- Rail
    - CN Rail, all four directions; loss of the rail connection would be significant

- Highways
    - Multiple highways in and out from north, east, west, south, but they are single routes so the potential loss of these is significant
- Airport
    - In 2011 the airport (YXS) supported 770 person years of employment generating $24 Million in wages[87]
- Hydro
    - Main transmission line from Bennett Dam to the south runs through the area
- Communications
    - On a fiber link which has vulnerabilities
    - In this area the majority of fiber is above ground
    - Site 'C'
- Gas/Oil
    - Pipelines run through the City
    - Refinery on the north side of the river
    - High pressure,
    - Note that some of this infrastructure is outside of the city limits, but there would an expectation that PG Fire would respond to prevent further spread into the city either of a fire, contamination or a smoke plume

Partnerships

Partnerships are an important part of successful emergency management. What public and private resources might be available to help your community or agency prevent, prepare for, or recover from a disaster? Where are they located, who controls them, and what are their capabilities?

- Provincial
    - BCAS
    - Forestry, assist with interface fires along with wildfire management branch
    - Ministry of Transportation, Environment
    - EMBC, PEP
    - SAR
    - UNBC, chemists are a resource
    - Northern Health,
- Federal
    - RCMP
    - Military
- RDFFG
- City of Prince George
- Industrial

[87] http://www.pgairport.ca/Airport_Info/air_service_development.php, accessed April 6, 2015

    - PG IMAC,
    - Industrial Mutual Aid Committee, multi-part group public and private
    - Rail
    - Trucking,
- Airport Authority
- E-Comm
- Utilities
    - Hydro, Fortis, Telus,
- Private contractors – Clean harbours/Newalta

Hazard, Risk and Vulnerability Analysis

The following list is taken from BCERMS. Within this list most may occur in Prince George with the exception of those noted.

- Air crashes
- Dam failures, not local but upstream
- Diseases (human and animal)
- Forest fires
- Gas explosions and gas leaks
- Hazardous material accidents
- Heat waves
- Ice storms and ice fogs
- Interface Fires
- Landslides, cut banks,
- Lightning
- Local flooding
- Marine accidents
- Motor vehicle accidents
- Power outages
- Rail accidents
- Rain storms
- Riots, unlikely
- Snow melt river flooding
- Snow storms
- Structural collapse
- Technological failure (computer hardware and software), including specifically for the department re Hall 1
- Terrorism, oil refinery
- An Industrial incident, mill explosion and fire, oil refinery
- Urban Fires
- None, or very low likelihood

    - Hailstorms, infrequent, low damage
    - Tsunami, none
    - Volcanic activity, none
    - Space object crash, unlikely
    - Earthquakes, minimal
    - Avalanches, unlikely
    - Mine explosions, none locally

Additional hazards would include the following.

- None identified

Risk Assessment

Prioritize the hazards in your community or agency.

- High Risk, more frequent occurrence
    - Forest fire
    - Rail
    - Hazmat
    - Flooding, ice jam or freshet, or dam failure
    - Urban fires
    - Industrial incidents
    - Major power failure/freezing rain
    - Gas explosion/leak
- High Risk, lower occurrence
    - Air crash
    - Loss of water supply
    - **noted not registered with EMBC for road rescue
    - Major MVI, commercial trucks
    - Disease, Pandemic

Vulnerability Assessment

Once an emergency management organization has analyzed the risk to the community of potential disasters, it must look at the impact of such events and the community's vulnerability. Each hazard can affect the community in different ways, such as:

Physical damage to the infrastructure, public and private buildings, and the environment

- Forest fire; significant impact on staff and equipment; may lose highway access, may lose utilities, may lose power to pumping stations, may lose radio transmission sites like Pilot Mountain,
- Major power loss; lack of standby power with the exception of Hall 1; short term loss of power for air bottle filling, etc., may lose power to pumping stations, note the backup FOCC at hall 2 does not have standby power

- Rail accident/fire, significant impact on staff and equipment + supplies like foam, significant impact on the economy
- Major flooding, significant impact on staffing, impact on the economy
- Industrial/HAZMAT, may result in major evacuations of the downtown or other areas, impact on the economy, staffing
- Loss of communication (Telephone/Internet/Data)

Social impacts on individuals, families, children, community organizations and society as a whole:

- Short term and long term health issues including for fire fighters
- Loss of jobs, family support
- Stress, including for fire fighters and other responders

Health issues

- To be determined

Economic losses

- Job losses
- Loss of revenue not just from the direct loss, but indirect from companies that support them
- Cost to replace infrastructure;
- Economic impact if businesses choose not to rebuild

What is the likely impact of hazards on your community or agency?

- To be determined

Mitigation

Examples of mitigation efforts that have been (or should be) taken in your community or agency.

Complete

- Wildfire mitigation, clearing underbrush and dead trees
- Raise the berm on River Road
- Resurrected PG IMAC
- Fire Chief is Deputy Director of the EOC
- EMR program – higher level of training provides for city wide coverage in the event of a major incident

Recommended

- Emergency planning
- Generators for all halls
- Emergency program coordinator

- Revise, update the emergency response plan
- Evacuation routes
- Community education,
- Reinforce the emergency operations centre in PG
- Should have regular activations of the EOC
- Apparatus for interface fires, such as structure protection units
- Specialized training for major mitigation such as forestry incidents,
- Need to exercise the planning at a local/tactical level
- Off-road capability
- Community refuge and/or shelter in place

Preparedness

Preparedness consists of activities designed to ensure the following:

1. Plan for effective response to and recovery from disasters

    - Understanding the risks, underway
    - Training and exercises
    - Clarify current staffing and apparatus, and will this accommodate the response
    - Community refuge; cooking facilities, water
    - Engage with identified partners such as ESS, Red Cross, SAR, conservation to avoid duplication, enhance response
    - Interagency PFA communication
    - Social media plan
    - Evacuation plan, evacuation routes
    - Review PG emergency plan
    - Develop an emergency operations plan for the Department for staff on and off duty
    - Identification of sources for other equipment we may not have access to
    - Clarify which plugs are on a UPS at Hall 1 and what isn't

2. Arrange for both internal and external resources to be available when needed

    - Review EMBC and the role of the PREOC
    - EOPS plan for staff

3. Provide education and training for everyone with a role during a disaster, from first responders to members of the public, with the education and training needed to respond effectively

    - Have a media plan to advise the public about emergency response and their role, expectations of the Department

- Provide more site support, EOC training
- Develop an agreed plan for the City and the RD
- Ensure that public education includes awareness of the plan, terms and phrases
- Noted that the city has a public awareness program that resides with a single individual
- Review and consider the implications of the Renteira report

4. Provide education and public awareness about emergency preparedness
    - Review and revise the emergency preparedness plan prior to discussing with the public
    - Plan for community/public education; this might be targeted to children, similar to fire prevention; this will require funding
    - Agreed that the best bang for the buck is the correct messaging ahead of the event;

5. Train, exercise and evaluate emergency plans, and
    - Discussed above, agreed this is a first step before a new plan can be rolled out and tested
    - Look for best practices
    - Department should designate an 'owner' for this

6. Revise plans and procedures.
    - To be done

What types of preparedness activities has your community or agency engaged in (i.e., public education, staff training, exercises, etc.)?

- Have conducted exercises in the past
- City does have a media person
- Have done pre-incident preparation with some industries
- Meet with officials from the PG PREOC
- Meet with Forestry annually
- Participate with PGIMAC
- Meet with utilities
- Working relationship with Northern Health
- Engage UNBC to access chemists
- Others?

Response

Response consists of activities designed to address the short-term effects of a disaster. This includes agency response, resource coordination, organizational structure, protection/warning systems and communication.

Response Agencies: A number of agencies may be involved in responding to a disaster. The most common first responders are law enforcement, fire and rescue, emergency medical

services and public works personnel. Your emergency management organization must work closely with these agencies to determine the type of response required for each hazard identified and the capabilities and resources needed by responders.

Resource Coordination: During a disaster, most communities and organizations will not have enough resources. A number of gaps in resources will be identified during the planning process. For example, there may be a need for more firefighting resources. Your organization should consider how extra resources could be accessed in case of a disaster. Private industry and other nearby municipalities may be able to provide resources. Resources based outside your community may not be immediately available after a disaster, so it may be necessary to plan interim measures.

Organizational Structure: The organizational structure during a disaster is usually different from day-to-day community management. The British Columbia Emergency Response Management System (BCERMS) is the structure used in this Province in case of a disaster.
How your organization will be structured during an emergency must be planned in advance. To prepare people to successfully fulfill their roles, the structure needs to be practised through training and exercises.

Protection/Warning Systems: A protection/warning system may be needed in your community. Based on their hazard analyses, some communities in BC have already implemented protection/warning systems. Port Alberni has an audible warning system to notify the public of a tsunami threat. Other communities have telephone warning systems in case of a hazardous materials incident.

Communication: Our society has become heavily dependent on technology for communications and computer systems. During a major emergency or disaster, there will be a large demand on such systems. Alternate systems should be available in case a disaster affects or shuts down day-to-day communication modes.

What response agencies exist in your community?

- PG Fire,
- RCMP,
- BCAS,
- Public Works,
- PG IMAC,
- Northern Health,
- SAR,
- Red Cross,
- Salvation Army,
- EMBC,
- Regional District,

- Utilities,
- Province: Ministry of the Environment; Transportation as required
- Federal Government: Military, DFO,
- Response partners outside of Prince George
- Contractors, Clean Harbours/Newalta; consider Ritchie Brothers for equipment
- Mobile fuel services for apparatus

How would (or could) your community notify the public of an impending disaster?

- At the present time by using the media (social media is being developed)
- RCMP door to door
- Mass notification service – blasts notification to subscribers

What alternate means of communications are available in your community?

- Social media
- Community notification systems in the future
- PG has a small capability to message the public for specific events
- In future consider MASAS

Recovery

Short-term recovery from a disaster returns vital life support systems to minimum operating standards. Long-term recovery may continue for years. Everyone in a community will be involved in recovery, including all levels of government, the business sector, families, and individuals. Ideally, disaster recovery processes will improve the community and make it a better, safer place for citizens.

Based on the hazards in your community, what may be some of the short-term recovery issues you could be faced with?

- Shelter and food, clean water, sewer
- Utilities for power and communication
- Fuel, [note no diesel tanks at the fire halls; fill at the City yard, but this would be impacted if a loss of power]
- Staffing
- Fatalities…(including for body storage0
- Internal dealing with any loss of staff or major injury
- Conflicting or multiple priorities
- Opening transportation routes

Based on the hazards in your community, what may be some of the long-term recovery issues you could be faced with?

- Environmental
- Major transportation disruptions
- Major communication disruptions
- Loss of major infrastructure such as the hospital
- Loss of a fire hall or equipment
- Loss of homes, requiring rebuild
- Loss of a major employer
- Unanticipated, uninsured costs
- Replacement of equipment
- Long-term health issues
- Conflicting or multiple priorities

Appendix 5: Review of existing training programs and proficiency criteria

The following is a review of the Department's current training programs and proficiency criteria, including those delivered in-house and those delivered by external providers.

Fire Suppression – full-service operations level which includes the following

- New Recruits – pre-requisites for new recruits are:
  - NFPA 1001
  - OFA or EMR
  - Class 3 drivers licence with air endorsement
  - Firefighter Candidate Physical Ability Test (CPAT).
- Once hired – all recruits receive PGFR specific fire ground operations and equipment training (9 weeks), which includes the following:
  - RIT – 3 day in-house program
  - EVD – 2 day in-house through IAPD program
  - Haz-Mat – 2 day in-house program
  - EMR – 2-3 day of EMR in-house program followed by a 2 day EMA Licence process.
  - Live Fire – 1 day at Fort St. James training facility
  - Swift Water Rescue – Ops. level, 2 days through Rescue Canada program
  - Vehicle Extrication – 2 day in-house program
  - Tender Operations – 1 day in-house program
  - Emergency Traffic Control – 1 day in-house program
  - Wildland for structural firefighters – S100 course
  - Radio procedures – in-house program
  - Fire Prevention Awareness – in-house program

Full Service Level Firefighter skills maintenance program

The Department is currently implementing an in-house program which will be conducted annually, and to include the following:

- All basic firefighter skills requirements of NFPA 1001 FF-I & II
- An orientation with all specialty services/teams skill sets
- Captains will be required to provide the training, and to maintain the training records (via RMS)

Fire Prevention – fire and life safety building inspections, fire investigation, and public education

- Oversight for training of the Fire Prevention Office is the responsibility of the Chief Fire Prevention Officer.
- Pre-requisite for the FPO – FF with Fire Inspection Level I (3rd party accredited course).

