FINAL REPORT

Calgary Fire Department
ZERO - BASED REVIEW

The City of Calgary

Presented to:

The City of Calgary

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EXECUTIVE SUMMARY

The following document serves as the Final Report complete with recommendations for The City of Calgary's 2014/2015 Zero-Based Review (ZBR) of the Calgary Fire Department. Our overarching objective for this project is to use the ZBR process to provide recommendations and business cases for means by which The City of Calgary can improve the efficiency and effectiveness of resource use by The Calgary Fire Department.

The Calgary Fire Department (CFD) is one of the most dedicated and respected departments in North America. During the course of our investigations, we have encountered some of the most dedicated individuals in the industry. We would like to express our gratitude and acknowledgement to everyone that participated in the process by providing us with information and input.

This ZBR process was an iterative process that took into account feedback and considerations from as many stakeholders within the Department as possible. We reached out to the extended fire community across North America and incorporated feedback from those peers wherever possible. The recommendations in this report not only strive to meet the criteria as laid out in the ZBR process but also extend into innovative solutions.

Summary of Recommendations and Cost Implications

Based on initial findings, discussions with the ZBR Committee and direction from the Steering Committee; this Final Report will focus on efficiency and effectiveness recommendations in the three (3) targeted areas. A thorough review of those areas has resulted in a total of 34 recommendations.

A summary of the recommendations and cost implications is as follows:

ORGANIZATIONAL EFFICIENCY AND EFFECTIVENESS

a) Management and Leadership

- **Recommendation #1:**

  Reduce and Re-organize Management and Leadership Structure (p. 15)

b) Diversity and Inclusion

- **Recommendation #2:**

  Enhance existing Diversity and Inclusion 'draft' performance measurement methods and criteria, including data collection and reporting (p. 26)

- **Recommendation #3:**

  Develop internal messaging to accompany rollout of CFD Diversity and Inclusion Program (p. 26)

- **Recommendation #4:**

  Include diversity messaging in recruiting campaigns (p. 26)

- **Recommendation #5:**

  Increase CFD community presence to promote awareness of diversity and inclusion (p. 26)

- **Recommendation #6:**

  Develop diversity and inclusion awareness training for all CFD members (p. 27)

ORGANIZATIONAL EFFICIENCY AND EFFECTIVENESS: Cost Benefit Overview

Recommendation	Potential Cost Savings	Potential Cost Differential
Reduce and Re-organize Management Structure	$571,431 (annual)	-
Diversity and Inclusion Recommendations	-	-
Total Annual Cost Savings/ Differential	**$571,431**	**-**

RESOURCE OPTIMIZATION

a) Deployment and Response

- **Recommendation #7:**

  Continue to Implement Dynamic Deployment System (p.38)

- **Recommendation #8:**

  Invest in Predictive Modeling Software (p.38)

- **Recommendation #9:**

  Conduct a pilot (trial) project to further transition toward Dynamic Deployment (risk-based response) (p.39)

- **Recommendation #10:**

  Differentiated response times for existing and new subdivisions (p.40)

b) Medical Response

- **Recommendation #11:**

  Maintain Emergency Medical Incident Response delivery (p.52)

- **Recommendation #12:**

  Establish a Service Level Agreement with AHS (p.52)

- **Recommendation #13:**

  Seek Cost Reimbursement from AHS (p.52)

- **Recommendation #14:**

  Complete Medical Response Unit (MRU) Pilot (p.53)

- **Recommendation #15:**

  Work with Alberta Health Services to improve medical dispatch (p.57)

c) CFIA Accreditation

2) **Recommendation #16**

Maintain CFAI accreditation (p.61)

d) Recruit Training

- **Recommendation #17:**

  Reduce duration of Recruit Training and Orientation (p.65)

- **Recommendation #18:**

  Eliminate recruit practicum (p.66)

- **Recommendation #19:**

  Use non-uniformed staff for non-technical training (p.66)

- **Recommendation #20:**

  Partner with external training institutions (p.66)

- **Recommendation #21:**

  Increase investment in incumbent training (p.67)

e) Fire Training Academy

- **Recommendation #22:**

  Develop a Training Academy Business Plan (p.70)

- **Recommendation #23:**

  Market the Training Academy facility and props to other users (p.71)

RESOURCE OPTIMIZATION: Cost Benefit Overview

Recommendation	Potential Cost Savings	Potential Cost Differential
3-Person Engine Pilot Project	-	$2,618,365 (labour avoided annually)
Differentiated Response Times for Peripheral Areas	$16,632,000 - $44,352,000 (annual) $51,000,000 (one-time)	
Complete Medical Response Unit Pilot Project (10 stations)	-	$257,244
Reduce Duration of Recruit Training and Orientation	-	$435,301 - $532,478 *Note, this is savings per class (Therefore, total savings below will assume 1 class per year)
Increase Investment in Incumbent Training (Partner with external training officers)	-	$191,560 - $1,376,459
Market the Training Academy Facility and Props to Other Users	$387,375 –$ 569,375 (new revenue)	-
Total Annual Cost Savings + New Revenue / Differential	**$17,019,375 - $44,921,375**	**$3,502,470 - $4,784,546**
Total One-Time Cost Savings/ Differential	**$51,000,000**	

ASSET AND FACILITY MANAGEMENT

a) Fleet Management

- **Recommendation #24:**

  Keep specification process for specialty apparatus and equipment in-house (p.79)

- **Recommendation #25:**

  Keep maintenance of specialty apparatus in-house (p.79)

- **Recommendation #26:**

  Out-source maintenance of light duty vehicles (p.80)

- **Recommendation #27:**

  Engage City Fleet Services to manage the light fleet (p.81)

- **Recommendation #28:**

  Implement advanced Lifecycle Management Software (p.81)

b) Mixed Use Facilities

- **Recommendation #29:**

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- **Recommendation #30:**

  Develop multi-use compatibility profile (p.84)

- **Recommendation #31:**

  Identify opportunities to request provisions from developers (p.84)

- **Recommendation #32:**

  Designate a CFD liaison to participate in the multi-use facility planning process (p.84)

- **Recommendation #33:**

  Collaborate in identifying multi-use facility opportunities (p.84)

- **Recommendation #34:**

  Maintain involvement in planning processes for new communities (p.84)

ASSET AND FACILITY MANAGEMENT: Cost Benefit Overview

Recommendation	Potential Cost Savings	Potential Cost Differential
Out-source maintenance of light duty vehicles to City Fleet and Private Sector	$1,428 (annual)	-
Total Annual Cost Savings/ Differential	**$1,428**	**-**

Conclusion

The Calgary Fire Department is a leader in the field of fire and emergency response, both in terms of the level of service provided and the forethought given to growing and adapting its service to meet the demands of a changing city. In the face of a tightening budget, however, the City of Calgary and CFD are using the City of Calgary's ZBR process to evaluate the costs and gains associated with each of its lines of services, and identify where improvements and innovation can be made in effectiveness and efficiency.

The common theme throughout our assessment has been that in terms of service rationale, scope of service, and level of service, CFD is almost entirely on target. The effectiveness of CFD's services is also excellent. This challenged the ZBR team to look beyond the numbers in front of us and to connect with the internal stakeholder base as well as industry expertise to bring forward not only effective and efficient recommendations, but also those that are innovative.

A thorough review of CFD's services, has identified three (3) distinct areas with high potential for improvements in efficiency, effectiveness and innovation; Organizational Efficiency and Effectiveness, Resource Optimization and Facility and Asset Management. Within those three areas, we have provided a total of 34 recommendations for improvement.

It is clear that CFD has a substantial amount of resources to work with, but needs to adopt better ways of managing them in order to continue to provide quality services in an efficient way. Implementation of the recommendations in this report will position CFD well to accommodate; city growth, a changing workforce pool while maintaining excellent community relationship.

SECTION 1
INTRODUCTION

1.1 Background

Across Canada, all levels of government are facing strong demands for cost management, cost reduction and increased value in the delivery of services. Elected Officials and government leaders are relentlessly looking for strategies that balance public expectations, deliver valued services/programs, while maintaining fiscal restraint amidst global, international, national and local economic realities. This environment has resulted in the need for Fire Chiefs to adopt a more business-like approach to leading and managing their departments. Fire Chiefs, along with their municipality's senior administration, need to be proactive and examine all aspects of the service delivery systems to look for innovative efficiencies and effectiveness.

Many fire departments across the nation are facing challenges such as budget constraints, rising call volumes, increased risk, and the growing expectation to do more with less. Failing to effectively manage these considerations can leave a community and the responders vulnerable, leading to unfavorable outcomes.

Over the past several years, CFD has demonstrated that, in the face of these challenges, not only can it remain a strong department, but it can also continue to progress and develop. In recent years, the capabilities and strength of CFD were tested in the face of major emergencies and natural disasters, earning CFD praise both within and beyond Calgary. CFD's efforts in preventative measures and response have been highlighted by the recent decreases in the number of fire incidents in Calgary and improved response times.

For over 125 years, The Calgary Fire Department (CFD) has been providing a critical service to the citizens of Calgary with a mandate for Safety and Service Excellence. The Department's recent efforts and successes make it apparent that pride, dedication, and diligence is a way of life for members of the Department.

Aside from fire incidents, the overall frequency of other responses and the complexity of events have increased, highlighting the need for strategic planning; thus the need to focus on an 'all hazards' approach to fire and emergency response. Over the next several years, there are a number of factors that will continue to increase pressures on the CFD's services, including:

- Population growth and changing demographics
- Industrial and commercial growth
- Urban sprawl
- Increased area densification

- Expansion of transportation networks
- Increased vertical infrastructure in the downtown core
- Increasing demands for medical response
- Increased natural disasters

Strictly adding human resources is not a sustainable way of addressing these challenges. To continue to meet the needs and expectations of the community, CFD needs to identify and implement strategies designed to increase effectiveness and efficiency at every opportunity.

1.2 Project Overview

The City of Calgary has developed the Zero-Based Review (ZBR) program as a standardized approach for reviewing programs and services within its business units, in order to increase their ability to restrain expenditures and to improve effectiveness and efficiency. Through a ZBR, a business unit's services are systematically reviewed to determine the most appropriate way to provide them and at what level. The objective is to provide solutions and recommendations for improvement to address two key service delivery questions:

- ***Effectiveness -*** *Are there any changes that could be made to services that would help to achieve greater results within currently available resources?*
- ***Efficiency -*** *Are there any changes that could be made to the current method of delivering services that would improve the cost effectiveness of the service?*

The Behr team in partnership with MNP Consulting was retained by The City of Calgary to conduct a ZBR of The Calgary Fire Department's lines of services, in keeping with Calgary's ZBR methodology. The end result of the ZBR is an overall assessment of services, and a series of business cases for efficiency and effectiveness improvements to select services.

This phase of the ZBR is an in-depth analysis of the services and sub-services within the business unit that were previously identified as requiring further analysis for efficiency and effectiveness. Based on our findings, recommendations and business cases are provided for improving these services and sub-services.

1.3 Scope of Final Report

Based on initial findings, discussions and direction the Steering Committee; this Final Report will focus on efficiency and effectiveness recommendations in the following targeted areas:

1) Organizational Efficiency and Effectiveness
    a. Management and Leadership
    b. Diversity and Inclusion
2) Resource Optimization
    a. Deployment and Response

b. Medical Response
c. Recruit Training
d. Fire Training Academy

3) Asset and Facility Management
   a. Fleet Management
   b. Mixed Use Facilities

1.4 Business Unit Overview

Operating with a mandate for safety and service excellence, The Calgary Fire Department (CFD) is a critical service within The City of Calgary. CFD's 1,431 employees provide prevention, education, protection, rescue, and safety services to Calgary's 1.15 million residents. In 1999, CFD was the first Canadian city to be awarded accreditation by the internationally recognized Commission on Fire Accreditation International (CFAI) and has consistently met the CFAI's requirements to maintain their accreditation.

While providing service to a rapidly growing city, CFD itself has grown modestly over the past few years in terms of its facilities and its employment numbers. In 2013, the Department saw its highest number of retirements in five years marking a time of significant change for CFD. Nevertheless, with 39 fire stations and one of Canada's strongest recruiting programs; CFD has adapted well in response to these challenges.

As outlined in the 2014 ZBR presentation, the following chart demonstrates a high level composition of CFD's service areas as defined specifically for the ZBR process:

SECTION 2
PROJECT APPROACH

2.1 Five Aspects of Zero-Based Review Analysis

The foundation of a ZBR review is the five areas of analysis, through which a business unit and its services are evaluated and potential improvements in efficiency and effectiveness, are identified and answered at a department level, within the table below.