- Lt. Fire Inspection – requires FO-I and 2 years in the FP division.
- Capt. Fire Inspection – requires FO-II and 4 years in the FP division.
- In-house program to include:
  - Fire Investigator Level I, II & III (scene/incident investigation)
  - Fire Code course through the JIBC
  - Ongoing Fire Prevention Officers Association courses
  - Public Education course through the JIBC or the FPO Association

Emergency Medical Services (EMS)

- All Firefighters and several Fire Officers licenced to the EMR level through BC EMA licencing.
- All in-house instructors and evaluators certified through Red Cross EMR Program.
- All evaluators are EMA licenced to conduct in-house EMA evaluations (2 days) for candidates to receive their EMA licence – renewed every 5 years.
- Must be maintained with 20 education credits and 20 patient contacts per year.

Emergency Vehicle Driver (EVD) and Emergency Vehicle Operator (EVO)

- In-house 2-day EVD program, conducted by four in-house instructors certified through the International Academy for Professional Driving (IAPD) Program.
- Evaluations conducted with IAPD evaluation procedures.
- Uncertain as to whether this program meets the requirements of NFPA 1002.
- All new recruit firefighters receive this 2-day EVD program.
- Pre-requisites to drive engines, rescues and tenders:
  - 20 hours minimum driving non-emergency
  - 10 hours pumping operations
  - No evaluation process; qualified at the discretion of the Company Officer
- Pre-requisites to drive aerial ladders:
  - Qualified to drive engines (see above)
  - 10 hours minimum driving non-emergency (aerial)
  - 5 aerial set-ups and pump water
- All firefighters up to approximately the 20 year service level have had the 2-day EVD program; those senior to that have probably not had this training.
- No formal EVO (pumps & pumping) program – conducted in-house by apparatus drivers . . . Word of mouth, no formal program or evaluations.

Vehicle Extrication

- In-house program similar to Vehicle Rescue Level I.
- Instructors and evaluators trained to Vehicle Rescue Level II (JIBC accredited).
- Rescuer Basics (JIBC) is a pre-requisite for Rescue Level I.
- Two instructors have Commercial Vehicle Heavy Rescue training.

- All members receive in-house vehicle rescue level I program.
- Maintenance for auto extrication – trainers/instructors are assigned to a hall and the crews are rotated through that hall for training; hall 3 for auto-ex.

Hazardous Materials Response

- 3rd party accredited training program to NFPA 472 awareness and operations level.
- All firefighters trained to the awareness and operations level.
- Approximately 25 members trained to the technician level.
- Approximately 10 of these members (lead instructors) have additional training in CBRNE as well as the Pueblo Colorado Transportation Technology Centre Training which includes managing rail car incidents.

Technical Rescue Responses

As a pre-requisite to any specific technical rescue skill/team, all technical rescue members receive the Rescuer Basics course (JIBC) prior to their training for a specific discipline.

High-Angle Rope Rescue

- All members trained to level I (operations level), with 3rd party accreditation.
- In-house instructors are trained to level II (technician level), along with tower crane rescue. (5 members are funded through the THARP program)
- Skills maintenance is primarily achieved by conducting this training on the members' days off using the Accumulated Time Off (ATO) approach; as such, good attendance is a struggle, thus it is difficult to maintain the required skill sets.

Confined Space Rescue

- All members trained to level I (operations level), with 3rd party accreditation.
- In-house instructors are trained to level II (technician level).
- Skills maintenance is primarily achieved by conducting this training on the members' days off using the Accumulated Time Off (ATO) approach; as such, good attendance is a struggle, thus it is difficult to maintain the required skill sets.

Swift Water and Ice Rescue (shore based)

- All members are trained to level I (operations level), certified through the Rescue Canada program.
- In-house instructors for both swift water and ice rescue are trained to level II (technician level), certified through the Rescue Canada program.
- Internal instructors for water rescue are also certified by Rescue Canada in boat-based rescue and rescue boat operator.

- Skills maintenance is primarily achieved by conducting this training on the members' days off using the Accumulated Time Off (ATO) approach; as such, good attendance is a struggle, thus it is difficult to maintain the required skill sets.

Trench rescue

- No specific training – orientation to the dangers of trench rescues only, but will respond.

Structural collapse rescue

- No specific training, but will respond.

Aircraft crash rescue

- An agreement is in place for the department to respond to the airport for structural fires and fire inspections.
- No specific training for crash rescue, but will respond.
- Some awareness/orientation with the airport equipment and procedures, but nothing in the past 8 to 10 years.

Rapid Intervention Teams (RIT)

In-house RIT program, RIT trainers are internal; all members have now been trained through this in-house program.

Wildland/Urban Interface Responses

- All new members for past 6 years receive S100 from Wildfire Management Branch; have members certified to teach parts of this program
- Also have some members certified as fallers/danger tree assessors.
- Prior to that most received informal in-house familiarization with PGFR equipment.
- A new program, Wildland for Structural Firefighters, is now available from the Wildfire Management Branch. (the Dept. Has 2 instructors for this program)

Fire Officer Development

There is no pre-requisite program; the training opportunity is posted and available to those who accept the opportunity on a seniority basis.

Fire Officer I training (FO-I)

- Provided through an external third party accredited program certified to NFPA 1021 FO-I.

- The administrative, supervisory, managerial, and leadership portions of the program are delivered in-house, while the emergency incident management portions are delivered by an third party external provider.
- This program is also supplemented by in-house program operated by the Department.
- This program is required to perform at the rank of Captain.
- All FO-I candidates also receive the Fire Service Instructor (FSI) I & II courses through the JIBC.
- Skills maintenance is primarily achieved through conducting a 2-day incident management and strategies and tactics seminar every two to three years; delivered by a 3rd party external provider.
- FO-I (captain) performance evaluations are formally conducted by the Assistant Chief annually.

Fire Officer II training (FO-II)

- Pre-requisite for FO-II is successful completion of FO-I and two 3-credit post-secondary courses.
- FO-II training is provided through an external 3rd party accredited program certified to NFPA 1021 FO-II.
- The administrative and managerial portions of the program are delivered in-house, while the emergency incident management portions are delivered by an outside provider.
- This program is also supplemented by a PGFR in-house program.
- This program is required to perform at the rank of Assistant Chief.
- The candidate, in addition to the FO-I program, must also have successfully completed (70%) a 3-person panel interview to be eligible to “act” in this position/rank.
- The candidate, in addition to the above noted requirements, must also have completed an additional three 3-credit post-secondary courses (one per year) to be eligible for permanent promotion to this rank.
- FO-II (assist. Chief) performance evaluations are formally conducted by the Deputy Chief annually.

Captain in Training Division

- The position is a one year secondment.
- Required to be FO-I qualified with FSI-I.
- Must be an instructor in at least one specialty team.

Assistant Chief Training

- Same requirements as for FO-II (assist. Chief) noted above.
- Be an instructor in at least two specialty teams.

Assistant Chief Fire Prevention

- Same requirements as for FO-II (assist. Chief) noted above.
- Completed Fire Inspector level I.

- Be a Captain in Fire Prevention with a minimum of four years in the division, continuously for the past one year.
- Have completed four 3-credit post-secondary courses.

Deputy Fire Chief

- An exempt position, selected through city hall interview process.
- No pre-requisite education required.

Fire Chief

- An exempt position, selected through city hall interview process.
- No pre-requisite education required.

Appendix 6: Playbook Compliance

Structure Firefighters Competency and Training

PLAYBOOK

Second Edition: May 2015

References to NFPA Standards for:

- Train the Trainer
- Exterior Operations Firefighter
- Interior Operations Firefighter
- Full Service Operations Firefighter
- Team Leader Exterior and Interior
- Risk Management Officer
- Company Fire Officer

Standards Referenced:

NFPA 220	Standard on Types of Building Construction
NFPA 921	Guide for Fire and Explosion Investigations
NFPA 1001	Standard for Fire Fighter Professional Qualifications
NFPA 1021	Standard for Fire Officer Professional Qualifications
NFPA 1041	Standard for Fire Service Instructor Professional Qualifications
NFPA 1407	Standard for Training Fire Service Rapid Intervention Crews
NFPA 1500	Standard on Occupational Safety and Health Program
NFPA 1584	Standard on the Rehabilitation Process for Members During Emergency Operations and Training Exercises
NFPA 5000	Building Construction and Safety Code

Train the Trainer	Competency Met
NFPA 1041 4.2.1 – 4.2.4 / 4.3.2 – 4.3.3 / 4.4.1 – 4.4.4 / 4.5.1 – 4.5.3 and 4.5.5	
4.2.1 Definition of Duty. The management of basic resources and the records and reports essential to the instructional process.	
4.2.2 Assemble course materials, given a specific topic, so that the lesson plan and all materials, resources, and equipment needed to deliver the lesson are obtained. **(A) Requisite Knowledge.** Components of a lesson plan, policies and procedures for the procurement of materials and equipment, and resource availability. **(B) Requisite Skills.** None required.	Yes ☐ No ☐
4.2.3 Prepare requests for resources, given training goals and current resources, so that the resources required to meet training goals are identified and documented. **(A) Requisite Knowledge.** Resource management, sources of instructional resources and equipment. **(B) Requisite Skills.** Training schedule completion.	Yes ☐ No ☐
4.2.4 Schedule single instructional sessions, given a training assignment, department scheduling procedures, instructional resources, facilities and timeline for delivery, so that the specified sessions are delivered according to department procedure. **(A) Requisite Knowledge.** Departmental scheduling procedures and resource management. **(B) Requisite Skills.** Training schedule completion.	Yes ☐ No ☐
4.3.2* Review instructional materials, given the materials for a specific topic, target audience, and learning environment, so that elements of the lesson plan, learning environment, and resources that need adaptation are identified. **(A) Requisite Knowledge.** Recognition of student limitations and cultural diversity, methods of instruction, types of resource materials, organization of the learning environment, and policies and procedures. **(B) Requisite Skills.** Analysis of resources, facilities, and materials	Yes ☐ No ☐
4.3.3* Adapt a prepared lesson plan, given course materials and an assignment, so that the needs of the student and the objectives of the lesson plan are achieved. **(A)* Requisite Knowledge.** Elements of a lesson plan, selection of instructional aids and methods, and organization of the learning environment. **(B) Requisite Skills.** Instructor preparation and organizational skills.	Yes ☐ No ☐
4.4.1 Definition of Duty. The delivery of instructional sessions utilizing prepared course materials.	
4.4.2 Organize the classroom, laboratory, or outdoor learning environment, given a facility and an assignment, so that lighting, distractions, climate control or weather, noise control, seating, audiovisual equipment, teaching aids, and safety are considered. **(A) Requisite Knowledge.** Classroom management and safety, advantages and limitations of audiovisual equipment and teaching aids, classroom arrangement, and methods and techniques of instruction. **(B) Requisite Skills.** Use of instructional media and teaching aids.	Yes ☐ No ☐
4.4.3 Present prepared lessons, given a prepared lesson plan that specifies the presentation method(s), so that the method(s) indicated in the plan are used and the stated objectives or learning outcomes are achieved, applicable safety standards and practices are followed, and risks are addressed. **(A)* Requisite Knowledge.** The laws and principles of learning, methods and techniques of instruction, lesson plan components and elements of the communication process, and lesson plan terminology and definitions; the impact of cultural differences on instructional delivery; safety rules, regulations, and practices; identification of training hazards; elements and limitations of distance learning; distance learning delivery methods; and the instructor's role in distance learning. **(B) Requisite Skills.** Oral communication techniques, methods and techniques of instruction, and utilization of lesson plans in an instructional setting.	Yes ☐ No ☐