Five Areas of Analysis		
1. Service Rationale		
Why is The City of Calgary providing the service?	• Preservation of life and property • To present the City as a fire safe community • To meet fire safety and education needs for citizens and visitors • Protection of commercial, private and public assets	
What would be the effect if The City of Calgary discontinued the service?	• Increase loss of life • Increased loss of property • Public and commercial assets will not be properly protected from fire • Could negatively affect the City's image in the media • Could affect level of tourism and investment in the Calgary area • Public backlash based on fire safety expectations	
2. Service Level & Scope		
Why is The City of Calgary providing the scope and level of service?	• To ensure that public expectation are met • Safety of citizens is ensured • To ensure protection of commercial, private and public assets • Identified risks & prevention mitigation initiatives are based on community risk assessment	
What would be the effect if The City of Calgary changed (increased or decreased) the scope and level of service?	**Increased**	**Decreased**
	• Increased capital and operational spending • Incrementally lower risk to property and life • Shorter response times	• Decreased budget spending • Surplus in Resources • Adverse Public reaction • Negative media attention • Challenging labour relations • Possible loss of life and property • Negative tourism perception • Increase of risk and associated impacts on City and citizens

3. Service Efficiency		
According to industry standards, is the service efficient?	**Efficient**	**Inefficient**
	• Based on Commission of Fire Accreditation (CFAI), CFD provides a good level of service to the city	• Presently, resource deployment is based more upon geographical coverage as opposed to risks balanced with coverage
Why is the service efficient or inefficient?	• CFD is well resourced; equipment & staff • Highly trained • CFAI accredited	• Not meeting targets established by council
Would best practices and other suggestions for improvement apply to The City of Calgary?	• Yes, based on the recommendations within this ZBR	
4. Service Effectiveness		
According to industry standards, is the service effective?	**Effective**	**Ineffective**
	• Yes, based on CFAI Accreditation, CFD is meeting majority of expectations	• Currently not meeting 90th percentile as noted in the NFPA and CFAI documents
Why is the service effective or ineffective?	• Consistently meeting business unit mandate and objectives • Equipment and Training is constantly being updated • Healthy Budgets to maintain the department	• Rising call volumes are challenging the CFD in relation to meeting NFPA/CAFI standards for response times
Would best practices and other suggestions for improvement apply to The City of Calgary?	Yes, based on the recommendations within this ZBR	
5. Service Funding		
How is the service funded?	Almost 100% tax supported	
Are the sources of funding sustainable and appropriate?	Yes, the resource funding has been sustainable.	
Would best practices and other suggestions for improvement apply to The City of Calgary?	Yes, only from a Canadian perspective. Funding models are consistent for fulltime career departments across Canada. Canadian municipalities fund Fire and Emergency Services. In the US funding models may differ from state to state and in some cases funding is available through federal agencies such as FEMA.	

2.2 Methodology

For each area of this report an in-depth analysis was explored through a variety of information sources, including available literature and data, site visits, community comparables and interviews. CFD's current and projected performances in these areas were utilized as indicators in determining whether there is significant room for improvement in the efficiency and effectiveness of service delivery.

2.2.1 Literature and Data Review

Extensive reviews of existing literature, CFD department data as well as industry data were evaluated as part of the process in the development of the recommendations in this report.

These included but are not limited to:

- CFD call history data
- Response time data
- Detailed cost information for calls, training, station development, salaries/wages, etc.
- Training schedules
- Fire fleet management data
- Organizational charts and job descriptions

Note: *A complete list of Literature and Data sources are available in Appendix B.*

2.2.2 Community Comparable Analysis

A community comparable analysis was used to analyze industry benchmarks and assess the relative strengths and weaknesses of the recommendations in this report.

The comparisons described in this report are to other Canadian fire departments. In our experience, the use of Canadian fire departments' data prove to be more relevant than using departments outside of Canada due to differences in sources of funding between the U.S. and Canada. The main difference is that some U.S. fire departments receive both federal and/or state funding, which is not normally available to Canadian departments. This greatly affects how they fund and operate their departments in comparison to Canadian departments.

In addition to using information from the community comparables, the Ontario Municipal CAO's Benchmarking Initiative (OMBI) was also used to which the City of Calgary is a member. OMBI is an initiative for collecting data for more than 700 measures across thirty-seven (37) municipal service areas. OMBI acts as a source of credible information to assist Council, senior management, staff and citizens to understand how their municipality is performing over time and in relation to others.

Toronto, Edmonton, Montreal, Ottawa, and Winnipeg fire departments were selected as comparisons for CFD, primarily because of their large service populations and/or large service areas. Initial consultation was completed with each participating department, and information on all six topics of our review was collected via a written survey*.

Note: *Copies of the Community Comparables are found in Appendix C.*

2.2.3 Targeted Interviews

Targeted interviews were conducted as part of the data collection process. Interviewees were selected from within CFD, both uniform and non-uniform staff as well as union (Local 255) and non-union staff and from other departments within The City of Calgary. A select number of Councilors as well as the Mayor were also interviewed for comments.

An interview guide was developed using a standard set of questions for each review topic. Interviewees were asked questions for the topics related to their areas of expertise. Along with the bank of questions, interviews also included open discussion about CFD's strengths and weaknesses, challenges it faces, anticipated changes, and other concerns and observations related to the topic(s) being discussed.

Note: *Copies of the Interview Guides can be found in Appendix D.*

2.2.4 CFD Staff Survey

To facilitate transparent, unbiased and anonymous input from as many CFD uniformed staff members not involved in the targeted interviews as possible, a survey was created and distributed as widely as possible. An online survey was made accessible through CFD's intranet and was completed by 345 respondents.

The survey included questions to gather data on:

- Challenges impacting CFD performance
- CFD's training programs
- Diversity and inclusion in the workplace

The results of this process provided an excellent perspective as well as a great cross section of data that was used as a basis for the recommendations presented in this Final Report.

Note: *A copy of the CFD Firefighter Staff Survey can be found in Appendix E.*

2.2.5 Peer Review(s)

Included in the ZBR methodology was a peer review process led by The City of Calgary, Corporate Initiatives. The peer review was an independent perspective on the reasonableness, practicality and likelihood of success in implementing the recommendations. Participants in the process included the peer review panel, representatives from CFD and Corporate Initiatives, and the Behr team. The peer review panel, appointed by The City of Calgary, consists of subject matter experts with diverse knowledge and experience in the fire service.

The panel was selected from a listing of retired Fire Chiefs in Canada, researching current fire service instructors and seeking participation from cities with jurisdictional experience with some of the suggested recommendations. The final panel selected includes a recently retired Fire Chief, a Fire Emergency Management and Education Specialist, and a current Deputy Chief from the United States. The peer review process also included a pre-reading of the report by all reviewers and a 3.5 hour webinar discussion between reviewers to share thoughts, feedback, and suggested improvements to the report, provide evidence and/or recommendations.

The peer review process is intended as a valuable tool to further test the recommendations and focus efforts on presenting fulsome evidence and options for recommendations that will ultimately aide continuous improvement within CFD*.

2.3 Analysis

In order to address the financial impact of the recommendations and options contained in this report, various forms of financial analysis were conducted. The approach to this financial analysis was to:

- Determine the financial elements associated with the preliminary recommendations that were developed based on key findings;
- Review the data provided by the CFD to identify existing baseline financial information;
- Conduct financial modeling workshops with representatives from the CFD's E3 team and The City of Calgary ZBR Team; and,
- Ultimately request additional data points or analysis from the CFD to fill any gaps.

2.3.1 Collaboration

Financial modeling workshops were conducted with the objective of working collaboratively to identify financial models that would adequately reflect the potential financial impact of the recommendations being developed. Rather than a conventional data request and response approach, the workshop environment encouraged all parties to work together to develop the financial models and identify how to leverage existing CFD data to its maximum capacity to support the recommendations.

2.3.2 Cost Savings vs. Cost Differential

The largest component of the CFDs operating costs are found to be attributed to human resources in salaries and benefits. These are largely 'fixed' based on the staffing levels that are maintained by the CFD in order to achieve its fire suppression and medical response targets, as well as carrying-out its other lines of service. The largest components to CFD's costs are attributed to salaries, benefits and overtime.

Therefore, in some recommendations there are no immediate cost reductions or savings. Instead, the recommendations result in greater utilization of existing human resources through peak staffing deployment and overtime avoidance, and the avoidance of future staffing costs by reducing the number of future new recruits necessary to perform to the same level of service, thereby improving efficiency.

A specific and intended effort has been made to clearly identify cost savings where they are actual savings in the current or next budget year - versus avoidance of cost or cost differentials that have lasting benefit over a longer period of time.

SECTION 3
ORGANIZATIONAL EFFICIENCY AND EFFECTIVENESS

3.1 Management and Leadership

The heart of any organization is its people. An effective and efficient management leadership structure is needed to guide an organization to success. Within a fire service, a fire department's organizational structure must support and promote strong and effective leadership, sound business management and continuity, effective communication and opportunities for staff development.

In some cases, this may require a shift from the historical approach of maintaining current systems to a focus on creating a future for the department that is responsive to change, sustainable and efficient. In CFD's case, they've made concerted efforts over the years to consistently improve and in some cases their successes are to the envy of other Canadian departments.

In 2007, CFD adopted a management model designed to optimize the use of resources, encourage intra-departmental connections & communications and provide opportunities for employee development that supported succession planning due to a significant upcoming succession of the Fire Executive team. This included the introduction of a matrix management system that expanded and bolstered the senior management team positions budgeted to peak levels. These levels included:

- One (1) Fire Chief position
- Eight (8) Deputy Fire Chief positions
- Nine (9) Assistant Deputy Chief positions

Each Deputy Chief position held responsibility for specific lines of service and sub-services and was supported by Assistant Deputy Chief positions for day-to-day operational responsibilities. This structure was analyzed and found to be considerably larger than other Canadian fire departments of similar size.

In late 2014, with a large part of the succession plans executed, CFD adjusted its structure slightly, by reducing the number of Deputy Chiefs and Assistant Deputy Chiefs. Data suggests that in 2015 the budgeted positions in the current model remain higher than other comparable departments.

3.1.1 Objective

The objective of the Management and Leadership section is to identify means by which CFD can balance and organize its management structure to include succession plans; while maximizing long term cost efficiency and improving the effectiveness of the current team.

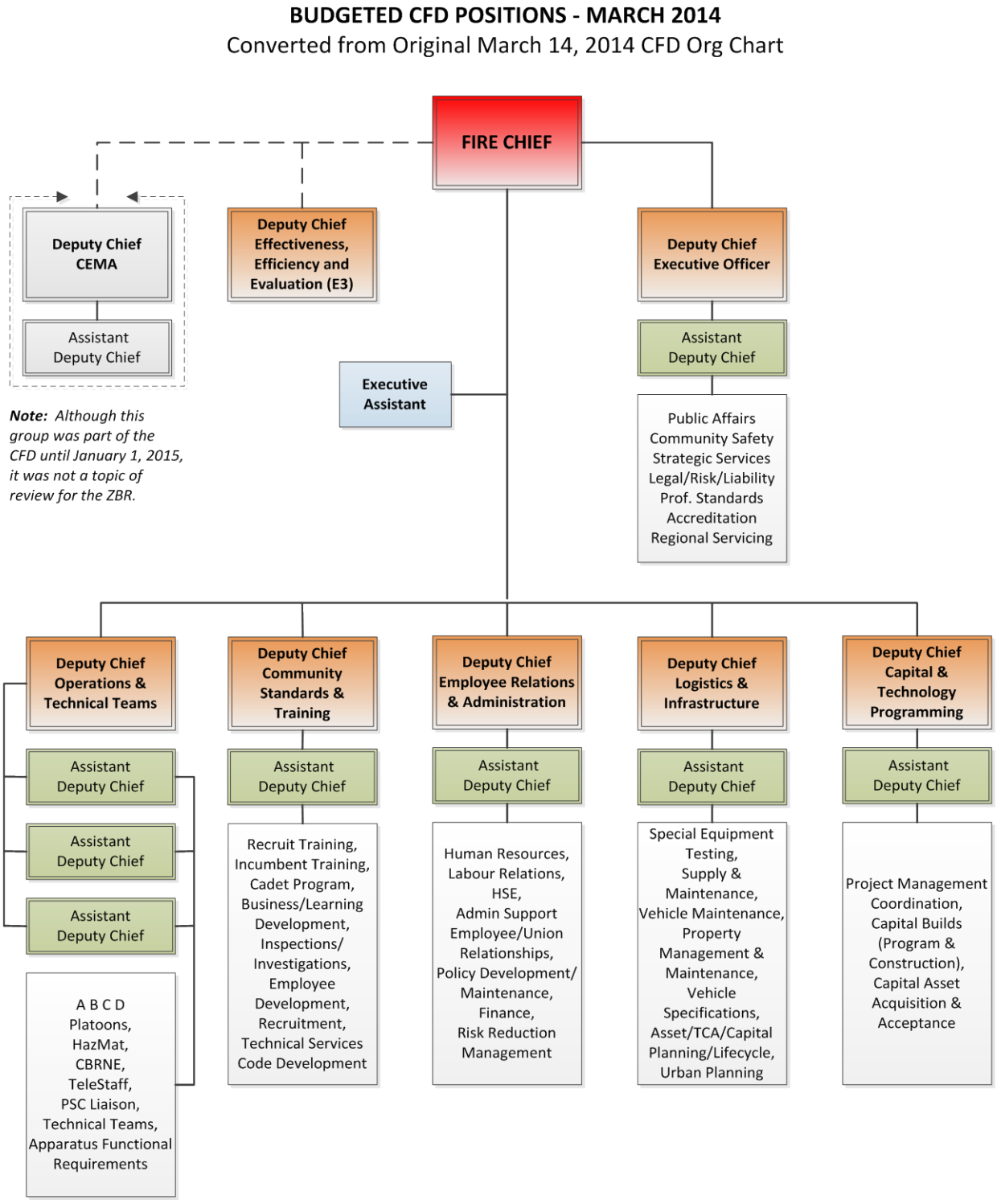
3.1.2 Current State

The following organizational chart shows CFD's 'budget approved' structure from March 14, 2014 (Figure 1). It should be noted that, although Calgary's current model includes 14 senior officers, there have been a number of recent retirements in the Deputy Chief rank that have been back-filled temporarily by an Assistant Deputy Chief.