Train the Trainer	Competency Met
4.4.4* Adjust presentation, given a lesson plan and changing circumstances in the class environment, so that class continuity and the objectives or learning outcomes are achieved. **(A) Requisite Knowledge.** Methods of dealing with changing circumstances. **(B) Requisite Skills.** None required	Yes ☐ No ☐
4.5.1* Definition of Duty. The administration and grading of student evaluation instruments.	
4.5.2 Administer oral, written, and performance tests, given the lesson plan, evaluation instruments, and evaluation procedures of the agency, so that bias or discrimination is eliminated the testing is conducted according to procedures, and the security of the materials is maintained. **(A) Requisite Knowledge.** Test administration, agency policies, laws and policies pertaining to discrimination during training and testing, methods for eliminating testing bias, laws affecting records and disclosure of training information, purposes of evaluation and testing, and performance skills evaluation. **(B) Requisite Skills.** Use of skills checklists and oral questioning techniques.	Yes ☐ No ☐
4.5.3 Grade student oral, written, or performance tests, given class answer sheets or skills checklists and appropriate answer keys, so the examinations are accurately graded and properly secured. **(A) Requisite Knowledge.** Grading methods, methods for eliminating bias during grading, and maintaining confidentiality of scores. **(B) Requisite Skills.** None required.	Yes ☐ No ☐
4.5.5* Provide evaluation feedback to students, given evaluation data, so that the feedback is timely; specific enough for the student to make efforts to modify behavior; and objective, clear, and relevant; also include suggestions based on the data. **(A) Requisite Knowledge.** Reporting procedures and the interpretation of test results. **(B) Requisite Skills.** Communication skills and basic coaching.	Yes ☐ No ☐

Exterior Operations – Firefighter	Competency Met
Emergency Scene Traffic NFPA 1001 5.3.3	
5.3.3* Establish and operate in work areas at emergency scenes, given protective equipment, traffic and scene control devices, structure fire and roadway emergency scenes, traffic hazards and downed electrical wires, an assignment, and SOPs, so that procedures are followed, protective equipment is worn, protected work areas are established as directed using traffic and scene control devices, and the fire fighter performs assigned tasks only in established, protected work areas. **(A) Requisite Knowledge.** Potential hazards involved in operating on emergency scenes including vehicle traffic, utilities, and environmental conditions; proper procedures for dismounting apparatus in traffic; procedures for safe operation at emergency scenes; and the protective equipment available for members' safety on emergency scenes and work zone designations. **(B) Requisite Skills.** The ability to use personal protective clothing, deploy traffic and scene control devices, dismount apparatus, and operate in the protected work areas as directed.	Yes ☐ No ☐
Safety & Communications NFPA 1001 5.1.1, 5.1.2, 5.2, 5.2.1, 5.2.2, 5.2.3, 5.3.2, 5.3.17, 5.3.18	
5.1 General. For qualification at Level I, the fire fighter candidate shall meet the general knowledge requirements in 5.1.1; the general skill requirements in 5.1.2; the JPRs defined in Sections 5.2 through 5.5 of this standard; and the requirements defined in Chapter 5, Core Competencies for Operations Level Responders, and Section 6.6, Mission-Specific Competencies: Product Control, of NFPA 472, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*.	Yes ☐ No ☐
5.1.1 General Knowledge Requirements. The organization of the fire department; the role of the Fire Fighter I in the organization; the mission of fire service; the fire department's standard operating procedures (SOPs) and rules and regulations as they apply to the Fire Fighter I; the value of fire and life safety initiatives in support of the fire department mission and to reduce fire fighter line-of-duty injuries and fatalities; the role of other agencies as they relate to the fire department; aspects of the fire department's member assistance program; the importance of physical fitness and a healthy lifestyle to the performance of the duties of a fire fighter; the critical aspects of NFPA1500, *Standard on Fire Department Occupational Safety and Health Program.*	Yes ☐ No ☐
5.1.2 General Skill Requirements. The ability to don personal protective clothing, doff personal protective clothing and prepare for reuse, hoist tools and equipment using ropes and the correct knot, and locate information in departmental documents and standard or code materials.	Yes ☐ No ☐
5.2 Fire Department Communications. This duty shall involve initiating responses, receiving telephone calls, and using fire department communications equipment to correctly relay verbal or written information, according to the JPRs in 5.2.1 through 5.2.4.	
5.2.1* Initiate the response to a reported emergency, given the report of an emergency, fire department SOPs, and communications equipment, so that all necessary information is obtained, communications equipment is operated correctly, and the information is relayed promptly and accurately to the dispatch center. **(A) Requisite Knowledge.** Procedures for reporting an emergency; departmental SOPs for taking and receiving alarms, radio codes, or procedures; and information needs of dispatch center. **(B) Requisite Skills.** The ability to operate fire department communications equipment, relay information, and record information.	Yes ☐ No ☐
5.2.2 Receive a telephone call, given a fire department phone, so that procedures for answering the phone are used and the caller's information is relayed. **(A) Requisite Knowledge.** Fire department procedures for answering nonemergency telephone calls. **(B) Requisite Skills.** The ability to operate fire station telephone and intercom equipment.	Yes ☐ No ☐

Exterior Operations – Firefighter	Competency Met
5.2.3 Transmit and receive messages via the fire department radio, given a fire department radio and operating procedures, so that the information is accurate, complete, clear, and relayed within the time established by the AHJ. **(A) Requisite Knowledge.** Departmental radio procedures and etiquette for routine traffic, emergency traffic, and emergency evacuation signals. **(B) Requisite Skills.** The ability to operate radio equipment and discriminate between routine and emergency traffic.	Yes ☐ No ☐
5.3.2* Respond on apparatus to an emergency scene, given personal protective clothing and other necessary personal protective equipment, so that the apparatus is correctly mounted and dismounted, seat belts are used while the vehicle is in motion, and other personal protective equipment is correctly used. **(A) Requisite Knowledge.** Mounting and dismounting procedures for riding fire apparatus, hazards and ways to avoid hazards associated with riding apparatus, prohibited practices, and types of department personal protective equipment and the means for usage. **(B) Requisite Skills.** The ability to use each piece of provided safety equipment.	Yes ☐ No ☐
5.3.17 Illuminate the emergency scene, given fire service electrical equipment and an assignment, so that designated areas are illuminated and all equipment is operated within the manufacturer's listed safety precautions. **(A) Requisite Knowledge.** Safety principles and practices, power supply capacity and limitations, and light deployment methods. supply and lighting equipment, deploy cords and connectors, reset ground-fault interrupter (GFI) devices, and locate lights for best effect.	Yes ☐ No ☐
5.3.18 Turn off building utilities, given tools and an assignment, so that the assignment is safely completed. **(A) Requisite Knowledge.** Properties, principles, and safety concerns for electricity, gas, and water systems; utility disconnect methods and associated dangers; and use of required safety equipment. **(B) Requisite Skills.** The ability to identify utility control devices, operate control valves or switches, and assess for related hazards.	Yes ☐ No ☐
PPE and Self Contained Breathing Apparatus NFPA 1001 5.1.2, 5.2, 5.3, 5.3.1, 5.3.2, 5.5.1	
5.1.2 General Skill Requirements. The ability to don personal protective clothing, doff personal protective clothing and prepare for reuse, hoist tools and equipment using ropes and the correct knot, and locate information in departmental documents and standard or code materials.	Yes ☐ No ☐
5.2 Fire Department Communications. This duty shall involve initiating responses, receiving telephone calls, and using fire department communications equipment to correctly relay verbal or written information, according to the JPRs in 5.2.1 through 5.2.4.	Yes ☐ No ☐
5.3 Fireground Operations. This duty shall involve performing activities necessary to ensure life safety, fire control, and property conservation, according to the JPRs in 5.3.1 through 5.3.20.	
5.3.1* Use self-contained breathing apparatus (SCBA) during emergency operations, given SCBAand other personal protective equipment, so that the SCBA is correctly donned, the SCBA is correctly worn, controlled breathing techniques are used, emergency procedures are enacted if the SCBA fails, all low-air warnings are recognized, respiratory protection is not intentionally compromised, and hazardous areas are exited prior to air depletion. **(A) Requisite Knowledge.** Conditions that require respiratory protection, uses and limitations of SCBA, components of SCBA, donning procedures, breathing techniques, indications for and emergency procedures used with SCBA, and physical requirements of the SCBA wearer. **(B) Requisite Skills.** The ability to control breathing, replace SCBA air cylinders, use SCBA to exit through restricted passages, initiate and complete emergency procedures in the event of SCBA failure or air depletion, and complete donning procedures.	Yes ☐ No ☐

Exterior Operations – Firefighter	Competency Met
5.3.2* Respond on apparatus to an emergency scene, given personal protective clothing and other necessary personal protective equipment, so that the apparatus is correctly mounted and dismounted, seat belts are used while the vehicle is in motion, and other personal protective equipment is correctly used. **(A) Requisite Knowledge.** Mounting and dismounting procedures for riding fire apparatus, hazards and ways to avoid hazards associated with riding apparatus, prohibited practices, and types of department personal protective equipment and the means for usage. **(B) Requisite Skills.** The ability to use each piece of provided safety equipment.	Yes ☐ No ☐
5.5.1 Clean and check ladders, ventilation equipment, SCBA, ropes, salvage equipment, and hand tools, given cleaning tools, cleaning supplies, and an assignment, so that equipment is clean and maintained according to manufacturer's or departmental guidelines, maintenance is recorded, and equipment is placed in a ready state or reported otherwise. **(A) Requisite Knowledge.** Types of cleaning methods for various tools and equipment, correct use of cleaning solvents, and manufacturer's or departmental guidelines for cleaning equipment and tools. **(B) Requisite Skills.** The ability to select correct tools for various parts and pieces of equipment, follow guidelines, and complete recording and reporting procedures.	Yes ☐ No ☐
Ropes and Knots NFPA 1001 5.1.2, 5.3.20, 5.5.1	
5.1.2 General Skill Requirements. The ability to don personal protective clothing, doff personal protective clothing and prepare for reuse, hoist tools and equipment using ropes and the correct knot, and locate information in departmental documents and standard or code materials.	Yes ☐ No ☐
5.3.20 Tie a knot appropriate for hoisting tool, given personnel protective equipment, tools, ropes, and an assignment, so that the knots used are appropriate for hoisting tools securely and as directed. **(A) Requisite Knowledge.** Knot types and usage; the difference between life safety and utility rope; reasons for placing rope out of service; the types of knots to use for given tools, ropes, or situations; hoisting methods for tools and equipment; and using rope to support response activities. **(B) Requisite Skills.** The ability to hoist tools using specific knots based on the type of tool.	Yes ☐ No ☐
5.5.1 Clean and check ladders, ventilation equipment, SCBA, ropes, salvage equipment, and hand tools, given cleaning tools, cleaning supplies, and an assignment, so that equipment is clean and maintained according to manufacturer's or departmental guidelines, maintenance is recorded, and equipment is placed in a ready state or reported otherwise. **(A) Requisite Knowledge.** Types of cleaning methods for various tools and equipment, correct use of cleaning solvents, and manufacturer's or departmental guidelines for cleaning equipment and tools. **(B) Requisite Skills.** The ability to select correct tools for various parts and pieces of equipment, follow guidelines, and complete recording and reporting procedures.	Yes ☐ No ☐
Fire Streams, Hose and Appliances NFPA 1001 5.3.7, 5.3.8, 5.5.1, 5.5.2	

Exterior Operations – Firefighter	Competency Met
5.3.7* Attack a passenger vehicle fire operating as a member of a team, given personal protective equipment, attack line, and hand tools, so that hazards are avoided, leaking flammable liquids are identified and controlled, protection from flash fires is maintained, all vehicle compartments are overhauled, and the fire is extinguished. **(A) Requisite Knowledge.** Principles of fire streams as they relate to fighting automobile fires; precautions to be followed when advancing hose lines toward an automobile; observable results that a fire stream has been properly applied; identifying alternative fuels and the hazards associated with them; dangerous conditions created during an automobile fire; common types of accidents or injuries related to fighting automobile fires and how to avoid them; how to access locked passenger, trunk, and engine compartments; and methods for overhauling an automobile. **(B) Requisite Skills.** The ability to identify automobile fuel type; assess and control fuel leaks; open, close, and adjust the flow and pattern on nozzles; apply water for maximum effectiveness while maintaining flash fire protection; advance 1½ in. (38 mm) or larger diameter attack lines; and expose hidden fires by opening all automobile compartments. in stacked or piled and small unattached structures or storage containers that can be fought from the exterior, attack lines, hand tools and master stream devices, and an assignment, so that exposures are protected, the spread of fire is stopped, collapse hazards are avoided, water application is effective, the fire is extinguished, and signs of the origin area(s) and arson are preserved.	Yes ☐ No ☐
5.3.8* Extinguish fires in exterior Class A materials, given fires in stacked or piled and small unattached structures or storage containers that can be fought from the exterior, attack lines, hand tools and master stream devices, and an assignment, so that exposures are protected, the spread of fire is stopped, collapse hazards are avoided, water application is effective, the fire is extinguished, and signs of the origin area(s) and arson are preserved. **(A) Requisite Knowledge.** Types of attack lines and water streams appropriate for attacking stacked, piled materials and outdoor fires; dangers — such as collapse — associated with stacked and piled materials; various extinguishing agents and their effect on different material configurations; tools and methods to use in breaking up various types of materials; the difficulties related to complete extinguishment of stacked and piled materials; water application methods for exposure protection and fire extinguishment; dangers such as exposure to toxic or hazardous materials associated with storage building and container fires; obvious signs of origin and cause; and techniques for the preservation of fire cause evidence. **(B) Requisite Skills.** The ability to recognize inherent hazards related to the material's configuration, operate handlines or master streams, break up material using hand tools and water streams, evaluate for complete extinguishment, operate hose lines and other water application devices, evaluate and modify water application for maximum penetration, search for and expose hidden fires, assess patterns for origin determination, and evaluate for complete extinguishment	Yes ☐ No ☐
5.5.1 Clean and check ladders, ventilation equipment, SCBA, ropes, salvage equipment, and hand tools, given cleaning tools, cleaning supplies, and an assignment, so that equipment is clean and maintained according to manufacturer's or departmental guidelines, maintenance is recorded, and equipment is placed in a ready state or reported otherwise. **(A) Requisite Knowledge.** Types of cleaning methods for various tools and equipment, correct use of cleaning solvents, and manufacturer's or departmental guidelines for cleaning equipment and tools. **(B) Requisite Skills.** The ability to select correct tools for various parts and pieces of equipment, follow guidelines, and complete recording and reporting procedures.	Yes ☐ No ☐

Exterior Operations – Firefighter	Competency Met
5.5.2 Clean, inspect, and return fire hose to service, given washing equipment, water, detergent, tools, and replacement gaskets, so that damage is noted and corrected, the hose is clean, and the equipment is placed in a ready state for service. **(A) Requisite Knowledge.** Departmental procedures for noting a defective hose and removing it from service, cleaning methods, and hose rolls and loads. **(B) Requisite Skills.** The ability to clean different types of hose; operate hose washing and drying equipment; mark defective hose; and replace coupling gaskets, roll hose, and reload hose.	Yes ☐ No ☐
Ventilation NFPA 1001 5.3.11, 5.5.1	
5.3.11 Perform horizontal ventilation on a structure operating as part of a team, given an assignment, personal protective equipment, ventilation tools, equipment, and ladders, so that the ventilation openings are free of obstructions, tools are used as designed, ladders are correctly placed, ventilation devices are correctly placed, and the structure is cleared of smoke. **(A) Requisite Knowledge.** The principles, advantages, limitations, and effects of horizontal, mechanical, and hydraulic ventilation; safety considerations when venting a structure; fire behavior in a structure; the products of combustion found in a structure fire; the signs, causes, effects, and prevention of backdrafts; and the relationship of oxygen concentration to life safety and fire growth. **(B) Requisite Skills.** The ability to transport and operate ventilation tools and equipment and ladders, and to use safe procedures for breaking window and door glass and removing obstructions	Yes ☐ No ☐
5.5.1 Clean and check ladders, ventilation equipment, SCBA, ropes, salvage equipment, and hand tools, given cleaning tools, cleaning supplies, and an assignment, so that equipment is clean and maintained according to manufacturer's or departmental guidelines, maintenance is recorded, and equipment is placed in a ready state or reported otherwise. **(A) Requisite Knowledge.** Types of cleaning methods for various tools and equipment, correct use of cleaning solvents, and manufacturer's or departmental guidelines for cleaning equipment and tools. **(B) Requisite Skills.** The ability to select correct tools for various parts and pieces of equipment, follow guidelines, and complete recording and reporting procedures.	Yes ☐ No ☐
Water Supply NFPA 1001 5.3.15, 5.5.1, 5.5.2	
5.3.15* Connect a fire department pumper to a water supply as a member of a team, given supply or intake hose, hose tools, and a fire hydrant or static water source, so that connections are tight and water flow is unobstructed. **(A) Requisite Knowledge.** Loading and off-loading procedures for mobile water supply apparatus; fire hydrant operation; and suitable static water supply sources, procedures, and protocol for connecting to various water sources. **(B) Requisite Skills.** The ability to hand lay a supply hose, connect and place hard suction hose for drafting operations, deploy portable water tanks as well as the equipment necessary to transfer water between and draft from them, make hydrant-to-pumper hose connections for forward and reverse lays, connect supply hose to a hydrant, and fully open and close the hydrant.	Yes ☐ No ☐
5.5.1 Clean and check ladders, ventilation equipment, SCBA, ropes, salvage equipment, and hand tools, given cleaning tools, cleaning supplies, and an assignment, so that equipment is clean and maintained according to manufacturer's or departmental guidelines, maintenance is recorded, and equipment is placed in a ready state or reported otherwise. **(A) Requisite Knowledge.** Types of cleaning methods for various tools and equipment, correct use of cleaning solvents, and manufacturer's or departmental guidelines for cleaning equipment and tools. **(B) Requisite Skills.** The ability to select correct tools for various parts and pieces of equipment, follow guidelines, and complete recording and reporting procedures	Yes ☐ No ☐

Exterior Operations – Firefighter	Competency Met
5.5.2 Clean, inspect, and return fire hose to service, given washing equipment, water, detergent, tools, and replacement gaskets, so that damage is noted and corrected, the hose is clean, and the equipment is placed in a ready state for service. **(A) Requisite Knowledge.** Departmental procedures for noting a defective hose and removing it from service, cleaning methods, and hose rolls and loads. **(B) Requisite Skills.** The ability to clean different types of hose; operate hose washing and drying equipment; mark defective hose; and replace coupling gaskets, roll hose, and reload hose.	Yes ☐ No ☐
Ladders NFPA 1001 5.3.6, 5.5.1	
5.3.6* Set up ground ladders, given single and extension ladders, an assignment, and team members if needed, so that hazards are assessed, the ladder is stable, the angle is correct for climbing, extension ladders are extended to the necessary height with the fly locked, the top is placed against a reliable structural component, and the assignment is accomplished. **(A) Requisite Knowledge.** Parts of a ladder, hazards associated with setting up ladders, what constitutes a stable foundation for ladder placement, different angles for various tasks, safety limits to the degree of angulation, and what constitutes a reliable structural component for top placement. **(B) Requisite Skills.** The ability to carry ladders, raise ladders, extend ladders and lock flies, determine that a wall and roof will support the ladder, judge extension ladder height requirements, and place the ladder to avoid obvious hazards.	Yes ☐ No ☐
5.5.1 Clean and check ladders, ventilation equipment, SCBA, ropes, salvage equipment, and hand tools, given cleaning tools, cleaning supplies, and an assignment, so that equipment is clean and maintained according to manufacturer's or departmental guidelines, maintenance is recorded, and equipment is placed in a ready state or reported otherwise. **(A) Requisite Knowledge.** Types of cleaning methods for various tools and equipment, correct use of cleaning solvents, and manufacturer's or departmental guidelines for cleaning equipment and tools. **(B) Requisite Skills.** The ability to select correct tools for various parts and pieces of equipment, follow guidelines, and complete recording and reporting procedures.	Yes ☐ No ☐
Rehabilitation Area (REHAB) NFPA 1001 5.1.1, NFPA 1500, NFPA 1584	
5.1.1 General Knowledge Requirements. The organization of the fire department; the role of the Fire Fighter I in the organization; the mission of fire service; the fire department's standard operating procedures (SOPs) and rules and regulations as they apply to the Fire Fighter I; the value of fire and life safety initiatives in support of the fire department mission and to reduce fire fighter line-of-duty injuries and fatalities; the role of other agencies as they relate to the fire department; aspects of the fire department's member assistance program; the importance of physical fitness and a healthy lifestyle to the performance of the duties of a fire fighter; the critical aspects of NFPA1500, *Standard on Fire Department Occupational Safety and Health Program*.	Yes ☐ No ☐
+ **NFPA 1500** Standard on Occupational Safety and Health Program	Yes ☐ No ☐
+ **NFPA 1584** Standard on the Rehabilitation Process for Members During Emergency Operations and Training Exercises	Yes ☐ No ☐
Introduction to Basic Fire Behavior and Building Construction NFPA 220, NFPA 921, NFPA 1001 5.3.11, 5.3.12, 5.3.13 NFPA 5000	

Exterior Operations – Firefighter	Competency Met
5.3.11 Perform horizontal ventilation on a structure operating as part of a team, given an assignment, personal protective equipment, ventilation tools, equipment, and ladders, so that the ventilation openings are free of obstructions, tools are used as designed, ladders are correctly placed, ventilation devices are correctly placed, and the structure is cleared of smoke. **(A) Requisite Knowledge.** The principles, advantages, limitations, and effects of horizontal, mechanical, and hydraulic ventilation; safety considerations when venting a structure; fire behavior in a structure; the products of combustion found in a structure fire; the signs, causes, effects, and prevention of backdrafts; and the relationship of oxygen concentration to life safety and fire growth. **(B) Requisite Skills.** The ability to transport and operate ventilation tools and equipment and ladders, and to use safe procedures for breaking window and door glass and removing obstructions.	Yes ☐ No ☐
5.3.12 Perform vertical ventilation on a structure as part of a team, given an assignment, personal protective equipment, ground and roof ladders, and tools, so that ladders are positioned for ventilation, a specified opening is created, all ventilation barriers are removed, structural integrity is not compromised, products of combustion are released from the structure, and the team retreats from the area when ventilation is accomplished. **(A) Requisite Knowledge.** The methods of heat transfer; the principles of thermal layering within a structure on fire; the techniques and safety precautions for venting flat roofs, pitched roofs, and basements; basic indicators of potential collapse or roof failure; the effects of construction type and elapsed time under fire conditions on structural integrity; and the advantages and disadvantages of vertical and trench/strip ventilation. **(B) Requisite Skills.** The ability to transport and operate ventilation tools and equipment; hoist ventilation tools to a roof; cut roofing and flooring materials to vent flat roofs, pitched roofs, and basements; sound a roof for integrity; clear an opening with hand tools; select, carry, deploy, and secure ground ladders for ventilation activities; deploy roof ladders on pitched roofs while secured to a ground ladder; and carry ventilation-related tools and equipment while ascending and descending ladders.	Yes ☐ No ☐
5.3.13 Overhaul a fire scene, given personal protective equipment, attack line, hand tools, a flashlight, and an assignment, so that structural integrity is not compromised, all hidden fires are discovered, fire cause evidence is preserved, and the fire is extinguished. **(A) Requisite Knowledge.** Types of fire attack lines and water application devices most effective for overhaul, water application methods for extinguishment that limit water damage, types of tools and methods used to expose hidden fire, dangers associated with overhaul, obvious signs of area of origin or signs of arson, and reasons for protection of fire scene. **(B) Requisite Skills.** The ability to deploy and operate an attack line; remove flooring, ceiling, and wall components to expose void spaces without compromising structural integrity; apply water for maximum effectiveness; expose and extinguish hidden fires in walls, ceilings, and subfloor spaces; recognize and preserve obvious signs of area of origin and arson; and evaluate for complete extinguishment.	Yes ☐ No ☐
+ **NFPA 220** Standard on Types of Building Construction	Yes ☐ No ☐
+ **NFPA 921** Guide for Fire and Explosion Investigations	Yes ☐ No ☐
+ **NFPA 5000** Building Construction and Safety Code	Yes ☐ No ☐