Although there are some positive aspects of the matrix management model, feedback from our interviews suggests:

- The assignment duration was too short, creating instability for subordinates as new leaders took over new assignments and introduced changes in some service areas.
- That desired levels of expertise fell short as shifting the assignments or portfolios frequently did not allow for appropriate knowledge and experience to be gained.
- The model created silos where certain services were advanced while others were marginalized at the expense of other services.
- The cost associated with maintaining CFD's existing management structure is disproportionate to the anticipated effectiveness and efficiency gains. It should also be noted that at the time of this report CEMA was not part of the ZBR.

Figure 1: Budgeted CFD Positions Org Chart 2014



3.1.3 Findings

Research revealed a number of leaner management structures used by departments that are similar in size to CFD. We found that the number of Deputy Chiefs in the selected comparable departments ranged from two to five. Montreal and Ottawa both use a Two-Deputy system, with one Deputy Chief who focuses on Operations and one who focuses on Strategic Services.

The table below is a current snapshot of the five comparable communities we used along with CFD's current active structure. It should be noted that to do a true comparison of job functions with Calgary, only the top three uniformed and out-of-scope levels of management were used for comparison.

Table 1: Community Comparable - Management and Leadership

City (as of December 2014)	Fire Chief	Deputy Fire Chief	Assistant Deputy Chief	Total
Calgary	1	7	8	**16**
Edmonton	1	5	0	**6**
Winnipeg	1	3	2	**6**
Toronto	1	5	0	**6**
Ottawa	1	2	6	**9**
Montréal	1	2	4	**7**

Note: *While the budgeted positions remain at 16, CFD has been operating with approximately 14 active positions. Additionally, other communities such as Toronto identify their ADC equivalent positions as Division Chief, which would also be an out-of-scope position, who may perform similar duties. In the case of Toronto, there would be 12 Division Chiefs of which 10 are in uniform and 2 are not.*

Data collected from surveys and targeted interviews suggest that a review of the structure of the portfolios was an important recommendation for CFD. The feedback requests received indicate that:

- Rotating senior officers often move from one portfolio to another without a set process this is interpreted as disruptive to both individual and team productivity.
- Longer rotations are requested, as they would provide a better opportunity for the Deputy Chiefs to settle into a role, gain knowledge and experience for current and future roles and be more effective.
- Broader portfolios allowing for more well-rounded roles for Deputy Chiefs.
- Portfolios for Deputy Chiefs and Assistant Deputy Chiefs appear to be inconsistent in size and scope, with some roles being far more demanding than others.
- Leadership consistency at the Assistant Deputy Chief position is not perceived to be adequate.

It was found that typically there is a blend of uniformed and non-uniformed employees in place in order to effectively manage all fire department business. Wearing uniforms to show rank structure supports a paramilitary atmosphere, which is supported by majority of respondents and should be preserved in CFD. The following feedback indicates that;

- There is support for the uniformed employees being under the leadership of uniformed superiors.
- Non-uniformed staff should be supervised by non-uniformed functional Managers with titles that align with The City of Calgary nomenclature. Providing opportunity for greater synergies between The City and the CFD.

The following observations are a summarized collection of respondent data received from 345 CFD employees relating to Hierarchy Relationships. The following list represents the most common concerns:

- Lines of communications are unclear between Union and Management Exempt officer ranks.
- It is perceived that there are restrictions in the Collective Agreement that prevent Union uniform staff to do temporary duties for uniformed management exempt positions.
- The nomenclature and levels of fire department management titles are not aligned with The City of Calgary creating ambiguity and confusion.
- It is perceived that the existing organizational structure is top heavy (uniform and non-uniform) and perceptions indicate there are unnecessary layers in the existing management structure from a staff perspective.
- The introduction of increased management roles has reportedly (via respondent data) caused poor relationships with IAFF Local 255.
- The structure has reportedly (via respondent data) been cause for negative impact on relationships with other City departments.
- In some cases, the Assistant Deputy Chief level was introduced without corresponding additional role and responsibilities or authority or accountability included in the position, causing confusion.
- Effective communication and decision-making are perceived as inhibited by multiple layers of management.
- There is a reported (via respondent data) disconnect between problem-identification in day-to-day operations and strategic planning and solution development in higher ranks.

3.1.4 Recommendation – Management and Leadership

Based on the opportunities for improvement identified, the following are the benefits of implementing the recommendations in this report:

- Reduced top-heaviness of organization, while maintaining succession opportunities.
- Improved effectiveness of communication.
- Improved long term efficiency and cost effectiveness of staff budget.
- Maintain succession planning initiatives.

Recommendation #1: Reduce and Re-Organize Management and Leadership Structure

Based on the feedback from respondents, analytics of industry comparable data and in keeping with the objectives of the ZBR we recommend a reorganization of the current management structure that is designed to improve management ratios and improve communications.

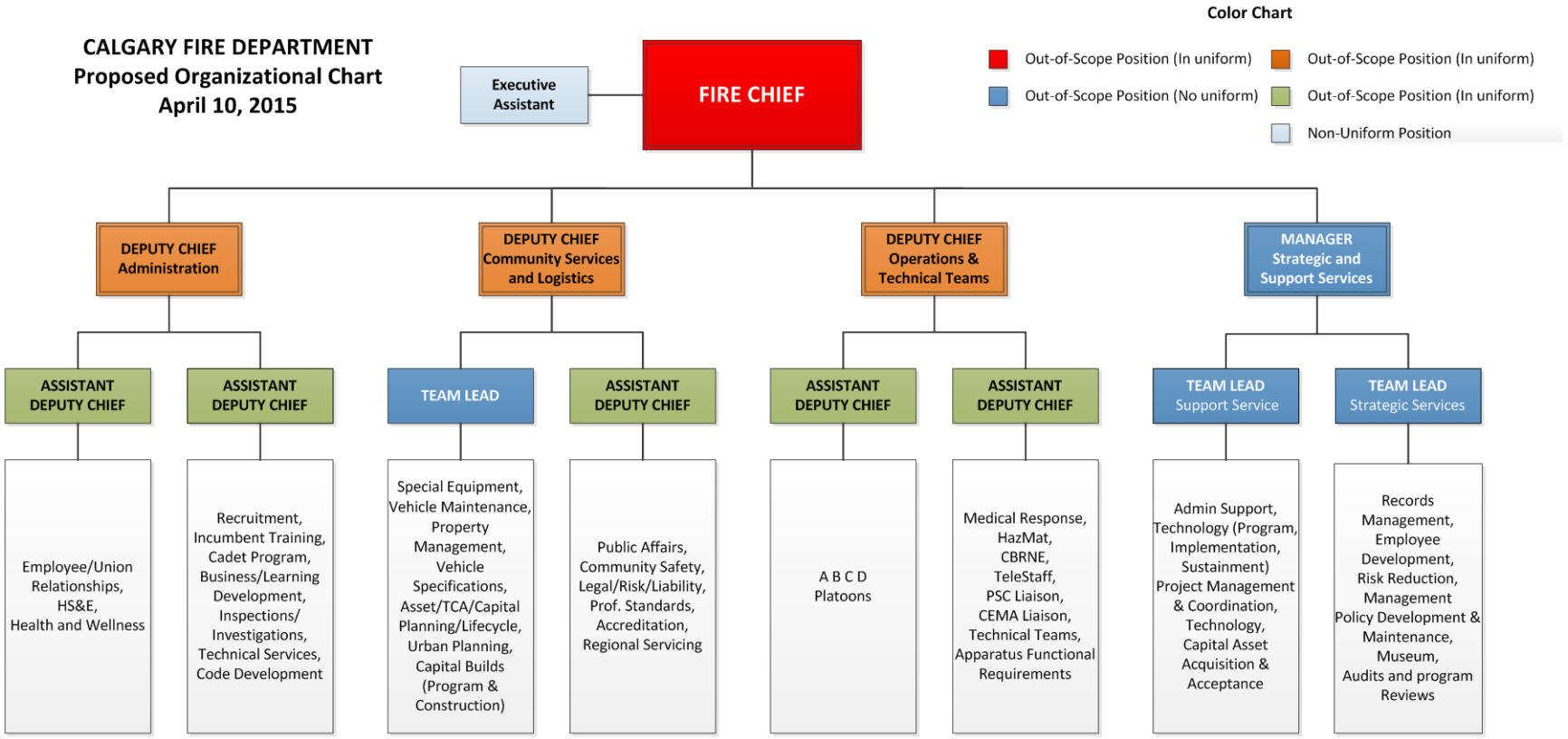
The new proposed structure needs to include:

- *Alignment of CFD's organizational structure to The City of Calgary's organizational structure, policies, and initiatives.*
- *Maintain the Incident Command System (ICS) span of control principle for emergency management within the new structure.*
- *This structure also supports succession planning by maintaining the adequate amount of Assistant Deputy Chief positions to act in the Deputy Chief positions.*

The structure shows a top-down traditional approach, which is congruent with other structures within this industry as well within The City itself. This approach also shows clear, single lines of reporting, and maintains appropriate span of control.

- *This structure maintains hierarchal relationship between ranks and also blends in non-uniformed management and staff.*
- *This structure provides more accountability at all levels while allowing more effective and efficient communication between management positions, as well as between in-scope and out-of-scope positions. This is particularly crucial with the Deputy Chief of Operations, who must maintain effective communication with the Battalion Chief positions.*
- *This structure is more streamlined and provides clear roles, responsibilities, and line-of-sight decision-making.*
- *This structure also supports succession planning, by maintaining the opportunity for Assistant Deputies to act in the Deputy Chief positions.*
- *The titles in the out-of-scope ranks or senior officer/management levels align with The City of Calgary's job title nomenclature.*

Figure 2: Proposed Management and Leadership Organizational Structure



Note: *The levels below the ADC and Team Lead positions are only suggestions. Titles and placement will be at the discretion of the CFD.*

3.1.4.1 Recommendation Implication

The following is an analysis of the current and proposed organizational structure's management and leadership roles, with the associated compensation:

Table 2: Current budgets-positions including salary and benefits

Current Structure (2014) Salary & Benefits, Budgeted 2015 (update provided March 19) *Salary and Benefits are based on budgeted salary data for 2015*		
Position	**FTE**	**Total Salary and Benefits**
Chief	1	$ 244,412
Deputy Fire Chief	7	$ 1,555,351
Assistant Deputy Chief	8	$ 1,359,330
Total Salary and Benefits	**16**	**$ 3,159,093**

Table 3: Recommended Non-salary and non-benefit management costs

Recommended Structure Salary & Benefits, Budgeted 2015 (update provided March 19) *Salary and Benefits are based on budgeted salary data for 2015*		
Position	**FTE**	**Total Salary and Benefits**
Chief	1	$ 244,412
Deputy Fire Chief	3	$666,579
Manager	1	$ 222,193
Assistant Deputy Chief	5	$849,582
Team Lead	3	$509,749
Total Salary and Benefits	**13**	**$2,492,515**

Aside from salaries and benefits, there are additional cost savings to be considered in transitioning to the proposed structure. These cost savings are in the form of training expenses, uniforms, and other staff expenses. There is also a small fleet of 10 light duty vehicles assigned to the Chief, DC's and ADCs. The costs associated with this fleet have not been modified based on the assumption that these vehicles will continue to be utilized by the remaining uniformed management.

Table 4: Non-salary and non-benefit management costs based on a reduction of 3 management positions

Costs (Per Annum)	Current	Recommended	Total Savings Per Annum
Training[1]	$2,111	$1,688	$563
Vehicles	$140,459	$-	$-
Uniforms	$30,840	$11,215	$19,625
IT/Telecom Expenses	$109,440	$54,720	$54,720
		SAVINGS	**$74,908**

Potential Salary and Benefit Cost Savings Utilizing New Organizational Structure
$666,579

+

Potential Additional Cost Savings Utilizing New Organization Structure
$74,908

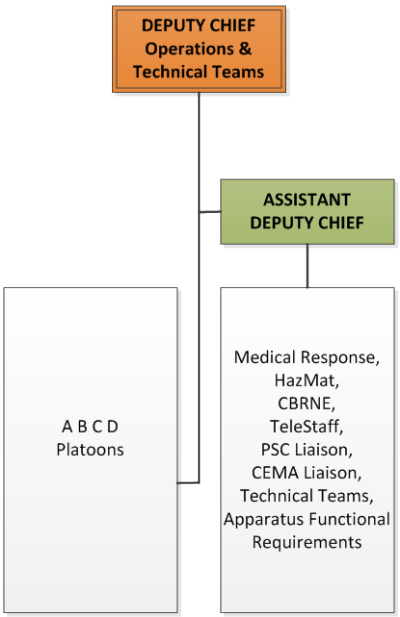
=

Potential TOTAL Cost Savings Utilizing New Organizational Structure
$741,487

3.1.5 Alternative considered but not recommended

It was considered to propose the same structure, minus the additional Assistant Deputy Chief (ADC) role reporting to the Deputy Chief of Operations. This model would allow the Platoons to deal directly to the Deputy Chief of Operations without having to go through the Assistant Deputy Chief. However, after practical consideration it was felt that it would not be optimal for the span of control for the Deputy Chief of Operations to do so.