Exterior Operations – Firefighter	Competency Met
Dangerous Goods or Hazmat Awareness *(from NFPA 472)* • Can utilize any training provider, including internal, that meets the competencies of NFPA 472 – Awareness Level [Playbook: Page 16, note1]	Yes ☐ No ☐
Gas & Electrical Safety for Firefighters *(supplied by a BC Utility utilizing an evaluation mechanism)* • Can utilize any program, developed by a registered Gas or Electrical Utility within the Province of BC, which includes an evaluation instrument based upon current recommended practice [Playbook: Page 16, note 2]	Yes ☐ No ☐
Incident Command System 100 *(from BCERMS curriculum)* • Can utilize any training provider, including internal, using certified training and evaluation based upon the BCEMS model. [Playbook: Page 16, note 3]	Yes ☐ No ☐

Interior Operations – Firefighter	Competency Met
All of Exterior Operations Firefighter PLUS the following:	Yes ☐ No ☐
Organization, Safety and Communications NFPA 1001 5.2.4	
5.2.4* Activate an emergency call for assistance, given vision obscured conditions, PPE, and department SOPs, so that the fire fighter can be located and rescued. **(A) Requisite Knowledge.** Personnel accountability systems, emergency communication procedures, and emergency evacuation methods. **(B) Requisite Skills.** The ability to initiate an emergency call for assistance in accordance with the AHJ's procedures, the ability to use other methods of emergency calls for assistance.	Yes ☐ No ☐
RIT Training – pertinent to jurisdictional hazards NFPA 1001 5.3.9 NFPA 1407, NFPA 1500	
5.3.9* Conduct a search and rescue in a structure operating as a member of a team, given an assignment, obscured vision conditions, personal protective equipment, a flashlight, forcible entry tools, hose lines, and ladders when necessary, so that ladders are correctly placed when used, all assigned areas are searched, all victims are located and removed, team integrity is maintained, and team members' safety — including respiratory protection — is not compromised. **(A) Requisite Knowledge.** Use of forcible entry tools during rescue operations, ladder operations for rescue, psychological effects of operating in obscured conditions and ways to manage them, methods to determine if an area is tenable, primary and secondary search techniques, team members' roles and goals, methods to use and indicators of finding victims, victim removal methods (including various carries), and considerations related to respiratory protection. **(B)* Requisite Skills.** The ability to use SCBA to exit through restricted passages, set up and use different types of ladders for various types of rescue operations, rescue a fire fighter with functioning respiratory protection, rescue a fire fighter whose respiratory protection is not functioning, rescue a person who has no respiratory protection, and assess areas to determine tenability.	Yes ☐ No ☐
+ **NFPA 1407** Standard for Training Fire Service Rapid Intervention Crews	Yes ☐ No ☐
+ **NFPA 1500** Standard on Fire Department Occupational Safety and Health Program	Yes ☐ No ☐
Self-Contained Breathing Apparatus NFPA 1001 5.3.1, 5.3.5, 5.3.9	
5.3.1* Use self-contained breathing apparatus (SCBA) during emergency operations, given SCBA and other personal protective equipment, so that the SCBA is correctly donned, the SCBA is correctly worn, controlled breathing techniques are used, emergency procedures are enacted if the SCBA fails, all low-air warnings are recognized, respiratory protection is not intentionally compromised, and hazardous areas are exited prior to air depletion. **(A) Requisite Knowledge.** Conditions that require respiratory protection, uses and limitations of SCBA, components of SCBA, donning procedures, breathing techniques, indications for and emergency procedures used with SCBA, and physical requirements of the SCBA wearer. **(B) Requisite Skills.** The ability to control breathing, replace SCBA air cylinders, use SCBA to exit through restricted passages, initiate and complete emergency procedures in the event of SCBA failure or air depletion, and complete donning procedures.	Yes ☐ No ☐

Interior Operations – Firefighter	Competency Met
5.3.5* Exit a hazardous area as a team, given vision-obscured conditions, so that a safe haven is found before exhausting the air supply, others are not endangered, and the team integrity is maintained. **(A) Requisite Knowledge.** Personnel accountability systems, communication procedures, emergency evacuation methods, what constitutes a safe haven, elements that create or indicate a hazard, and emergency procedures for loss of air supply. **(B) Requisite Skills.** The ability to operate as a team member in vision-obscured conditions, locate and follow a guideline, conserve air supply, and evaluate areas for hazards and identify a safe haven.	Yes ☐ No ☐
5.3.9* Conduct a search and rescue in a structure operating as a member of a team, given an assignment, obscured vision conditions, personal protective equipment, a flashlight, forcible entry tools, hose lines, and ladders when necessary, so that ladders are correctly placed when used, all assigned areas are searched, all victims are located and removed, team integrity is maintained, and team members' safety — including respiratory protection — is not compromised. **(A) Requisite Knowledge.** Use of forcible entry tools during rescue operations, ladder operations for rescue, psychological effects of operating in obscured conditions and ways to manage them, methods to determine if an area is tenable, primary and secondary search techniques, team members' roles and goals, methods to use and indicators of finding victims, victim removal methods (including various carries), and considerations related to respiratory protection. **(B)* Requisite Skills.** The ability to use SCBA to exit through restricted passages, set up and use different types of ladders for various types of rescue operations, rescue a fire fighter with functioning respiratory protection, rescue a fire fighter whose respiratory protection is not functioning, rescue a person who has no respiratory protection, and assess areas to determine tenability.	Yes ☐ No ☐
Search and Rescue NFPA 1001 5.3.9	
5.3.9* Conduct a search and rescue in a structure operating as a member of a team, given an assignment, obscured vision conditions, personal protective equipment, a flashlight, forcible entry tools, hose lines, and ladders when necessary, so that ladders are correctly placed when used, all assigned areas are searched, all victims are located and removed, team integrity is maintained, and team members' safety — including respiratory protection — is not compromised. **(A) Requisite Knowledge.** Use of forcible entry tools during rescue operations, ladder operations for rescue, psychological effects of operating in obscured conditions and ways to manage them, methods to determine if an area is tenable, primary and secondary search techniques, team members' roles and goals, methods to use and indicators of finding victims, victim removal methods (including various carries), and considerations related to respiratory protection. **(B)* Requisite Skills.** The ability to use SCBA to exit through restricted passages, set up and use different types of ladders for various types of rescue operations, rescue a fire fighter with functioning respiratory protection, rescue a fire fighter whose respiratory protection is not functioning, rescue a person who has no respiratory protection, and assess areas to determine tenability.	Yes ☐ No ☐
Fire Behavior NFPA 1001	Yes ☐ No ☐
Fire Extinguishers NFPA 1001 5.3.16	

Interior Operations – Firefighter	Competency Met
5.3.16* Extinguish incipient Class A, Class B, and Class C fires, given a selection of portable fire extinguishers, so that the correct extinguisher is chosen, the fire is completely extinguished, and correct extinguisher-handling techniques are followed. **(A) Requisite Knowledge.** The classifications of fire; the types of, rating systems for, and risks associated with each class of fire; and the operating methods of and limitations of portable extinguishers. **(B) Requisite Skills.** The ability to operate portable fire extinguishers, approach fire with portable fire extinguishers, select an appropriate extinguisher based on the size and type of fire, and safely carry portable fire extinguishers.	Yes ☐ No ☐
Building Construction NFPA 1001 5.3.11, 5.3.12	
5.3.11 Perform horizontal ventilation on a structure operating as part of a team, given an assignment, personal protective equipment, ventilation tools, equipment, and ladders, so that the ventilation openings are free of obstructions, tools are used as designed, ladders are correctly placed, ventilation devices are correctly placed, and the structure is cleared of smoke. **(A) Requisite Knowledge.** The principles, advantages, limitations, and effects of horizontal, mechanical, and hydraulic ventilation; safety considerations when venting a structure; fire behavior in a structure; the products of combustion found in a structure fire; the signs, causes, effects, and prevention of backdrafts; and the relationship of oxygen concentration to life safety and fire growth. **(B) Requisite Skills.** The ability to transport and operate ventilation tools and equipment and ladders, and to use safe procedures for breaking window and door glass and removing obstructions.	Yes ☐ No ☐
5.3.12 Perform vertical ventilation on a structure as part of a team, given an assignment, personal protective equipment, ground and roof ladders, and tools, so that ladders are positioned for ventilation, a specified opening is created, all ventilation barriers are removed, structural integrity is not compromised, products of combustion are released from the structure, and the team retreats from the area when ventilation is accomplished. **(A) Requisite Knowledge.** The methods of heat transfer; the principles of thermal layering within a structure on fire; the techniques and safety precautions for venting flat roofs, pitched roofs, and basements; basic indicators of potential collapse or roof failure; the effects of construction type and elapsed time under fire conditions on structural integrity; and the advantages and disadvantages of vertical and trench/strip ventilation. **(B) Requisite Skills.** The ability to transport and operate ventilation tools and equipment; hoist ventilation tools to a roof; cut roofing and flooring materials to vent flat roofs, pitched roofs, and basements; sound a roof for integrity; clear an opening with hand tools; select, carry, deploy, and secure ground ladders for ventilation activities; deploy roof ladders on pitched roofs while secured to a ground ladder; and carry ventilation-related tools and equipment while ascending and descending ladders.	Yes ☐ No ☐
Forcible Entry NFPA 1001 5.3.4	
5.3.4* Force entry into a structure, given personal protective equipment, tools, and an assignment, so that the tools are used as designed, the barrier is removed, and the opening is in a safe condition and ready for entry. **(A) Requisite Knowledge.** Basic construction of typical doors, windows, and walls within the department's community or service area; operation of doors, windows, and locks; and the dangers associated with forcing entry through doors, windows, and walls. **(B) Requisite Skills.** The ability to transport and operate hand and power tools and to force entry through doors, windows, and walls using assorted methods and tools.	Yes ☐ No ☐

Interior Operations – Firefighter	Competency Met
Ventilation NFPA 1001 5.3.12	
5.3.12 Perform vertical ventilation on a structure as part of a team, given an assignment, personal protective equipment, ground and roof ladders, and tools, so that ladders are positioned for ventilation, a specified opening is created, all ventilation barriers are removed, structural integrity is not compromised, products of combustion are released from the structure, and the team retreats from the area when ventilation is accomplished. **(A) Requisite Knowledge.** The methods of heat transfer; the principles of thermal layering within a structure on fire; the techniques and safety precautions for venting flat roofs, pitched roofs, and basements; basic indicators of potential collapse or roof failure; the effects of construction type and elapsed time under fire conditions on structural integrity; and the advantages and disadvantages of vertical and trench/strip ventilation. **(B) Requisite Skills.** The ability to transport and operate ventilation tools and equipment; hoist ventilation tools to a roof; cut roofing and flooring materials to vent flat roofs, pitched roofs, and basements; sound a roof for integrity; clear an opening with hand tools; select, carry, deploy, and secure ground ladders for ventilation activities; deploy roof ladders on pitched roofs while secured to a ground ladder; and carry ventilation-related tools and equipment while ascending and descending ladders.	Yes ☐ No ☐
Loss Control NFPA 1001 5.3.13, 5.3.14	
5.3.13 Overhaul a fire scene, given personal protective equipment, attack line, hand tools, a flashlight, and an assignment, so that structural integrity is not compromised, all hidden fires are discovered, fire cause evidence is preserved, and the fire is extinguished. **(A) Requisite Knowledge.** Types of fire attack lines and water application devices most effective for overhaul, water application methods for extinguishment that limit water damage, types of tools and methods used to expose hidden fire, dangers associated with overhaul, obvious signs of area of origin or signs of arson, and reasons for protection of fire scene. **(B) Requisite Skills.** The ability to deploy and operate an attack line; remove flooring, ceiling, and wall components to expose void spaces without compromising structural integrity; apply water for maximum effectiveness; expose and extinguish hidden fires in walls, ceilings, and subfloor spaces; recognize and preserve obvious signs of area of origin and arson; and evaluate for complete extinguishment.	Yes ☐ No ☐
5.3.14 Conserve property as a member of a team, given salvage tools and equipment and an assignment, so that the building and its contents are protected from further damage. **(A) Requisite Knowledge.** The purpose of property conservation and its value to the public, methods used to protect property, types of and uses for salvage covers, operations at properties protected with automatic sprinklers, how to stop the flow of water from an automatic sprinkler head, identification of the main control valve on an automatic sprinkler system, forcible entry issues related to salvage, and procedures for protecting possible areas of origin and potential evidence. **(B) Requisite Skills.** The ability to cluster furniture; deploy covering materials; roll and fold salvage covers for reuse; construct water chutes and catch-alls; remove water; cover building openings, including doors, windows, floor openings, and roof openings; separate, remove, and relocate charred material to a safe location while protecting the area of origin for cause determination; stop the flow of water from a sprinkler with sprinkler wedges or stoppers; and operate a main control valve on an automatic sprinkler system.	Yes ☐ No ☐
Live Fire Exterior NFPA 1001 5.3.7, 5.3.8, 5.3.10, 5.3.19	

Interior Operations – Firefighter	Competency Met
5.3.7* Attack a passenger vehicle fire operating as a member of a team, given personal protective equipment, attack line, and hand tools, so that hazards are avoided, leaking flammable liquids are identified and controlled, protection from flash fires is maintained, all vehicle compartments are overhauled, and the fire is extinguished. **(A) Requisite Knowledge.** Principles of fire streams as they relate to fighting automobile fires; precautions to be followed when advancing hose lines toward an automobile; observable results that a fire stream has been properly applied; identifying alternative fuels and the hazards associated with them; dangerous conditions created during an automobile fire; common types of accidents or injuries related to fighting automobile fires and how to avoid them; how to access locked passenger, trunk, and engine compartments; and methods for overhauling an automobile. **(B) Requisite Skills.** The ability to identify automobile fuel type; assess and control fuel leaks; open, close, and adjust the flow and pattern on nozzles; apply water for maximum effectiveness while maintaining flash fire protection; advance 1½ in. (38 mm) or larger diameter attack lines; and expose hidden fires by opening all automobile compartments.	Yes ☐ No ☐
5.3.8* Extinguish fires in exterior Class A materials, given fires in stacked or piled and small unattached structures or storage containers that can be fought from the exterior, attack lines, hand tools and master stream devices, and an assignment, so that exposures are protected, the spread of fire is stopped, collapse hazards are avoided, water application is effective, the fire is extinguished, and signs of the origin area(s) and arson are preserved. **(A) Requisite Knowledge.** Types of attack lines and water streams appropriate for attacking stacked, piled materials and outdoor fires; dangers — such as collapse — associated with stacked and piled materials; various extinguishing agents and their effect on different material configurations; tools and methods to use in breaking up various types of materials; the difficulties related to complete extinguishment of stacked and piled materials; water application methods for exposure protection and fire extinguishment; dangers such as exposure to toxic or hazardous materials associated with storage building and container fires; obvious signs of origin and cause; and techniques for the preservation of fire cause evidence. **(B) Requisite Skills.** The ability to recognize inherent hazards related to the material's configuration, operate handlines or master streams, break up material using hand tools and water streams, evaluate for complete extinguishment, operate hose lines and other water application devices, evaluate and modify water application for maximum penetration, search for and expose hidden fires, assess patterns for origin determination, and evaluate for complete extinguishment.	Yes ☐ No ☐

Interior Operations – Firefighter	Competency Met
5.3.10* Attack an interior structure fire operating as a member of a team, given an attack line, ladders when needed, personal protective equipment, tools, and an assignment, so that team integrity is maintained, the attack line is deployed for advancement, ladders are correctly placed when used, access is gained into the fire area, effective water application practices are used, the fire is approached correctly, attack techniques facilitate suppression given the level of the fire, hidden fires are located and controlled, the correct body posture is maintained, hazards are recognized and managed, and the fire is brought under control. **(A) Requisite Knowledge.** Principles of fire streams; types, design, operation, nozzle pressure effects, and flow capabilities of nozzles; precautions to be followed when advancing hose lines to a fire; observable results that a fire stream has been properly applied; dangerous building conditions created by fire; principles of exposure protection; potential longterm consequences of exposure to products of combustion; physical states of matter in which fuels are found; common types of accidents or injuries and their causes; and the application of each size and type of attack line, the role of the backup team in fire attack situations, attack and control techniques for grade level and above and below grade levels, and exposing hidden fires. **(B) Requisite Skills.** The ability to prevent water hammers when shutting down nozzles; open, close, and adjust nozzle flow and patterns; apply water using direct, indirect, and combination attacks; advance charged and uncharged 1½ in. (38 mm) diameter or larger hose lines up ladders and up and down interior and exterior stairways; extend hose lines; replace burst hose sections; operate charged hose lines of 1½ in. (38 mm) diameter or larger while secured to a ground ladder; couple and uncouple various handline connections; carry hose; attack fires at grade level and above and below grade levels; and locate and suppress interior wall and subfloor fires.	Yes ☐ No ☐
5.3.19* Combat a ground cover fire operating as a member of a team, given protective clothing, SCBA (if needed), hose lines, extinguishers or hand tools, and an assignment, so that threats to property are reported, threats to personal safety are recognized, retreat is quickly accomplished when warranted, and the assignment is completed. **(A) Requisite Knowledge.** Types of ground cover fires, parts of ground cover fires, methods to contain or suppress, and safety principles and practices. **(B) Requisite Skills.** The ability to determine exposure threats based on fire spread potential, protect exposures, construct a fire line or extinguish with hand tools, maintain integrity of established fire lines, and suppress ground cover fires using water.	Yes ☐ No ☐

Full Service Operations – Firefighter	Competency Met
All of NFPA 1001 – FF2 Competencies (except Hazmat and Medical Response) and with the addition of:	Yes ☐ No ☐
Live Fire Exterior and Interior	Yes ☐ No ☐
Hazmat Operations *(NFPA core competencies plus 6.6.1.1.2)*	Yes ☐ No ☐
6.6.1.1.2 The operations level responder assigned to perform product control at hazardous materials/ WMD incidents shall be trained to meet all competencies at the awareness level (*see Chapter 4*), all core competencies at the operations level (*see Chapter 5*), all mission-specific competencies for personal protective equipment (*see Section 6.2*), and all competencies in this section.	Yes ☐ No ☐

Team Leader Exterior & Interior	Competency Met
• Can utilize any training provider, including internal, that meets the competencies of NFPA 1021 – Fire Officer Professional Qualifications [Playbook: Page 16, note 3] *Completion of the Operational Firefighter requirements for either the Exterior or Interior Service Level PLUS the following Competencies from NFPA 1021:*	Yes ☐ No ☐
Incident Command and Fire Attack NFPA 1021 4.1.1, 4.2.1, 4.2.2, 4.2.3	
4.1.1* General Prerequisite Knowledge. The organizational structure of the department; geographical configuration and characteristics of response districts; departmental operating procedures for administration, emergency operations, incident management system and safety; fundamentals of leadership; departmental budget process; information management and recordkeeping; the fire prevention and building safety codes and ordinances applicable to the jurisdiction; current trends, technologies, and socioeconomic and political factors that affect the fire service; cultural diversity; methods used by supervisors to obtain cooperation within a group of subordinates; the rights of management and members; agreements in force between the organization and members; generally accepted ethical practices, including a professional code of ethics; and policies and procedures regarding the operation of the department as they involve supervisors and members.	Yes ☐ No ☐
4.2.1 Assign tasks or responsibilities to unit members, given an assignment at an emergency incident, so that the instructions are complete, clear, and concise; safety considerations are addressed; and the desired outcomes are conveyed. **(A) Requisite Knowledge.** Verbal communications during emergency incidents, techniques used to make assignments under stressful situations, and methods of confirming understanding. **(B) Requisite Skills.** The ability to condense instructions for frequently assigned unit tasks based on training and standard operating procedures.	Yes ☐ No ☐
4.2.2 Assign tasks or responsibilities to unit members, given an assignment under nonemergency conditions at a station or other work location, so that the instructions are complete, clear, and concise; safety considerations are addressed; and the desired outcomes are conveyed. **(A) Requisite Knowledge.** Verbal communications under nonemergency situations, techniques used to make assignments under routine situations, and methods of confirming understanding. **(B) Requisite Skills.** The ability to issue instructions for frequently assigned unit tasks based on department policy.	Yes ☐ No ☐
4.2.3 Direct unit members during a training evolution, given a company training evolution and training policies and procedures, so that the evolution is performed in accordance with safety plans, efficiently, and as directed. **(A) Requisite Knowledge.** Verbal communication techniques to facilitate learning. **(B) Requisite Skills.** The ability to distribute issue-guided directions to unit members during training evolutions.	Yes ☐ No ☐
Pre-Incident Planning, Size-up and Incident Action Planning NFPA 1021 4.5.2, 4.5.3, 4.6, 4.6.1, 4.6.2	

Team Leader Exterior & Interior	Competency Met
4.5.2 Identify construction, alarm, detection, and suppression features that contribute to or prevent the spread of fire, heat, and smoke throughout the building or from one building to another, given an occupancy, and the policies and forms of the AHJ so that a pre-incident plan for any of the following occupancies is developed: (1) Public assembly (2) Educational (3) Institutional (4) Residential (5) Business (6) Industrial (7) Manufacturing (8) Storage (9) Mercantile (10) Special properties **(A) Requisite Knowledge.** Fire behavior; building construction; inspection and incident reports; detection, alarm, and suppression systems; and applicable codes, ordinances, and standards. **(B) Requisite Skills.** The ability to use evaluative methods and to communicate orally and in writing.	Yes ☐ No ☐
4.5.3 Secure an incident scene, given rope or barrier tape, so that unauthorized persons can recognize the perimeters of the scene and are kept from restricted areas, and all evidence or potential evidence is protected from damage or destruction. **(A) Requisite Knowledge.** Types of evidence, the importance of fire scene security, and evidence preservation. **(B) Requisite Skills.** The ability to establish perimeters at an incident scene.	Yes ☐ No ☐
4.6* Emergency Service Delivery. This duty involves supervising emergency operations, conducting pre-incident planning, and deploying assigned resources in accordance with the local emergency plan and according to the following job performance requirements.	
4.6.1 Develop an initial action plan, given size-up information for an incident and assigned emergency response resources, so that resources are deployed to control the emergency. **(A)* Requisite Knowledge.** Elements of a size-up, standard operating procedures for emergency operations, and fire behavior. **(B)* Requisite Skills.** The ability to analyze emergency scene conditions; to activate the local emergency plan, including localized evacuation procedures; to allocate resources; and to communicate orally.	Yes ☐ No ☐
4.6.2* Implement an action plan at an emergency operation, given assigned resources, type of incident, and a preliminary plan, so that resources are deployed to mitigate the situation. **(A) Requisite Knowledge.** Standard operating procedures, resources available for the mitigation of fire and other emergency incidents, an incident management system, scene safety, and a personnel accountability system. **(B) Requisite Skills.** The ability to implement an incident management system, to communicate orally, to manage scene safety, and to supervise and account for assigned personnel under emergency conditions.	Yes ☐ No ☐
Fire Ground Accountability NFPA 1021 4.6.1, 4.6.2	

Team Leader Exterior & Interior	Competency Met
4.6.1 Develop an initial action plan, given size-up information for an incident and assigned emergency response resources, so that resources are deployed to control the emergency. **(A)* Requisite Knowledge.** Elements of a size-up, standard operating procedures for emergency operations, and fire behavior. **(B)* Requisite Skills.** The ability to analyze emergency scene conditions; to activate the local emergency plan, including localized evacuation procedures; to allocate resources; and to communicate orally.	Yes ☐ No ☐
4.6.2* Implement an action plan at an emergency operation, given assigned resources, type of incident, and a preliminary plan, so that resources are deployed to mitigate the situation. **(A) Requisite Knowledge.** Standard operating procedures, resources available for the mitigation of fire and other emergency incidents, an incident management system, scene safety, and a personnel accountability system. **(B) Requisite Skills.** The ability to implement an incident management system, to communicate orally, to manage scene safety, and to supervise and account for assigned personnel under emergency conditions.	Yes ☐ No ☐
Live Fire – Exterior *(Recommended for Exterior Operations)* NFPA 1001 5.3.7, 5.3.8, 5.3.10	
5.3.7* Attack a passenger vehicle fire operating as a member of a team, given personal protective equipment, attack line, and hand tools, so that hazards are avoided, leaking flammable liquids are identified and controlled, protection from flash fires is maintained, all vehicle compartments are overhauled, and the fire is extinguished. **(A) Requisite Knowledge.** Principles of fire streams as they relate to fighting automobile fires; precautions to be followed when advancing hose lines toward an automobile; observable results that a fire stream has been properly applied; identifying alternative fuels and the hazards associated with them; dangerous conditions created during an automobile fire; common types of accidents or injuries related to fighting automobile fires and how to avoid them; how to access locked passenger, trunk, and engine compartments; and methods for overhauling an automobile. **(B) Requisite Skills.** The ability to identify automobile fuel type; assess and control fuel leaks; open, close, and adjust the flow and pattern on nozzles; apply water for maximum effectiveness while maintaining flash fire protection; advance 1½ in. (38 mm) or larger diameter attack lines; and expose hidden fires by opening all automobile compartments.	Yes ☐ No ☐
5.3.8* Extinguish fires in exterior Class A materials, given fires in stacked or piled and small unattached structures or storage containers that can be fought from the exterior, attack lines, hand tools and master stream devices, and an assignment, so that exposures are protected, the spread of fire is stopped, collapse hazards are avoided, water application is effective, the fire is extinguished, and signs of the origin area(s) and arson are preserved. **(A) Requisite Knowledge.** Types of attack lines and water streams appropriate for attacking stacked, piled materials and outdoor fires; dangers — such as collapse — associated with stacked and piled materials; various extinguishing agents and their effect on different material configurations; tools and methods to use in breaking up various types of materials; the difficulties related to complete extinguishment of stacked and piled materials; water application methods for exposure protection and fire extinguishment; dangers such as exposure to toxic or hazardous materials associated with storage building and container fires; obvious signs of origin and cause; and techniques for the preservation of fire cause evidence. **(B) Requisite Skills.** The ability to recognize inherent hazards related to the material's configuration, operate handlines or master streams, break up material using hand tools and water streams, evaluate for complete extinguishment, operate hose lines and other water application devices, evaluate and modify water application for maximum penetration, search for and expose hidden fires, assess patterns for origin determination, and evaluate for complete extinguishment.	Yes ☐ No ☐