Image 1: Management and Leadership Alternate



[1] *Training costs are calculated as the management portion of professional development costs across all employees ($205,989 in 2014). Management staff also receives professional development funded by the corporation, which is not included in this calculation (provided by CFD).*

3.2 Diversity and Inclusion

Over the past several years diversity and inclusion has been a high priority within The City of Calgary's management and business units. As The City of Calgary workforce continues to reflect an increasingly diverse population, The City must effectively manage diversity in order to attract and retain high-quality employees and to maintain a cooperative and respectful workplace. It is important for CFD to promote a proactive approach to diversity and inclusion at every opportunity, both within the department and through relationships with the citizens it serves. In doing so, CFD will broaden its potential pool of applicants while continuing to maintain quality and effectiveness.

The case for diversity in fire departments is incredibly important. It is not necessarily only about reflecting all groups within the community; rather, it is about the ability for CFD to effectively access recruits from all groups within the community. As the population in Calgary becomes increasingly diverse, CFD will need to depend on recruits from diverse groups to maintain their staffing numbers. This does not conflict with, but actually supports seeking the "best person for the job" by broadening the pool of applicants from which the department can select recruits.

Promoting and supporting a diverse and inclusive workforce has become a key objective in today's workplace for a variety of reasons. There is a growing understanding that public servants should reflect the communities which they serve, and that the workplace needs to be a healthy and supportive environment for all workers. While this makes sense for municipal staff and organizations such as police departments, the fire service has historically struggled with how to embrace and promote diversity and inclusion practices without detracting from their "best person for the job" approach to staffing.

3.2.1 Objective

The objectives of this review and its recommendations are to:

- Ensure that CFD is accessing and reaching out to its staff and the community in its attempts to hire, retain, and promote a rich cross section of staff, and to
- Ensure that CFD has effective diversity and inclusion programing aimed at making all staff feel comfortable and valued in an environment where they can flourish.

Based on The City of Calgary's Diversity & Inclusion in the Workplace Framework and Respectful Workplace Policy, the Calgary Fire Department has adopted the following definitions of diverse, inclusive and respectful:

- A **diverse workforce** is one composed of individuals with unique dimensions of diversity including colour, race, ethnicity, gender, disability, age, religion, sexual orientation, personality, work style, work status, communication style, learning preferences and other.
- An **inclusive workplace** is a positive work environment that welcomes, supports, respects and values individuals for their differences, perspectives, talents and contributions.
- A **respectful workplace** is promoting and maintaining a common understanding of the expectations and behaviors considered appropriate and inappropriate in City workplaces and in the delivery of, or access to, City services, and taking action to prevent and/or deal with inappropriate behavior wherever City business is being conducted. All people are to be treated with respect, honesty and dignity.

3.2.2 Current State

At the time of this report, it is understood that CFD is in the very early stages of implementing a Diversity and Inclusion Framework that was completed in January 2015. Within the new framework, CFD identifies that diversity and inclusion pertains to a variety of activities and aspects of the business that fall into three broad categories:

- Diverse Workforce
- Inclusive Workplace
- Respectful Workplace

By using this new framework to promote and support diversity within CFD, the department will be able to increase access to potential new recruits in diverse communities and groups within the City. CFD will also be better equipped to foster a healthy work environment for its staff.

While interviewees noted that diversity and inclusion are priorities for CFD, the business unit as a whole has just started to increase its planning and initiatives in this area. In January 2015, CFD completed work on a Diversity and Inclusion Framework. CFD is now working with the City to develop a detailed process for implementing the new Diversity and Inclusion framework.

3.2.3 Findings

Due to the timing of our research, some respondent data was provided in this area. With the objective of transparency and accurately reflecting the feedback of the respondents – a summary of the feedback received is noted below:

- Until recently, CFD has had limited participation on the City's Diversity and Inclusion advisory group.
- The diversity initiative requires a more collaborative approach, which would involve The City of Calgary Human Resources (HR) and CFD Leadership formalizing a plan to broaden CFD's approach to diversity and inclusion. The strategies need to be meaningful and respectful while not compromising the performance standards of the department and its delivery of services.
- It is apparent from the community comparable we received that Diversity and Inclusion is an emerging topic in the fire service; however there are examples of some forward thinking goals and positive results. Table: Diversity and Inclusion in Comparable Communities (2014) shows that CFD needs to focus on rolling out its new framework in order to be on par with diversity programs in other departments.

Table 5: Diversity and Inclusion in Comparable Communities (2014)

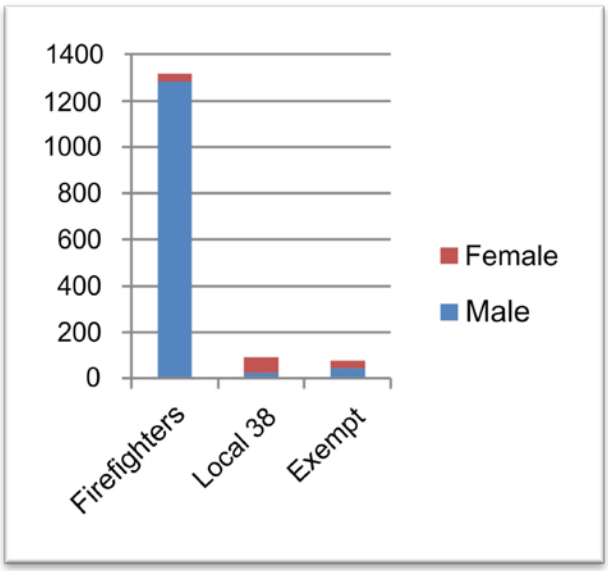
	Calgary	Edmonton	Winnipeg	Toronto	Ottawa	Montréal
Diversity policy in place?	No (per 2014)	Yes	Yes	Yes	Yes	General
Diversity a priority?	Yes	Yes	Yes	Yes	Yes	Increasingly
Why?	This plan has been developed to help all employees succeed in relating effectively at work, nurturing inclusiveness and creating an environment free of harassment, discrimination and violence.	Sustainability; success based on community support; representative of community	Helps to meet City's mission of delivering responsible, affordable, and innovating public service	We would like to build an inclusive and diverse workforce that reflects the people and communities we serve.	Reflect community	Guided by city policies
Diversity-targeted messaging?	Yes (starting 2015)	Yes	Yes	Ad hoc	Yes	Increasingly
Diversity-targeted recruitment?	Yes	Yes	Yes	Yes	Yes	Yes
Diversity training for staff and recruits?	Yes (starting 2015)	Yes	Yes	Yes	Yes	Yes
Mandatory?	Yes	Yes	Yes	Yes	Yes	Limited
Ongoing?	Yes (starting 2015)	Yes	Yes	Yes - through City's Learning Centre	Yes	Developing
Support available for diverse staff members and recruits?	Yes (starting 2015)	No	Yes	Yes	No	No
Partnerships with diversity groups?	Yes (starting 2015)	Yes	Yes	Yes	No	Developing

3.2.3.1 Diversity and Inclusion Performance Measures

Within the new Diversity and Inclusion Framework, CFD should implement a set of key performance indicators to assist in track ensuring a qualitative success of its diversity program. These measures should include actions and activities that need to occur, the critical outputs of these actions and activities, the indicators of success, the desired outcomes of success, and the ways in which data will be collected.

Currently, CFD does not formally track diversity information about its staff, other than gender. For recruit classes, applicants can self-identify as members of visible minorities.

Figure 3: Numbers of Female and Male Staff Members within CFD (2014)



While females make up

- 76% of staff members within Local 38
- 4% of staff members in the CFD Exempt
- 2.6% of firefighters

Of 2,647 applicants on January 6, 2015, only

- 6.6% disclosed that they were female.
- 2.4% did not disclose their gender
- 9.8% disclosed that they were part of a visible minority

Despite lacking substantial data regarding diversity within CFD, it is clear from this data and from the interviews conducted that CFD has room for improvement to meeting its goals for workforce diversity.

Feedback from interviews indicated that workforce diversity is still a new concept within CFD that is not widely promoted or understood. Without good data, however, it will be very difficult for CFD to track any progress over the next few years.

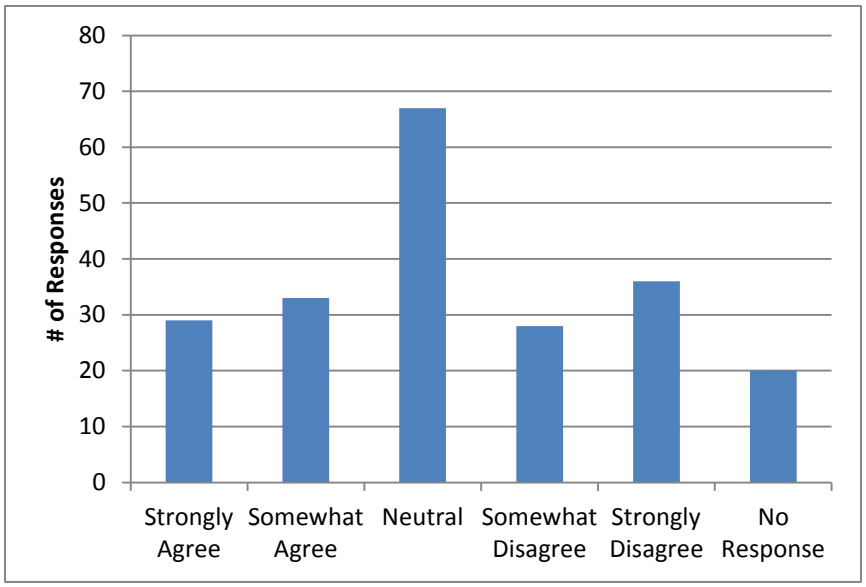
3.2.3.2 Diversity and Inclusion Awareness Training

Our survey results show very split responses about the adequacy of CFD's diversity training (see Figure 4) Many respondents were not aware that such training existed – some felt that was good, while others felt there should be more. In spite of this split, these responses do indicate that an aggressive training program needs to be implemented by the CFD to promote an understanding of what diversity and inclusion means to CFD and The City of Calgary.

Summary of respondent data:

- Currently, the only training or diversity-related information that uniformed staff receive is the respectful workplace message that The City of Calgary delivers during orientation.
- No other training or messaging is delivered after orientation.
- Prior to the ZBR employee survey, CFD has not surveyed its staff in relation to diversity and inclusion.

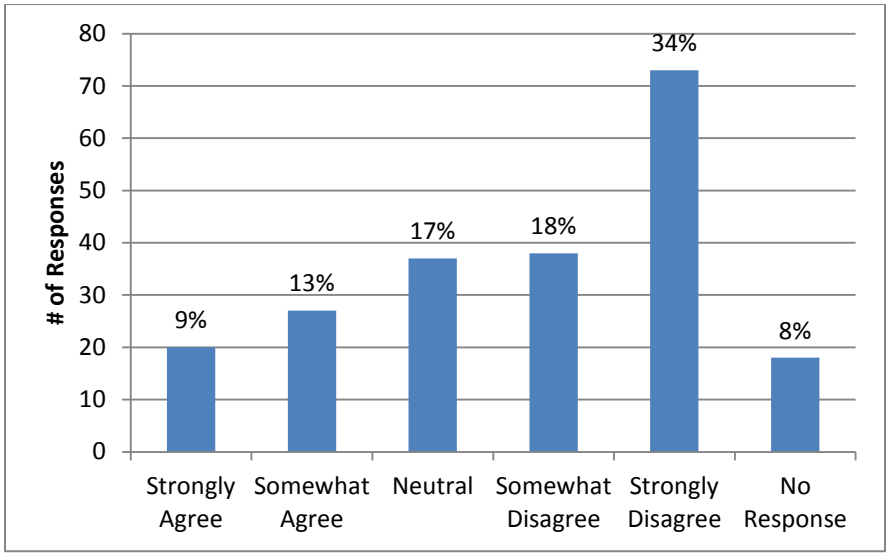
Figure 4: Survey results for the following question found on the survey "There is an adequate amount of diversity and inclusion training provided to all CFD employees."



The following Figure 5 shows that,

- Some employees support the concept of a diverse workforce; there was a large number of staff who did not agree that it should be a priority for CFD.
- It was noted that the majority of the employees who indicated that they did not support a diversity program because they were concerned diversity would be the focus for hiring, rather than focusing on the best-qualified candidates.
- Even respondents who did indicate that it should be a priority noted that it should not be a priority at the expense of recruit quality.
- Most respondents were adamant that hiring the "best person for the job" is the most important thing.
- When asked about improvements that could be made to CFD's diversity program, a similar split was apparent, with
- Several respondents noting that there shouldn't be any training time spent on diversity.
- Other respondents noted that diversity-related training should be available to all levels within CFD, and that it should not focus only on the gender aspect of diversity.
- Across the board, fairness, equal treatment, and equal standards were the most important things.
- Ensuring that there are adequate numbers of firefighters to staff the department in the future is a growing concern. The diversity program could play an important role in promoting a deeper pool of recruits for CFD in the future. By reaching out to the community through the promotion of diversity, there is an opportunity to also create a greater level of sustainability and effectiveness of staffing the department to cover all stations and provide effective response levels in a growing city.

Figure 5: Survey results for the following question found on the survey Diverse Workforce Priority: "A diverse workforce should be a priority for CFD"



3.2.3.3 Addressing Diversity in the Community

CFD reaches 1 in 10 people in the community each year – take from annual report: these include calls for inspections, prevention education, and safety information. As a result, CFD spends a large amount of time in communities outside of emergency calls. As it grows, Calgary is becoming an increasingly diverse city.

In 2014, 54% of new Calgarians represented a diverse group.

Projections estimate that members of visible minority groups will make up more than 40% of Calgary's population by 2020. As the City's diversity increases, CFD will need to ensure that it is visible, accessible, and trusted for all members of the community.

CFD needs to be more pro-actively visible in the community to be more effective with all diverse groups. This will become more and more the case as diversity increases, and CFD will need to find better ways of becoming involved and present in communities.

3.2.4 Recommendations – Diversity and Inclusion

Based on this analysis, recommendations for CFD are to ensure a sustainable workforce and required staffing levels to meet the needs of the community through effective and efficient responses for assistance.

Use of the new Diversity and Inclusion framework to promote and support diversity within CFD, the department will be able to increase access to potential new recruits in diverse communities and groups within the City, and will be better equipped to foster a healthy work environment for its staff.

- Alignment between The City of Calgary organizational structure, policies, and initiatives
- Sustainable workforce levels with enough personnel to provide effective response in a growing city.
- Diversity and inclusion goals and messaging that aligns with The City of Calgary's goals and messaging.
- Healthy and respectful workplace, where staff can feel comfortable, valued, and be a part of the team. Greater pool of candidates from which to recruit and develop firefighters.
- Greater pool of candidates from which to recruit and develop management staff.
- Ability to better relate to increasing number of citizens from diverse groups, which is important when providing medical assistance, evacuating/rescuing, and conducting prevention/awareness activities.
- Increased potential for innovation and creativity through diverse perspectives.
- Social benefits within CFD and in the community as a result of increased understanding and improved communication.

Recommendation #2: Enhance existing Diversity and Inclusion 'draft' performance measurement methods and criteria, including data collection and reporting

Implement performance measures to track the development and qualitative success of its diversity program. These measures should include actions and activities that need to occur, the critical outputs of these actions and activities, the indicators of success, the desired outcomes of success, and the ways in which data will be collected.

Recommendation #3: Develop internal messaging to accompany rollout of CFD Diversity and Inclusion Program

Prepare key messaging that can be used during the rollout of its new diversity program. The purpose of this would be to explain the rationale of the program, and to respond to staff concerns about diversity quotas and the changes to hiring standards.

A strategy should be developed to ensure that this key messaging is delivered to all staff regularly; not just during the rollout of the new framework or during recruit training. This strategy will demonstrate commitment on the part of CFD to promote and maintain a healthy, respectful and inclusive workplace. This approach will also reduce the spread of misinformation about CFD's diversity program.

With regard to the roll out of such a strategy, the aspect of Change Management will be an important part of successful departmental acceptance. The most effective way to ensure program buy-in would include developing an appropriate Change Management Plan to be used throughout the transition period of this program implementation.

Recommendation #4: Include diversity messaging in recruiting campaigns

Ensure recruiting campaigns and practices are updated to include all diverse groups. This will broaden awareness of CFD employment opportunities amongst diverse groups, creating a broader range of applicants and improving CFD's ability to hire the best people for the job.

Recommendation #5: Increase CFD community presence to promote awareness of diversity and inclusion

Increase CFD community presence to promote awareness of diversity and inclusion. One way in which to achieve this is through the role of an Ombudsperson. Classified as a civilian role, the Ombudsperson can not only develop and deliver Diversity and Inclusion programs, but can also thrust these issues to the forefront and be a trusting voice of reason in these areas. It is imperative that an Ombudsman be appointed as the champion of this initiative and to lead this program once the initial messaging has been delivered. The absence of this role may likely result in a lack of continued support for this program.

Additionally, identify ways that it can build its community presence, particularly in diverse communities. Participation in community events, school visits, and open houses are ways that CFD can both reach out to diverse communities and demonstrate that diversity is a priority within the department.

Recommendation #6: Develop diversity and inclusion awareness training for all CFD members

Develop a training program that is targeted at management and leadership to address diversity and inclusion issues in the department. A separate training program should also be developed and delivered to all CFD employees to inform them of the importance and benefits of diversity and inclusion. These courses should be developed with the Corporate HR department to align with existing policies and programs.

3.2.5 Recommendation Implications

While improving workforce diversity will not have a direct impact on the CFD's cost savings; it will improve effectiveness.

While the costs of pursuing increased diversity and inclusion can be identified and tabulated; conducting a cost-benefit analysis is challenging because it is not a direct comparison of dollars spent, but rather a comparison of program expenditures and anticipated social benefit and long-term business unit sustainability.

Costs related to awareness campaigns, training programs, recruitment programs are examples of program expenditures. Similarly, reductions in costs associated with addressing diversity and inclusion non-compliance (complaints, disputes, lawsuits, fines and settlements) can be a measurement of benefits.

SECTION 4
RESOURCE OPTIMIZATION

Effective management of a fire department requires a clear understanding of risk coupled with the ability to provide and manage fire and emergency service resources to deal with the risk. It is imperative that all stakeholders know how a fire department's abilities and resources affect the outcome of a response.

Every municipality has common and unique challenges when it comes to safety of its citizens. It is the unique challenges and the community's identified risk tolerances that require every fire department to evolve their structure and equipment to best serve the citizens. Municipalities have a fundamental responsibility in conducting community risk assessments to provide effective public and private property protection. However, there is no national fire or insurance standards that can be imposed on a municipality. A community's emergency service requirements relate to a number of factors, including its economic situation, geography, population, building profiles, and service delivery system.

The details of this section offer a detailed analysis of the subject of resource optimization across the CFD. The subject matter has been broken down in to a number of core sections and laid out in the following order:

- Deployment and Response
- Medical Response
- CFAI Accreditation
- Training

In each of the core sections, there is discussion regarding the current environment at the CFD as gathered through interviews and surveys. Key findings are presented and offer relevant research and data from the industry. Recommendations are made with associated efficiency and effectiveness analysis. Additionally, where applicable, alternatives that were considered but not recommended have also been discussed. Finally, the implications of the recommendations on the CFD are presented to round out each of the four main sections.

4.1 Deployment and Response

The Calgary Fire Department's Standards of Cover (SOC) are the policies and procedures designed to determine the optimal location of fixed and mobile resources while balancing risk and resources to provide effective response coverage across the city. Response time goals are part of CFD's Standards of Cover. The Standards of Cover document outlines the *distribution* and c*oncentration* of CFD's resources.

- Distribution: the location and deployment of apparatus and staff designed to provide the initial response to any type of emergency call. For CFD, current distribution is based on a minimum of one engine at every station, capable of providing an initial (first-in) response to any type of incident.
- Concentration: the deployment of additional and specialized apparatus and staff designed to meet specific demands and risks. Increased risk requires increased concentration of resources. For CFD, station districts with high call volumes or other specific risks present are served by additional resources such as second engines and specialized apparatus, equipment, and personnel suited to the area's risks (e.g. a boat, a high-rise support unit, hazardous materials equipment, technical rescue team). Optimal concentration of resources provides the entire effective response force required for any type of incident, beyond the initial apparatus that arrives first on scene.

CFD's current SOC provides:

- an assessment of the City's service environment including risks
- a description of the service delivery model designed to respond to the unique characteristics of the city and to manage the risks identified with the resources available through prevention, preparedness, and emergency response
- a basis for evaluating performance that addresses both current and future service demands for the City of Calgary

CFD's current response time goals are the product of continuous process of examining performance trends, industry standards, and the unique fire and emergency response service needs of the City including risk assessments and available resources, to determine a level of service that is affordable, acceptable, and appropriate for the citizens of Calgary. The current set of response time objectives are the result of a process begun in 2005.

History of SOC within The City of Calgary data provided by The City:

- In 2005 the CFD began work on a report intended to provide a vision to Council on fire standards and effective deployment of resources (addressing how to evaluate the city's risks and fire safety needs, the ability to respond to those risks and needs, and identifying the gaps and recommended improvements). This analysis would enable the development of "standards of response", which supported the CFD's accreditation efforts (the CFD had been an accredited agency with the Commission on Fire Accreditation International since 1999). While response times were analyzed at that time, a comprehensive set of goals or benchmarks had not yet been developed. As directed by the Standing Policy Committee on Community and Protective Services, the CFD was to consider industry standards such as the National Fire Protection Association (NFPA) standard 1710 in developing these goals.

- By 2006 the CFD had presented a work plan for developing new benchmarks, including conduct community risk assessments and examining the impact on service delivery of current and future planned densification. Extensive analysis was undertaken over the next year, IAFF Local 255 was engaged, and Council approved a series of principles for establishing the new service level and response time benchmarks.
- By late 2007 the CFD had conducted extensive analysis and developed a resulting comprehensive series of benchmarks to define what constitutes an affordable, acceptable, and appropriate level of service for the city, given the risks and demand for service and the resources available. It was intended that the benchmarks be used to define the CFD's performance expectations, consistently and fairly evaluate performance, identify gaps, and guide service improvements. The final series of benchmarks, including response time goals, were presented in the CFD's Service Levels and Response Time Targets (SLRTT) report, and were approved by Council in January 2008.
- By 2013, the CFD had reviewed response time standards again, taking into account changes in the fire service environment such as city growth, performance against the 2008 goals, changes to deployment and response practices, improved access to response data, new developments in best practices, and changes to industry standards (such as NFPA standards 1221 and 1710). Modifications to a number of the original SLRTT measures approved by Council in 2008 were then implemented for internal analysis and reporting purposes beginning in 2014, and later adopted by Council through the Action Plan 2015-2018. (These included changing the measures for the first engine response times to incorporate any first apparatus on scene not just engines, increasing the turnout time goal for emergency medical incidents from 60 seconds to 90 seconds, expanding on the incident categories to provide increased performance detail, and updating the method for calculating the response time performance for assembling an effective response force on scene at a fire suppression incident).

4.1.1 Objective

Based on this reports findings the objective of this review and its recommendations is to address opportunities for improvement pertaining to Standards of Cover, Concentration and Distribution including fire station locations.

4.1.2 Current State

4.1.2.1 Staffing

Typically fire department staffing models are built around a comprehensive community risk assessment and the department's ability to effectively respond to identified incidents. CFD's current operational deployment strategy is built around the 4-person initial first-in engine to respond to almost all emergencies. While this has been the traditional approach for decades in Calgary and in most other North American cities, both economic pressures and changes in the frequency and type of responses have generated opportunities for some communities to rethink this model. This model was originally and ultimately designed for the 'first-in' engine responding to a structural fire. However, this model also extends to all emergencies, large or small, including medical response that is almost half of CFD's total annual call volume.

Our research found that a number of departments in the United States and Canadian cities have been forced to re-think this model. Cities such as Nashville, Tampa, Atlanta, Long Beach, Santa Clara, and Naperville are now staffing their engines with 3 Person crews rather than the usual 4. In Canada, Sault Ste. Marie already uses 3-person engines, and Sarnia is considering implementing them. We also found that it was quite typical for smaller cities throughout Canada and the U.S. to routinely staff their engines with 3 persons.

Although, the use of 3-person engines offers the potential for substantial long-term cost avoidance, there are risks that need to be evaluated and weighed when responding to fire situations. However, this is not the case when responding to all other emergencies. Using 3-person engines does not mean that the Effective Response Force (ERF)[2] standards need to change. The ERF would still have to be assembled on the fire ground in order to safely complete the critical tasks. These firefighters would arrive to form the ERF from additional responding units.

Several of the staff survey responses noted concern about sending smaller crews on engines. In particular, staff indicated concern about implications for crew member safety and about difficulties assembling an ERF at a fire event. CFD not only needs to carefully consider these risks, but also needs to ensure open and transparent communications with staff prior to and during any changes it may choose to make to crew sizes. Such communication should include opportunities for staff to have questions answered and concerns addressed.

4.1.2.2 Response Time and Distribution

During interviews and in the responses received to the staff survey, the most common concern was with regards to CFD's response coverage as the urban sprawl continues to put enormous strain on the Department's resources. Over the past few years, as new areas of Calgary developed, CFD has added fire stations, fire engines, and staff to cover those areas within its set response times. However, even as CFD has added stations to meet demand in growing communities, its ability to meet its response time targets has fallen short.

The new stations on the periphery of The City have remained relatively quiet compared to the inner city stations. The massive expenditures for the construction, operation and staffing of new stations is ultimately for a low number of calls, which makes these peripheral stations, on a per call basis, much more expensive to run (see Table 6). This growth model is proving to be un-sustainable.

[2] *An Effective Response Force (ERF) is defined as the minimum number of firefighters and equipment that must reach a specific emergency incident location within a maximum prescribed travel time. (Fire & Emergency Service Self-Assessment Manual, 8th Edition, Copyright © 2011, Commission on Fire Accreditation International, CPSE, Inc.*

Table 6: Cost per Incident by Fire Station (2013)[3]

Cost Per Incident, 2013			
Station	Primary Engine	# of Incidents Engine Dispatched To	Cost Per Incident
Station 1	01EN	3,977	$661
Station 2	02EN	2,799	$939
Station 4	04EN	2,480	$1,060
Station 5	05EN	1,936	$1,357
Station 6	06EN	2,375	$1,107
Station 7	07EN	1,857	$1,415
Station 8	08EN	2,045	$1,285
Station 9	09EN	1,523	$1,726
Station 10	10EN	1,767	$1,487
Station 11	11EN	2,511	$1,047
Station 12	12EN	2,418	$1,087
Station 14	14EN	2,716	$968
Station 15	15EN	1,301	$2,020
Station 16	16EN	1,066	$2,465
Station 17	17EN	1,723	$1,525
Station 18	18EN	1,973	$1,332
Station 19	19EN	1,397	$1,881
Station 20	20EN	1,602	$1,640
Station 21	21EN	1,783	$1,474
Station 22	22EN	2,260	$1,163
Station 23	23EN	2,592	$1,014
Station 24	24EN	1,367	$1,922
Station 25	25EN	1,032	$2,547
Station 26	26EN	2,102	$1,250
Station 28	28EN	1,417	$1,855
Station 29	29EN	807	$3,257
Station 30	30EN	1,311	$2,005
Station 31	31EN	1,497	$1,756
Station 32	32EN	1,324	$1,985
Station 33	33EN	1,059	$2,482
Station 34	34EN	958	$2,743
Station 35	35EN	400	$6,570
Station 36	36EN	1,173	$2,240
Station 37	37EN	1,249	$2,104
Station 38	38EN	546	$4,813
Station 39	39EN	1,124	$2,338
Station 40	40EN	564	$4,660
Source: CFD FireRMS, Financial Costing - CFD Finance			

This requirement for additional resources is stimulated by the need to meet CFD's 'blanket' response coverage model and not necessarily for actual risk. This influences organizational planning and service delivery decisions such as station location, apparatus deployment, and staffing levels.