Team Leader Exterior & Interior	Competency Met
5.3.10* Attack an interior structure fire operating as a member of a team, given an attack line, ladders when needed, personal protective equipment, tools, and an assignment, so that team integrity is maintained, the attack line is deployed for advancement, ladders are correctly placed when used, access is gained into the fire area, effective water application practices are used, the fire is approached correctly, attack techniques facilitate suppression given the level of the fire, hidden fires are located and controlled, the correct body posture is maintained, hazards are recognized and managed, and the fire is brought under control. **(A) Requisite Knowledge.** Principles of fire streams; types, design, operation, nozzle pressure effects, and flow capabilities of nozzles; precautions to be followed when advancing hose lines to a fire; observable results that a fire stream has been properly applied; dangerous building conditions created by fire; principles of exposure protection; potential longterm consequences of exposure to products of combustion; physical states of matter in which fuels are found; common types of accidents or injuries and their causes; and the application of each size and type of attack line, the role of the backup team in fire attack situations, attack and control techniques for grade level and above and below grade levels, and exposing hidden fires. **(B) Requisite Skills.** The ability to prevent water hammers when shutting down nozzles; open, close, and adjust nozzle flow and patterns; apply water using direct, indirect, and combination attacks; advance charged and uncharged 1½ in. (38 mm) diameter or larger hose lines up ladders and up and down interior and exterior stairways; extend hose lines; replace burst hose sections; operate charged hose lines of 1½ in. (38 mm) diameter or larger while secured to a ground ladder; couple and uncouple various handline connections; carry hose; attack fires at grade level and above and below grade levels; and locate and suppress interior wall and subfloor fires.	Yes ☐ No ☐
Live Fire – Exterior & Interior *(Recommended for Interior Operations)*	Yes ☐ No ☐

Risk Management Officer	Competency Met
Completion of the Team Leader requirements for the Exterior Operations level PLUS the following courses (1 from each area):	Yes ☐ No ☐
EITHER Incident Action Planning NFPA 1021 4.6.1, 4.6.2 • *Requires a training program with subject matter covering areas such as strategies and tactics, fire ground command and emergency scene management* [Playbook: Page 16, note 5]	
4.6.1 Develop an initial action plan, given size-up information for an incident and assigned emergency response resources, so that resources are deployed to control the emergency. **(A)* Requisite Knowledge.** Elements of a size-up, standard operating procedures for emergency operations, and fire behavior. **(B)* Requisite Skills.** The ability to analyze emergency scene conditions; to activate the local emergency plan, including localized evacuation procedures; to allocate resources; and to communicate orally.	Yes ☐ No ☐
4.6.2* Implement an action plan at an emergency operation, given assigned resources, type of incident, and a preliminary plan, so that resources are deployed to mitigate the situation. **(A) Requisite Knowledge.** Standard operating procedures, resources available for the mitigation of fire and other emergency incidents, an incident management system, scene safety, and a personnel accountability system. **(B) Requisite Skills.** The ability to implement an incident management system, to communicate orally, to manage scene safety, and to supervise and account for assigned personnel under emergency conditions.	Yes ☐ No ☐
OR Incident Safety Officer NFPA 1521 6.1 – 6.7.2 *(operational)*	Yes ☐ No ☐
6.1 General Functions of the Incident Safety Officer. **6.1.1*** The incident safety officer (ISO) shall be integrated with the incident management system (IMS) as a command staff member, as specified in NFPA 1561, *Standard on Emergency Services Incident Management System*. **6.1.2*** Standard operating procedures (SOPs) shall define criteria for the response of a predesignated incident safety officer. **6.1.2.1** If the incident safety officer is designated by the incident commander, the fire department shall establish criteria for appointment based upon 6.1.1. **6.1.3*** The incident safety officer and assistant incident safety officer(s) shall be readily identifiable at the incident scene. **6.1.4*** Upon arrival or assignment as the incident safety officer at an incident, he or she shall obtain a situation-status briefing from the incident commander, that includes the incident action plan. **6.1.5** The incident safety officer shall monitor the incident action plan, conditions, activities, and operations to determine whether they fall within the criteria as defined in the fire department's risk management plan. **6.1.6** When the perceived risk(s) is not within the fire department's risk management criteria, the incident safety officer shall take action as outlined in Section 4.6. **6.1.7** The incident safety officer shall monitor the incident scene and report to the incident commander the status of conditions, hazards, and risks.	

Risk Management Officer	Competency Met
6.1.8 The incident safety officer shall ensure that the fire department's personnel accountability system is being utilized. **6.1.9*** The incident safety officer shall offer judgment to the incident commander on establishing control zones and no entry zones and ensure that established zones are communicated to all members present on the scene. **6.1.10** The incident safety officer shall evaluate motor vehicle incident scene traffic hazards and apparatus placement and take appropriate actions to mitigate hazards as described in Section 8.7 of NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*. **6.1.11** The incident safety officer shall monitor radio transmissions and stay alert to transmission barriers that could result in missed, unclear, or incomplete communication. **6.1.12*** The incident safety officer shall ensure that the incident commander establishes an incident scene rehabilitation tactical level management component during emergency operations. **6.1.13*** The incident safety officer shall communicate to the incident commander the need for assistant incident safety officers and/or technical specialists due to the need, size, complexity, or duration of the incident. **6.1.14** The incident safety officer or assistant incident safety officer shall survey and evaluate the hazards associated with the designation of a landing zone and interface with helicopters. **6.1.15*** The incident safety officer shall recognize the potential need for critical incident stress interventions and notify the incident commander of this possibility. **6.1.16** If the incident safety officer or an assistant safety officer needs to enter a hot zone or an environment that is immediately dangerous to life or health (IDLH), the incident safety officer or assistant safety officer shall be paired up with another member and check in with the entry control officer.	
6.2 Fire Suppression. **6.2.1** The incident safety officer shall meet the provisions of Section 6.2 during fire suppression operations. **6.2.2*** The incident safety officer shall ensure that a rapid intervention team meeting the criteria in Chapter 8 of NFPA 1500, is available and ready for deployment. **6.2.3** Where fire has involved a building(s) the incident safety officer shall advise the incident commander of hazards, collapse potential, and any fire extension in such building(s). **6.2.4** The incident safety officer shall evaluate visible smoke and fire conditions and advise the incident commander, tactical level management component's (TLMC) officers, and company officers on the potential for flashover, backdraft, blow-up, or other events that could pose a threat to operating teams. **6.2.5** The incident safety officer shall monitor the accessibility of entry and egress of structures and its effect on the safety of members conducting interior operations.	
6.3 Emergency Medical Service Operations. **6.3.1** The incident safety officer shall meet the provisions of Section 6.3 during emergency medical service (EMS) operations. **6.3.2** The incident safety officer shall ensure compliance with the department's infection control plan and NFPA 1581, *Standard on Fire Department Infection Control Program*, during emergency medical service operations. **6.3.3** The incident safety officer shall ensure that incident scene rehabilitation and critical incident stress management are established as needed at emergency medical service operations, especially mass casualty incidents (MCIs).	

Risk Management Officer	Competency Met
6.4 Technical Rescue. **6.4.1** The incident safety officer shall meet the provisions of Section 6.4 during technical rescue operations. **6.4.2*** In cases where a designated incident safety officer does not meet the technician-level requirements of NFPA 1006, *Standard for Rescue Technician Professional Qualifications*, the incident commander shall appoint an assistant incident safety officer or a technical specialist who meets the technician-level requirements of NFPA 1006 to assist with incident safety officer functions. **6.4.3** The incident safety officer shall attend strategic and tactical planning sessions and provide input on risk assessment and member safety. **6.4.4*** The incident safety officer shall ensure that a safety briefing is conducted and that an incident action plan and an incident safety plan are developed and made available to all members on the scene.	
6.5 Hazardous Materials Operations. **6.5.1** The incident safety officer shall meet the provisions of Section 6.5 during hazardous materials operations. **6.5.2*** In cases where a designated incident safety officer does not meet the technician-level requirements of NFPA 472, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, the incident commander shall appoint an assistant incident safety officer or a technical specialist who meets the technician-level requirements of NFPA 472 to assist with incident safety officer functions. **6.5.3** The incident safety officer shall attend strategic and tactical planning sessions and provide input on risk assessment and member safety. **6.5.4*** The incident safety officer shall ensure that a safety briefing is conducted and that an incident action plan and an incident safety plan are developed and made available to all members on the scene. **6.5.5** The incident safety officer shall ensure that control zones are clearly marked and communicated to all members.	
6.6 Accident Investigation and Review. **6.6.1** Upon notification of a member injury, illness, or exposure, the incident safety officer shall immediately communicate this information to the incident commander to ensure that emergency medical care is provided. **6.6.2** The incident safety officer shall initiate the accident investigation procedures as required by the fire department. **6.6.3*** In the event of a serious injury, fatality, or other potentially harmful occurrence to a member, the incident safety officer shall request assistance from the health and safety officer.	
6.7 Post-Incident Analysis. **6.7.1*** The incident safety officer shall prepare a written report for the post-incident analysis that includes pertinent information about the incident relating to health and safety issues. **6.7.2*** The incident safety officer shall participate in the post incident analysis.	
EITHER FCABC/LGMA: Effective Fire Service Administration	Yes ☐ No ☐
OR	Yes ☐

Risk Management Officer	Competency Met
Beyond Hoses and Helmets, or equivalent *(administrative)*	No ☐

Company Fire Officer	Competency Met
Fire Officer 1 (NFPA 1021 in its entirety)	Yes ☐ No ☐
Incident Command 200	Yes ☐ No ☐
Fire Service Instructor 1 (NFPA 1041 Chapter 4)	Yes ☐ No ☐
4.1 General. **4.1.1** The Fire Service Instructor I shall meet the JPRs defined in Sections 4.2 through 4.5 of this standard.	Yes ☐ No ☐
4.2 Program Management. **4.2.1 Definition of Duty.** The management of basic resources and the records and reports essential to the instructional process.	
4.2.2 Assemble course materials, given a specific topic, so that the lesson plan and all materials, resources, and equipment needed to deliver the lesson are obtained. **(A) Requisite Knowledge.** Components of a lesson plan, policies and procedures for the procurement of materials and equipment, and resource availability. **(B) Requisite Skills.** None required.	Yes ☐ No ☐
4.2.3 Prepare requests for resources, given training goals and current resources, so that the resources required to meet training goals are identified and documented. **(A) Requisite Knowledge.** Resource management, sources of instructional resources and equipment. **(B) Requisite Skills.** Oral and written communication, forms completion.	Yes ☐ No ☐
4.2.4 Schedule single instructional sessions, given a training assignment, department scheduling procedures, instructional resources, facilities and timeline for delivery, so that the specified sessions are delivered according to department procedure. **(A) Requisite Knowledge.** Departmental scheduling procedures and resource management. **(B) Requisite Skills.** Training schedule completion.	Yes ☐ No ☐
4.2.5 Complete training records and report forms, given policies and procedures and forms, so that required reports are accurate and submitted in accordance with the procedures. **(A) Requisite Knowledge.** Types of records and reports required, and policies and procedures for processing records and reports. **(B) Requisite Skills.** Basic report writing and record completion.	Yes ☐ No ☐
4.3 Instructional Development. **4.3.1* Definition of Duty.** The review and adaptation of prepared instructional materials.	
4.3.2* Review instructional materials, given the materials for a specific topic, target audience, and learning environment, so that elements of the lesson plan, learning environment, and resources that need adaptation are identified. **(A) Requisite Knowledge.** Recognition of student limitations and cultural diversity, methods of instruction, types of resource materials, organization of the learning environment, and policies and procedures. **(B) Requisite Skills.** Analysis of resources, facilities, and materials.	Yes ☐ No ☐
4.3.3* Adapt a prepared lesson plan, given course materials and an assignment, so that the needs of the student and the objectives of the lesson plan are achieved. **(A)* Requisite Knowledge.** Elements of a lesson plan, selection of instructional aids and methods, and organization of the learning environment. **(B) Requisite Skills.** Instructor preparation and organizational skills.	Yes ☐ No ☐
4.4 Instructional Delivery. **4.4.1 Definition of Duty.** The delivery of instructional sessions utilizing prepared course materials.	

Company Fire Officer	Competency Met
4.4.2 Organize the classroom, laboratory, or outdoor learning environment, given a facility and an assignment, so that lighting, distractions, climate control or weather, noise control, seating, audiovisual equipment, teaching aids, and safety are considered. **(A) Requisite Knowledge.** Classroom management and safety, advantages and limitations of audiovisual equipment and teaching aids, classroom arrangement, and methods and techniques of instruction. **(B) Requisite Skills.** Use of instructional media and teaching aids	Yes ☐ No ☐
4.4.3 Present prepared lessons, given a prepared lesson plan that specifies the presentation method(s), so that the method (s) indicated in the plan are used and the stated objectives or learning outcomes are achieved, applicable safety standards and practices are followed, and risks are addressed. **(A)* Requisite Knowledge.** The laws and principles of learning, methods and techniques of instruction, lesson plan components and elements of the communication process, and lesson plan terminology and definitions; the impact of cultural differences on instructional delivery; safety rules, regulations, and practices; identification of training hazards; elements and limitations of distance learning; distance learning delivery methods; and the instructor's role in distance learning. **(B) Requisite Skills.** Oral communication techniques, methods and techniques of instruction, and utilization of lesson plans in an instructional setting.	Yes ☐ No ☐
4.4.4* Adjust presentation, given a lesson plan and changing circumstances in the class environment, so that class continuity and the objectives or learning outcomes are achieved. **(A) Requisite Knowledge.** Methods of dealing with changing circumstances. **(B) Requisite Skills.** None required.	Yes ☐ No ☐
4.4.5* Adjust to differences in learning styles, abilities, cultures, and behaviors, given the instructional environment, so that lesson objectives are accomplished, disruptive behavior is addressed, and a safe and positive learning environment is maintained. **(A)* Requisite Knowledge.** Motivation techniques, learning styles, types of learning disabilities and methods for dealing with them, and methods of dealing with disruptive and unsafe behavior. **(B) Requisite Skills.** Basic coaching and motivational techniques, correction of disruptive behaviors, and adaptation of lesson plans or materials to specific instructional situations.	Yes ☐ No ☐
4.4.6 Operate audiovisual equipment and demonstration devices, given a learning environment and equipment, so that the equipment functions properly. **(A) Requisite Knowledge.** Components of audiovisual equipment. **(B) Requisite Skills.** Use of audiovisual equipment, cleaning, and field level maintenance.	Yes ☐ No ☐
4.4.7 Utilize audiovisual materials, given prepared topical media and equipment, so that the intended objectives are clearly presented, transitions between media and other parts of the presentation are smooth, and media are returned to storage. **(A) Requisite Knowledge.** Media types, limitations, and selection criteria. **(B) Requisite Skills.** Transition techniques within and between media.	Yes ☐ No ☐
4.5 Evaluation and Testing. **4.5.1* Definition of Duty.** The administration and grading of student evaluation instruments.	
4.5.2 Administer oral, written, and performance tests, given the lesson plan, evaluation instruments, and evaluation procedures of the agency, so that bias or discrimination is eliminated, the testing is conducted according to procedures, and the security of the materials is maintained. **(A) Requisite Knowledge.** Test administration, agency policies, laws and policies pertaining to discrimination during training and testing, methods for eliminating testing bias, laws affecting records and disclosure of training information, purposes of evaluation and testing, and performance skills evaluation. **(B) Requisite Skills.** Use of skills checklists and oral questioning techniques.	Yes ☐ No ☐

Company Fire Officer	Competency Met
4.5.3 Grade student oral, written, or performance tests, given class answer sheets or skills checklists and appropriate answer keys, so the examinations are accurately graded and properly secured. **(A) Requisite Knowledge.** Grading methods, methods for eliminating bias during grading, and maintaining confidentiality of scores. **(B) Requisite Skills.** None required.	Yes ☐ No ☐
4.5.4 Report test results, given a set of test answer sheets or skills checklists, a report form, and policies and procedures for reporting, so that the results are accurately recorded, the forms are forwarded according to procedure, and unusual circumstances are reported. **(A) Requisite Knowledge.** Reporting procedures and the interpretation of test results. **(B) Requisite Skills.** Communication skills and basic coaching.	Yes ☐ No ☐
4.5.5* Provide evaluation feedback to students, given evaluation data, so that the feedback is timely; specific enough for the student to make efforts to modify behavior; and objective, clear, and relevant; also include suggestions based on the data. **(A) Requisite Knowledge.** Reporting procedures and the interpretation of test results. **(B) Requisite Skills.** Communication skills and basic coaching.	Yes ☐ No ☐
Emergency Scene Management (4.6.1, 4.6.2)	
4.6.1 Develop an initial action plan, given size-up information for an incident and assigned emergency response resources, so that resources are deployed to control the emergency. **(A)* Requisite Knowledge.** Elements of a size-up, standard operating procedures for emergency operations, and fire behavior. **(B)* Requisite Skills.** The ability to analyze emergency scene conditions; to activate the local emergency plan, including localized evacuation procedures; to allocate resources; and to communicate orally.	Yes ☐ No ☐
4.6.2* Implement an action plan at an emergency operation, given assigned resources, type of incident, and a preliminary plan, so that resources are deployed to mitigate the situation. **(A) Requisite Knowledge.** Standard operating procedures, resources available for the mitigation of fire and other emergency incidents, an incident management system, scene safety, and a personnel accountability system. **(B) Requisite Skills.** The ability to implement an incident management system, to communicate orally, to manage scene safety, and to supervise and account for assigned personnel under emergency conditions.	Yes ☐ No ☐

Appendix 7: New Fire Safety Act

The following is draft language that the Department and City can consider for use when revising the Department's operational and establishment bylaw. This language is specifically aimed at addressing the new obligation to conduct "risk-based compliance monitoring" of public buildings. Certain issues – such as training requirements and the form that risk-based assessments are to take – remain to be clarified by regulation.

Definitions

(a) "**Fire Inspector**" means a Member trained as a fire inspector in accordance with the requirements of the *Fire Safety Act* and regulations made thereunder;

(b) "**Fire Investigator**" means a Member trained as a fire investigator in accordance with the requirements of the *Fire Safety Act* and regulations made thereunder;

(c) "**Fire Safety Assessment**" means a fire safety assessment as defined in the *Fire Safety Act*;

(d) ""***Fire Safety Act***" means the *Fire Safety Act*, SBC 2016, c. 19, as amended or re-enacted from time to time;

(e) "**Inspection**" means a fire safety inspection as defined in the *Fire Safety Act*;

(f) "**Public Buildings"** has the meaning ascribed thereto in the *Fire Safety Act;*

Fire Chief's Powers

1. The Fire Chief shall be deemed to be the fire chief of the City as contemplated by the *Fire Safety Act* and for all other purposes, and entitled within the City to exercise all of the powers of a fire chief as set out in the *Fire Safety Act*.

Risk-Based System of Compliance Monitoring

2. The Fire Chief shall establish, and the Department shall operate, a risk-based system of compliance monitoring of Public Buildings within the Fire Service Area, in accordance with the requirements of the *Fire Safety Act* and regulations made thereunder. The Department shall conduct such risk analysis as the Fire Chief determines is necessary and appropriate, subject to and in accordance with the requirements of the *Fire Safety Act.*

3. The Fire Chief shall determine which Public Buildings are to be subject to Inspections and which owners of public buildings are to be required to produce Fire Safety Assessments. The frequency of Inspection for any Public Building shall be set by the Fire Chief, based on the risk assigned to the particular Public Building.

4. Members of the Department are hereby authorized to conduct Inspections, provided that any Member conducting an Inspection shall be trained as a Fire Inspector as required by the *Fire Safety Act*.

5. The Fire Chief shall ensure that the risk assessments upon which the compliance monitoring system is based are reviewed by the Department not less than **[triennially,]** or as may be required by the *Fire Safety Act* and the regulations made thereunder. **[Note: this section talks about the frequency of conducting the overall risk assessments – it is not speaking to minimum inspection frequency of buildings themselves.]**

6. Owners of Public Buildings required to produce a Fire Safety Assessment shall do so in a within 30 days of the request therefor by the Department, using the format prescribed under the *Fire Safety Act*. A Fire Safety Assessment will be updated annually by the owner of the Public Building unless an Inspection is conducted by the Department. A Fire Safety Assessment will be updated by the owner of the Public Building at any time that there has been any change to the Public Building, or any change to the use thereof, that makes the existing Fire Safety Assessment inaccurate, incomplete or obsolete.

7. Where a Fire Safety Assessment has not been produced as required by section 6, the Department may conduct an Inspection and levy a charge therefor as provided in Schedule A to this bylaw.

8. Where a person, business or other undertaking is required by the Fire Code to develop and maintain a Fire Safety Plan, a copy of such Fire Safety Plan shall be submitted to the Department for review in accordance with the Fire Code. The Department may prescribe the form in which any Fire Safety Plan is to be submitted, including that the Fire Safety Plan must be submitted in a specified electronic format.

9. The Fire Safety Plan shall be reviewed not less than annually by the owner of the property and updated if required. The Fire Safety Plan shall be updated and a new Fire Safety Plan submitted to the Department for review at any time that there has been any change to a building, property or premises, or any change to the use thereof, that makes the existing Fire Safety Plan inaccurate or obsolete.

10. Notwithstanding any review of a Fire Safety Assessment or Fire Safety Plan by the Department, the owner of the Public Building (or other property) in respect of which such assessment or plan is submitted remains solely responsible therefor and neither Department nor the Corporation shall be liable for any defect in any Fire Safety Assessment or Fire Safety Plan or for any loss, damage, costs or injuries arising in connection therewith. **[Note: consider whether to include a provision which limits liability in relation to Fire Inspections as well. This would probably need to be a separate section.]**

11. The Department will conduct such pre-fire planning, including the development of pre-incident plans, as may be required by the Playbook, or as the Fire Chief may otherwise deem necessary or advisable. In connection with such pre-fire planning, the Department

may require any person submitting a Fire Safety Plan for review, to submit such additional information or data as may be required by the Department, all in a format determined by the Department.

12. The Department shall conduct such Fire Investigations and fire cause determinations as are required by the *Fire Safety Act*, or as otherwise deemed necessary or advisable by the Fire Chief. Fire Investigations shall be conducted by Members or other persons trained as Fire Investigators in accordance with the *Fire Safety Act*. **[Note: the actual requirements for being a fire investigator have not been issued. There also is a transition period under the Fire Safety Act that may need to be taken into account.]**

13. The Department may charge for the cost of conducting an Inspection (or any re-Inspection), reviewing a Fire Safety Assessment, conducting a Fire Investigation, reviewing a Fire Safety Plan or other use of Department services and resources, in each case in accordance with the **[City's Fees and Charges Bylaw.]**