[3] *CFD Fire RMS, Financial Costing – CFD Finance*

Having a broadly understood and accepted system for determining deployment helps policy makers at all levels understand the deployment resources needed. Historically, fire departments have employed a 'geographic response' model. This is where fire stations, staff and equipment are strategically placed throughout the community to effectively respond to any type of emergency within an established response area.

Police agencies, on the other hand, generally employ a 'dynamic response' approach, which means they can shift resources to different locations where and when needed. They can 'step up' or 'roll back' resources based on levels of activity and the anticipated threat/risk (real or perceived) at different locations and at different times. While geographic response means that you need 100 percent of your response forces in place, 100 per cent of the time, dynamic response means that your response force will vary depending on need.

Survey responses indicated that some staff members are not as trusting of the dynamic deployment system, and many view it as too risky. This indicates a lack of clarity about the dynamic deployment system, and a lack of communication between management and CFD members on the floor. Based on our interviews, CFD does not appear to have a clear plan with measurable objectives for implementing a dynamic deployment system.

CFD's dynamic deployment system, initiated in 2013, is currently in the initial stages of implementing a dynamic response model which includes apparatus redeployment guidelines to manage resources based on risks, probability, reliability, and service demands. The model applies this systematic approach based on risk rather than blanket response. It is used for apparatus redistribution and the day-to-day backfilling or repositioning of resources to improve response performance. Once completed, this system will identify optimum station locations including gaps, redundancies, or enhancements, along with the more effective utilization of equipment and responders. This initiative is led by the CFD Deployment Working Group. Further implementation will allow for the matching of resources to the identified risk.

Several interviewees noted that CFD does not have enough apparatus to keep up with the growing demand for service. With the introduction of Dynamic Deployment System, CFD is now able to reposition apparatus depending on time of day and activities in the area.

It is also apparent that many departments largely driven by economic factors coupled with increasing call-volumes are employing peak time resource redistribution. This is where they shift resources (equipment and staff) from one station to another to manage changing risk in the community. In some cases, stations might be left vacant or apparatus not staffed during identified quiet times. The City of Toronto is one example of this.

4.1.3 Findings

4.1.3.1 Staffing

Although, the use of 3-person engines offers substantial long-term cost avoidance, there are risks that need to be evaluated and weighed when ultimately responding to a fire situation. However, this is not the case when responding to all other emergencies. Using 3-person engines does not necessarily mean that the Effective Response Force (ERF) for fire standards needs to change. Rather, it means that the ERF would be assembled from additional units. This means that it could take more time to assemble

the Effective Response Force (ERF) of 14 for fire; from when the first unit arrives on-scene. This also means that a rescue can't be affected until a 4th person arrives to achieve the required 2-in 2-out safety factor.

In a 2010 study conducted by the National Institute of Standards and Technology (NIST), the evidence pointed to the impact of crew size on protection and safety. [Source: http://www.nist.gov/el/fire_research/residential-fire-report_042810.cfm] The report suggests "the modeling demonstrated that trapped occupants receive less exposure to toxic combustion products—such as carbon monoxide and carbon dioxide—if the firefighters arrive earlier and involve three or more persons per crew."

In line with the recommendations below, a pilot involving 3-person engines can have a substantial impact on both the cost effectiveness and responsiveness of CFD specifically to low-hazard calls.

If the need for fire service staffing levels was based on the frequency of calls only, there could be a significant reduction in staff and apparatus during some hours of the day. However, if the City subscribes to the philosophy that response time is important no matter the frequency of calls, then allocation of apparatus and staff must be based on the geography that can be covered in four minutes as well as support response by other apparatus. In that case, staff levels must remain the same 24 hours a day. It is noted that police and EMS decrease their staff levels during off-peak times that may result in an increase in response times due to fewer resources. Here, the possibility of increased response times is mitigated by the fact that incident occurrence is considerably lower than during peak volume periods.

In contrast to police and EMS, fire is staffed based on a full risk model; response time is considered paramount and the much-reduced likelihood of an incident occurring is not taken into account in the determination of staff and equipment required. If the fire service was staffed based on the same probability risk model as police and EMS, costs would decrease dramatically but response times could increase beyond response time targets during off peak hours. This possible increase in response times is moderated by the fact that fewer incidents occur, which means the likelihood of a delay occurring is also decreased.

4.1.3.2 Response Time and Distribution

As cities continue to grow in population and expand in footprint, this blanket approach has proven to be both difficult to maintain in a timely manner and very costly. This holds true for Calgary, as the City continues to grow, the construction of new stations and additional resources, geographically situated to meet blanket response times will be required.

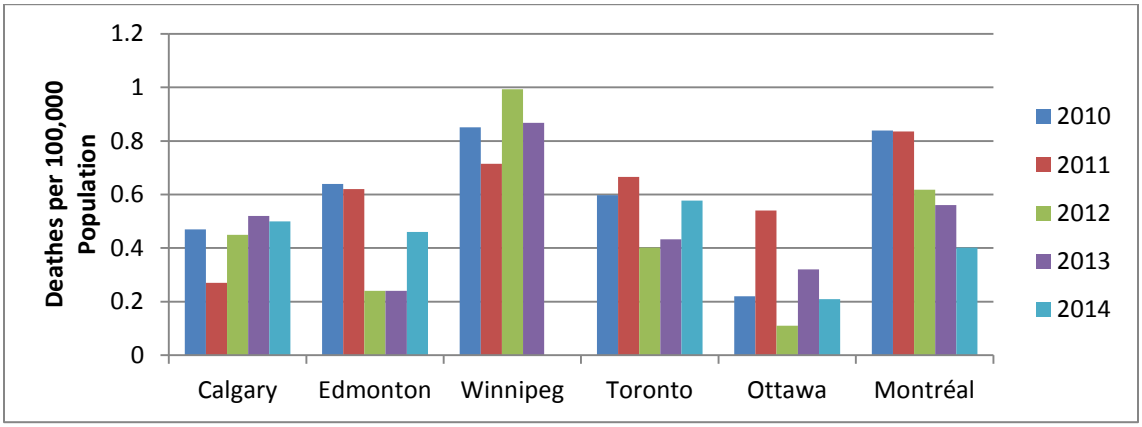
Table 7: First-In Unit Total Response Time Performance, Fire Suppression, and Emergency Medical Incidents, 2013 & 2014[4]

First-In-Unit Total Response, Fire Suppression and Emergency Medical Incidents, 2013 &2014				
	2013		2014	
	Fire Suppression	Emergency Medical	Fire Suppression	Emergency Medical
Average	6:11	5:16	5:51	5:07
90th Percentile	8:37	7:22	8:10	7:11
% within 7 Minutes	73.2%	86.8%	78.3%	88.5%
% within 7.5 Minutes	80.5%	91.1%	84.5%	92.0%
% within 8 Minutes	85.4%	93.8%	88.9%	94.4%
Source CFD FireRMS				

Setting response time targets based on risk and all hazards, rather than based on geography[5], would allow CFD to slow the addition of fire stations in the quieter peripheral areas, and instead determine how to adapt the response zones of its existing stations as these areas grow. These decisions would be based on data already collected by CFD as they extend the existing response areas and some response times.

While longer response times may come with increased risk, the data collected from comparable communities shows that the amount of additional risk is marginal. While Calgary area fire-related deaths, injuries, and dollar losses have been and continue to be relatively low with current response times (see Figures 6, 7 & 8).

Figure 6: Fire-Related Deaths per 100,000 Populations in Comparable Communities (2010-2014)



[4] *Source: CFD Fire RMS*

[5] *Geographic Response Model: fire stations, staff, and equipment are strategically placed throughout the community with all stations staffed 24/7 with, at minimum, a 4-person crew, and all areas are covered by established response times.*

Figure 7: Fire-Related Injuries per 100,000 Populations in Comparable Communities (2010-2014)

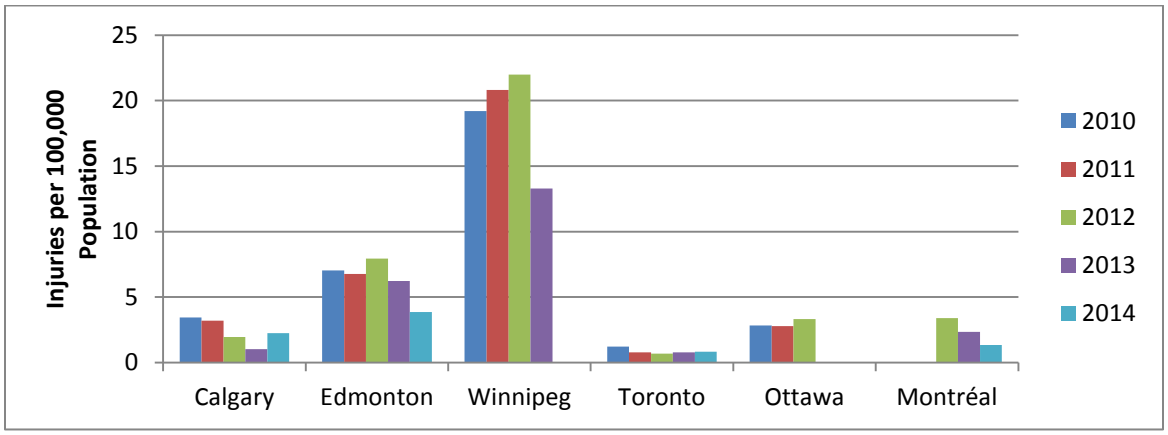
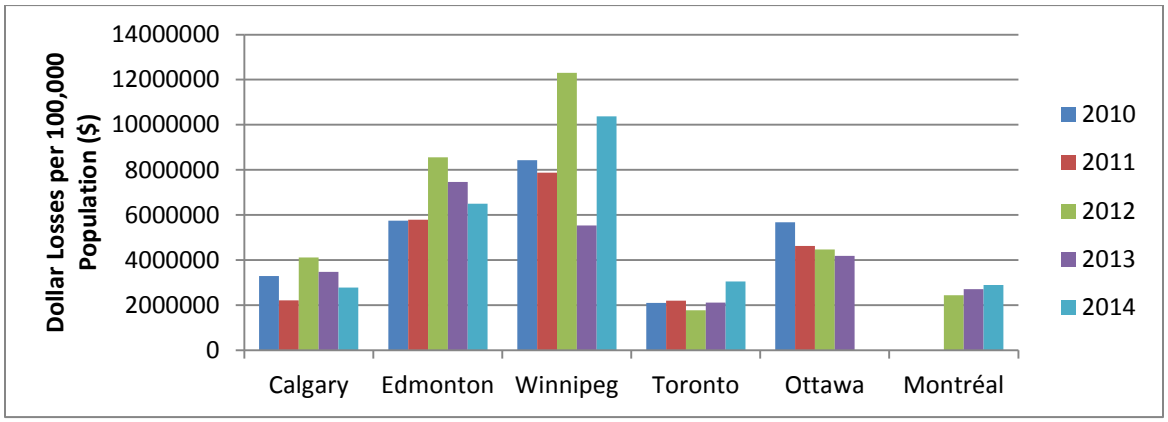


Figure 8: Fire-Related Dollar Losses per 100,000 Populations in Comparable Communities (2010-2014)



4.1.3.3 Deployment Model

For a fire department, the shift to a more dynamic response approach allows for a more effective positioning of resources. Of our community comparable, all are currently using some form of dynamic and/or risk-based response. The CFD has implemented the dynamic deployment model and is currently working towards maturing the deployment as part of a continuous improvement service delivery model.

Table 8: Deployment Models in Comparable Communities (2014)

	Calgary	Edmonton	Winnipeg	Toronto	Ottawa	Montréal
Response Model	Dynamic deployment[6]	Dynamic station based deployment model. Apparatus assigned to each station are deployed based on overall level of risk, city-wide coverage and workload.	Dynamic deployment, using automated vehicle locating technology	Risk-based	Risk based deployment model[7]	Unit selections based on real time automated vehicle location positioning and calculated travel times

Concentration and distribution of resources within a dynamic deployment system is a leading practice being adopted by several fire departments in North America. Departments that have integrated dynamic deployment systems benefit from substantial efficiencies and have demonstrated value for service outputs based on costs.

[6] *Dynamic Deployment - Basic: Currently, CFD's base level of deployment is the geographic response model above, with all stations staffed at all times. Within this, there is some limited dynamic deployment of crews on a real-time basis, where crews may temporarily move to cover a different station where the original crew has been called out, in order to provide area coverage.*

Dynamic deployment - Enhanced: dynamic response where the planned level of staffing can be varied from different station locations and/or times of day, based on acceptable risk. Resources are managed based on risks, probability, reliability, and service demands.

[7] *Risk Based Deployment - Identifying what resources and related training are required for a specific response.*

4.1.4 Recommendations – Deployment and Response

Based on the challenges that CFD is facing, the data analyzed and the potential for increased efficiency and effectiveness with this set of recommendations; these recommendations provide a clear path to achieve greater efficiency and effectiveness.

An objective review of the data by industry experts across the country, combined with valuable feedback from The City of Calgary as well as The Calgary Fire Department provided the basis for each of these recommendations.

Recommendation #7: Continue to Implement Dynamic Deployment System

CFD should continue the maturation of its Dynamic Deployment system by:

- *Developing an implementation plan by identifying clear objectives, tangible benefits, process benchmarks, required steps, and timeframes.*
- *Identifying peak and low times for every station*
- *Identifying next closest service for every station*
- *Developing and communicating internal key messaging and learning opportunities about the objectives and implementation of CFD's dynamic deployment system*

Recommendation #8: Invest in Predictive Modeling Software

For low-volume response stations, CFD should identify opportunities for re-positioning personnel and apparatus based on risk level and time of day. In combination with the structured redistribution currently planned as part of the Dynamic Deployment system, this would provide optimal use of current staff and apparatus. As with Dynamic Deployment, the trial and potential full implementation of this type of redistribution will require the use of predictive modeling software.

Invest in evidence-based predictive modelling and dynamic deployment system (PM/DDS) software that considers historical response data and anticipates the need to reassign resources for effective response times. This software provides timely and accurate mission critical information to improve the delivery of services and enhance citizen safety and firefighter safety. The delivery of effective information also means efficient use of resources. The ultimate cost for an implementation of this software would include set-up fees, annual licensing and support fees, as well as any incremental CFD staff costs for training or adding new staff with specialized skillsets. Each of these variables would depend on the CFD's decisions on how to implement, and therefore "standard" pricing from software vendors is not available. As a point of reference, the City of Kelowna is proceeding with an implementation with a cost of $621,762 over 5 years.[8]

Consider the viability of off-the shelf software vs. building in-house software. There are a number of software providers on the market that have proven products for predictive modelling.

[8] *Source: City of Kelowna Fire Department*

Recommendation #9: Conduct a pilot (trial) project to further transition toward Dynamic Deployment (risk-based response)

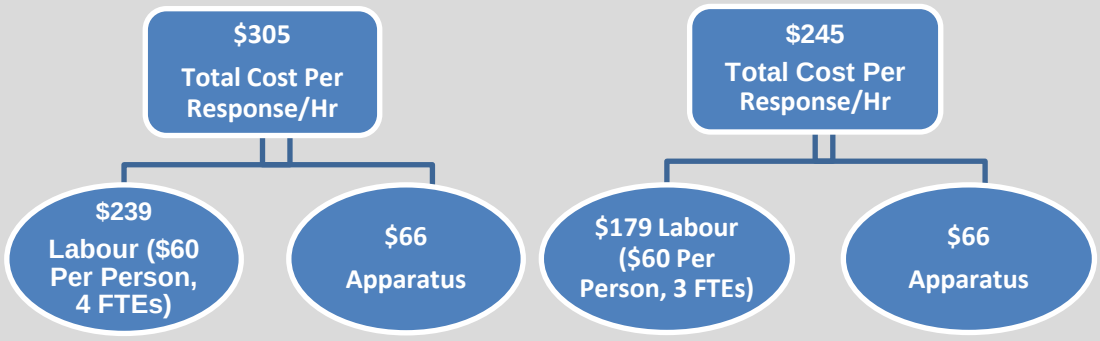
In addition to continuing the implementation of the Dynamic Deployment System and Predictive Modelling software, CFD can further transition to a risk-based all-hazards response model, rather than a geographically-based response model by adjusting first-in engine companies, we recommend an 18-month pilot project using a 3-person engine company. The pilot could be initiated at five (5) stations, allowing for approximately one (1) station per zone with low call volumes; such as those on the periphery of the City. The first six (6) months of the pilot project would be dedicated to a comprehensive analysis to determine the best stations to include in the pilot and the remaining 12 months for actual deployment implementation and data collection.

We recommend that CFD pilot this approach and use the collected data to determine a combination of follow-up approaches that allow for an improved balance of risk with capacity. The City of Calgary and CFD should collaborate on which solutions fit best with its goals and risk tolerance.

While cost savings can be realized by simply eliminating the fourth person on an engine, the use of 3-person engines does not have to mean a reduction in the current staffing or more importantly, affects to the ERF. The fourth crew member can potentially be redeployed as part of the recommendations for peak time resource redistribution or as part of an MRU program.

Cost Analysis

In moving from a 4-person engine to a 3-person engine one (1) FTE must be removed from the base cost per /hour, as shown below. The apparatus cost would not be changed.



The cost differential per year would be calculated according to the following:

Differential of 3 Person Engines (Per Engine)
$60/Hour
$43,639/Month
$523,673/Year

*Removing 1 Firefighter from each engine, on each shift, at the five pilot locations can result in the **avoidance of $2,618,365 in wages and benefits over a one year period** by avoiding the need to recruit new firefighters. These wages and benefits would continue to be avoided until the CFD needs to hire new firefighters to address growth.*

After the pilot (trial) project is completed, The City and CFD should study the impacts, benefits, and risks of 3-person vs. 4-person engines, and identify where (if at all) it makes the most sense to use this strategy so as to have a positive effect on resource efficiency and a minimal impact on the assembly of an EFR.

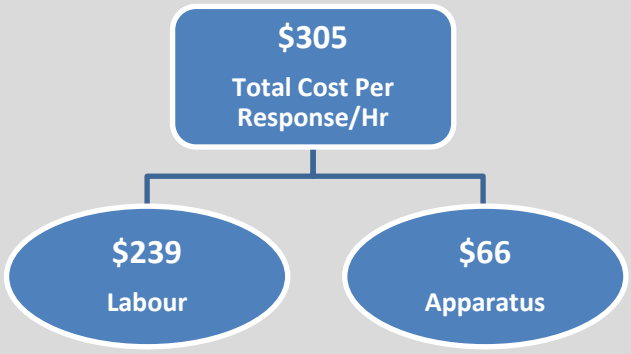
The continued maturation of Dynamic Deployment in conjunction with implementing Predictive Modelling will provide the CFD with significant data analytics and business intelligence to effectively evaluate the outcomes of the pilot (trial) project and determine the best course of action moving forward.

Recommendation #10: Differentiated response times for existing and new subdivisions

Based upon the data received, it is recommended that The City of Calgary should extend response time targets for existing and new subdivisions (i.e. expand the response polygons of existing stations, rather than adding new stations).

This should be done based on risk/call volume as a pilot in targeted areas. Extended response time targets in low call volume/low risk areas will allow CFD to make better use of existing staff capacity while focusing on 'all-hazards' response rather than just fires.

To determine the cost of expanding the response polygons of existing stations; the base cost per call should be considered:[9]



***Note:** CFAI accreditation should be considered when pursing recommendations that affect operational integrity, such as response time, station location, and 'first-in' staffing*

[9] *Data Provided by Calgary Fire Department*

At $304.99 an hour, the apparatus cost is $65.87, or $1.10 per minute. Therefore, for every minute the polygon is increased, the incremental cost per incident will be $1.10 x 2 (each minute adds 2 additional minutes to the total response time, 1 minute each way).

An analysis was conducted to determine the maximum number of stations that could be eliminated while still providing 8-minute response coverage across the city. In CFD's analysis, 5 stations were eliminated, with three noted gaps in response coverage.

If the 5 stations were to be removed with an 8-minute response time, the annual cost avoided could be $27,720,000 (5 stations at $5,544,000 in operating costs per year). [6]

The study also notes that previous analysis has shown that modeling 8 minute response times instead of 7 minute responses times results in 3 fewer required stations in planned growth areas. The total cost avoidance of these 3 stations would be as follows:

Table 9: Station Scenarios Based on 8-Minute Response Time

Station Scenarios	Total Cost Avoided
Redundancy of 5 existing stations	5 x $5,544,000 (Operating) = $27,720,000
Avoidance of 3 new stations in future growth areas	3 x $17,000,000 (Capital) = $51,000,000
	3 x $5,544,000 (Operating) = $16,632,000
Combined Costs Avoided/Saved	**$51,000,000 One- time costs**
	$44,352,000 Annually

4.1.5 Recommendation Implications

The three recommendations presented here offer CFD a clear and concise approach to delivering increased effectiveness and efficiency throughout the department. First, the maturation of the Dynamic Dispatch, coupled with Predictive Analytics provides leadership with clear line-of-sight as to resource and asset utilization and provides CFD with the business intelligence necessary to make up-to-the-minute decisions. Based on science and quantifiable data; the deployment of apparatus and crews in real-time can offer greater response, enhanced safety while increasing cost efficiencies across the entire department.

Consideration should be given for varying staff levels based on the demand for service as determined by how many calls for service are expected at different times of the day. Law enforcement agencies have used differential staffing for years, in recognition of a far greater need for staffing levels on Friday at midnight than on Monday morning, for instance. Similar demand-based, or dynamic, staffing would be of great benefit to the fire service.

In some cases, crews could be repositioned; apparatus taken out of service or certain resources and apparatus redistributed during quiet times. This approach supports the dynamic deployment model where resources are more effectively positioned to manage identified risk. "

Second, through deploying the two pilot projects recommended above, in conjunction with the implementation of mature processes and supporting technology can assist in proving which deployment methodology and crew composition structures are the most effective in dealing with each type of emergency.

Finally, when considering these recommendations, the true value is in delivering a comprehensive approach that deals with all components of crew safety, public safety,

responsiveness and effectiveness. Delivering an integrated solution, along with key pilot projects offers CFD with the foundational elements enabling greater effectiveness and efficiency through science and factual evidence.

4.1.6 Alternative considered but not recommended

System-wide Implementation of 3-Person Engines

While considered during the analysis, an immediate system-wide implementation of 3 person engines is NOT recommended for CFD. The potential impact to public safety of a complete department implementation is deemed to be extremely risky and the phased, pilot approach to a trial of the 3-person engine provides sufficient baseline data to determine the potential impact of a complete implementation. Additionally, the rationale for implementing a Pilot Project instead of a complete implementation is to evaluate and understand the implications to fire crew safety as part of the Pilot.

4.2 Emergency Medical Incident Response

The Calgary Fire Department has been supplying Emergency Medical Incident Response to Calgarians since 1971. Even when Calgary had a stand-alone Emergency Medical Service (EMS), CFD still supplied some level of medical response. The primary reason for doing so was and still is to ensure the safety of the citizens and visitors of Calgary.

On April 1, 2009 Alberta Health Services (AHS) took over the provision of Medical Services for the province of Alberta including the City of Calgary. This meant that the City no longer provided a stand-alone EMS, including ambulance service. Today, Alberta Health Services (AHS) is the primary agency responsible for the delivery of Emergency Medical Services (EMS) in Alberta. There is no mandate indicating that a municipality needs to provide any level of EMS. As such, the primary rationale for maintaining EMS as a core service of CFD is largely moral, ethical and historical. It does not make sense that CFD would cease or reduce current service levels, given that it has the capacity to deliver them. Conversely, it also doesn't make sense that the City delivers these services free of charge.

The emergency medical response services provided by CFD are very effective, with CFD's crews frequently arriving on scene before AHS. CFD members are all trained to provide Basic Life Support (BLS) care. Medical response calls range in severity. Generally, CFD responds to Delta and Echo calls and provide BLS care until paramedics arrive on scene.

- Basic Life Support (BLS) is the level of medical care which is used for victims of life-threatening illnesses or injuries until they can be given full medical care at a hospital or trained personnel on-site that can give Advanced Life Support (ALS). It can be provided by trained medical personnel, including emergency medical technicians, paramedics, and by laypersons who have received BLS training. BLS is generally used in the pre-hospital setting, and can be provided without medical equipment or the use of drugs depending on the level of distress.
- Advanced Life Support (ALS) is a higher level of emergency medical pre-hospital care, usually provided by EMT-intermediates or paramedics. Typically ALS includes invasive techniques such as IV therapy, intubation, and/or drug administration.

4.2.1 Objective

As the number of emergency medical incident response calls grows year after year, the time and cost associated with providing medical response service continues to rise as well. The current service delivery model is not sustainable, and this review is targeted at developing solutions that will allow CFD to continue to provide quality medical response service, without impacting the quality or availability of its other core services.

4.2.2 Current State

4.2.2.1 Level of Service

The majority of Canadian fire departments, career or volunteer, provide some level of EMS or Emergency Medical Incident Response. The primary rationale for providing and maintaining Emergency Medical Incident Response as a core service is moral and ethical, as the departments generally have the capacity to provide this service. While this can be an effective and efficient use of complimentary emergency response system capacity, a balance needs to be achieved where the delivery of Emergency Medical Incident Response does not overtask the primary fire service functions of fire suppression and prevention. According to our interviews and survey results, the vast majority of CFD members appear to support medical response as a core service and duty of the fire department.

In British Columbia (BC) the First Medical Responder (FMR) program provides a relative comparative. The challenges with this program are similar to the British Columbia EMS service delivery in the following factors:

- No funding is provided by the British Columbia Ambulance Service (BCAS) for participating fire services
- Call volumes for participating BC fire services range from 50%-75% of the total call volume
- An overarching perception by local government (Senior Administration and Councils) is that the Province is down loading their responsibility and that BCAS is seriously under resourced.
- BCAS central dispatch centre frequently dispatches First Medical Responder (FMR) fire crews for calls of lessor category such as Alpha, Charlie and Bravo.
- There are prolonged periods when FMR fire crews are on scene providing primary care while awaiting BCAS arrival.

In an effort to alleviate the demands on BCAS resources and the impact on FMR fire services, BCAS reviewed the Medical Priority Dispatch System (MPDS) and developed a revised Resource Allocation Plan (RAP) in November of 2013. The RAP re-classified a number of MPDS responses to 'cold calls' (not requiring lights, sirens, and immediate response) and FMR from fire departments. BCAS projected that the RAP would reduce FMR responses for local fire departments by 1/3.

The result of this change created moral and ethical issues for the FMR fire departments. The BCAS RAP created situations where primary care was not provided for prolonged periods as ambulances were not available or tending to the more critical life threating calls. In many of these responses the fire departments were available to provide the initial primary care. Several fire departments have since disregarded the BCAS RAP and are continuing to provide initial primary care for the lower life risk calls. This choice has been made at the local government level in response to their citizen's needs and expectations, and the available emergency response capacity within the respective fire department.

Emergency Medical Incident Response calls are resource intensive, employing a minimum of two responders. For CFD, primary response to a medical response call usually involves a 4-person crew responding with an Engine. If an Engine is

unavailable, then the next available apparatus is dispatched. While responding to an EMS event, the crew and engine are not available for other service delivery until released from the scene.

4.2.2.2 Call Volume

Over the last five years, CFD has seen an increase in the number of medical calls per year *(Figure 9: Number of medical calls received annually by CFD (2010-2014))*. These calls make up approximately half of CFD's total call volume, and this proportion does not appear to be changing substantially year to year *(Figure 10: Percent of medical calls received annually by CFD (2010-2014*)). Within CFD, five stations in particular receive the highest volumes of medical calls each year; these are stations 01, 12, 22, 14, and 23.

Figure 9: Number of medical calls received annually by CFD (2010-2014). The shaded percentages represent the number of Emergency Medical Incident Response calls per capita, per year.

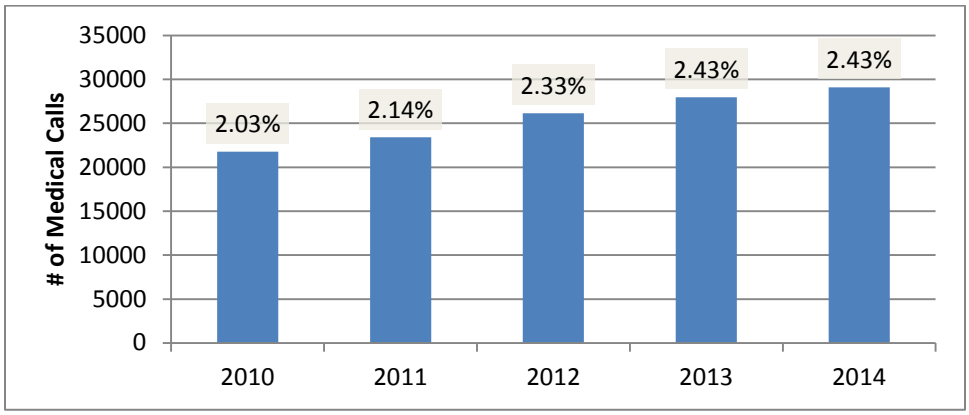
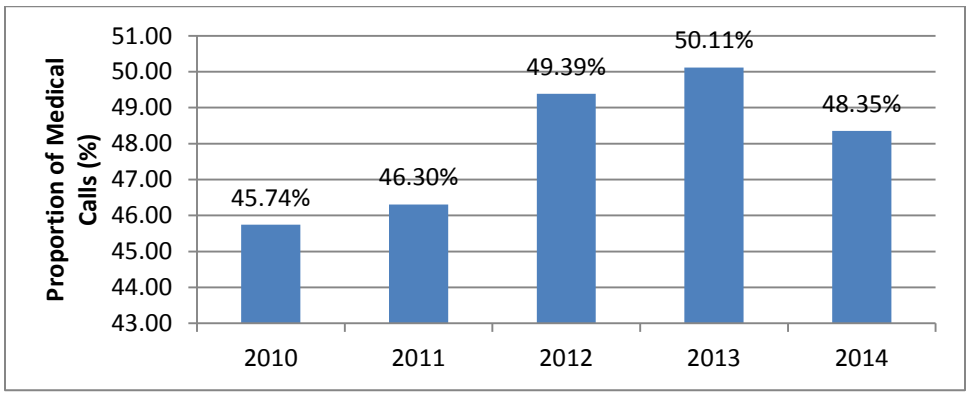


Figure 10: Percent of Emergency Medical Incident Response calls received annually by CFD (2010-2014)



4.2.2.3 Capacity to Respond

Given that the number of fire calls is declining year after year, the department has increasing availability to respond to EMS calls. The City is not required to provide EMS services, although it has voluntarily taken on that responsibility. AHS is chartered to provide EMS services. The City entered into an informal arrangement with AHS to

provide first responder services. Available capacity in fire response resources has been used as a justification for providing EMS services. Since the firefighters are available, it is logical to use them to respond to BLS-based medical emergencies.

Majority of interviewees did not believe that Emergency Medical Incident Response is currently overtasking CFD's response capacity; however, as the number of calls increases, capacity could potentially become more of an issue. Several interviewees were confident that the shift to the Dynamic Deployment System will greatly improve Emergency Medical Incident Response and overall efficiency by determining when and where to redeploy resources.

Some interviewees also felt that the use of smaller units, specifically for medical responses, would enable more efficient use of resources. They referred to the proposed Medical Response Unit (MRU) pilot project currently planned for CFD's two stations with the highest EMS call volume. Interviewees felt the MRUs would be a good way to fill the gap and improve service delivery, as they would take pressure off of front-line engines. Originally, the MRU program was designed to use an additional two FTEs per MRU; however, in conjunction with the 3-person engine pilot and redeployment system recommended in the previous section, it would be of greater benefit to run the MRUs using existing FTEs. Interviewees had varying opinions on the splitting of engine companies in order to staff the MRUs; some felt it made sense, while other thought it would lead to increased risk to firefighters and the public.

4.2.2.4 Medical Dispatch

It was noted in interviews and survey responses that the current dispatch system for medical calls does not always provide enough information to CFD responders. As a result, CFD is dispatched to calls that are lower priority than initially thought, or that it does not need to respond to at all.

AHS intends on relocating the EMS dispatch service from Calgary's E-911 Centre or Public Safety Answering Point (PSAP). Separating the EMS and CFD fire dispatch functions will result in communication and coordination challenges between the AHS and the CFD. A centralized PSAP that receives and dispatches all types of emergencies is preferred.

A leading practice being implemented in Canadian and American Fire Services is the use of Predictive Modelling and Dynamic Deployment Systems (PM/DDS). These systems are integrated into the Dispatch Centre and based upon a defined risk tolerance measure and historical data that prompts the move up or back filling of response units. For example, in the CFD at stations 01 or 22 during peak periods for EMS this system would prompt the move up of additional resources from less busier areas for coincidental or sequential emergencies including the core service of firefighting. As recommended in the Concentration and Distribution Section CFD should accelerate the implementation of its Dynamic Deployment System. This system should include predictive modelling that anticipates the need to reassign resources based on historical response data and peak activity times. As part of a phased maturation roadmap, EMS can be integrated into this system to increase the efficient and effective deployment of resources.

4.2.2.5 Reimbursement and Cost Sharing

The majority of Canadian Fire Services provide EMS or medical first responder service without reimbursement from the Province for incremental costs. This matter has come

under considerable scrutiny by the respective City Executives and Elected Officials asking why they should deliver such services when there is no mandate or compensation to do so.

While most interviewees and survey respondents were adamant that CFD should continue to provide medical response, most also noted that AHS should provide reimbursement for costs incurred by CFD.

Based on 2013 and 2014 CFD costs, call numbers, and response times, we estimate that CFD spends $2,903,000 every year responding to medical calls. This is a combination of $2,276,000 in labour costs and $627,000 in apparatus costs.

A recent study conducted by IBM Global Business Services: Operations Efficiency Diagnostic for the City of San Jose notes that EMS should not be a means of justifying the capacity of a fire department, and in most cases should not be combined with fire service at all. The study noted the declining number of fires, the increasing call volume for EMS, the perceived impact on the core services of firefighting and fire prevention, and lack of funding to provide EMS service. It indicates that the capacity of the department should be based on core fire service delivery, and that ideally excess capacity would be shed as the demand for service declines. The study suggests that, if the department does not choose to shed excess capacity and chooses instead to remain in the EMS business; it should identify and implement ways of being reimbursed for the service.

4.2.3 Findings

CFD should continue providing Emergency Medical Incident Response for high life risk emergencies; however, like many other fire departments CFD needs to find a balance between core service functions such as emergency response (non-EMS) and fire prevention. The level of Emergency Medical Incident Response should be determined only once the capacity of the response service has been rationalized to the appropriate level based on risk and other community factors. In any case CFD needs to be funded for their role in Emergency Medical Incident Response including a formal agreement with AHS that clearly defines the level of service for Emergency Medical Incident Response.

4.2.3.1 Levels of Service

Table 10 below shows the level of EMS or Emergency Medical Incident Response provided by each of the comparable fire departments. This information indicates that CFD provides comparable minimum medical response deployment to that of the comparable departments.

Table 10: Levels of Medical Response Provided by Comparable Communities (2014)

	Calgary	Edmonton	Winnipeg	Toronto	Ottawa	Montréal
What level of medical response?	Basic Life Support (BLS)	Basic Life Support (BLS)	Basic Life Support (BLS)	Basic Life Support (BLS)	Basic Life Support (BLS)	Basic Life Support (BLS)
Minimum deployment for medical response?	4 person engine or next available apparatus	4 person pumper unit	1 Firefighter Primary Care Paramedic	4 person apparatus	4 person pumper	4 person pump, including minimum 2 certified first responders

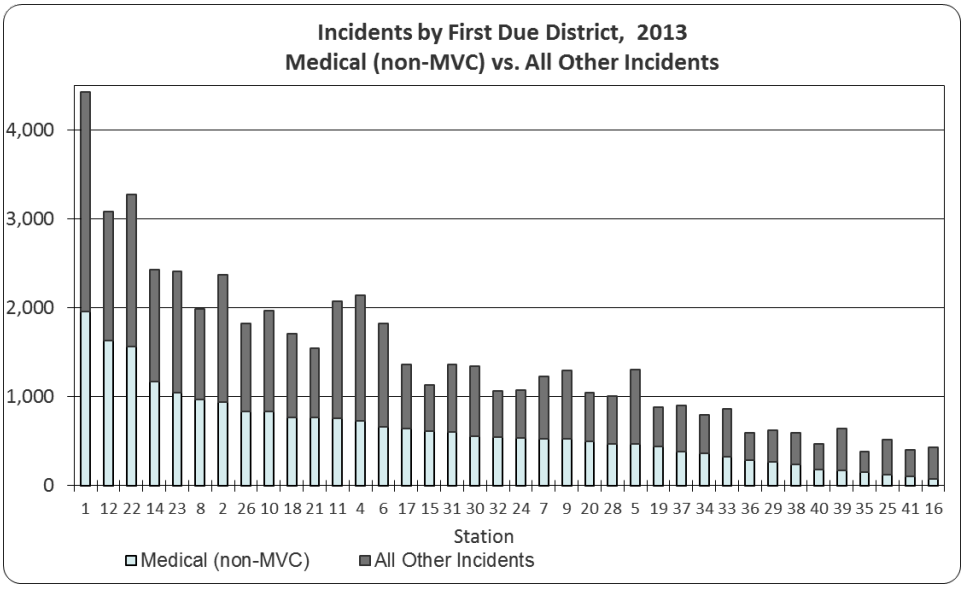
As a comparison, the BC First Medical Response (FMR) program provides some context for the CFD to consider. The FMR program was created in July 1989 to address recommendations resulting from a report prepared by Chief Coroner Vince Cain. The primary objective of the FMR program is to improve the continuity of patient care provided throughout the Province for pre-hospital emergencies. By recognizing that police and fire department personnel are often available to assist patients prior to arrival of ambulance crews, basic life support training provides responders with knowledge and the capability to deal with critical situations involving airway, breathing and/or circulation concerns until higher levels of help can takeover. Even when the first responder is only able to comfort the patient and document initial findings, a difference can be observed. 278 BC Fire Services currently participate in this critical pre-hospital care program.

4.2.3.2 Call Volume

In a 2013 study completed for CFD by the University of Alberta [7], analysis shows that higher risk EMS/Emergency Medical Incident Response categories (Delta and Echo) accounted for 84% of the Emergency Medical Incident Response calls received. The remaining 16% of the calls for Emergency Medical Incident Response were lower risk calls such as Alpha, Bravo, Charlie, and Omega (no determinant assigned) categories. Some interviewees noted that CFD is only expected to respond to Delta and Echo calls, although AHS appears to be relying more on CFD for all other calls now. Several interviewees noted that it is currently not clear which type of calls AHS expects CFD to respond to.

Figure below shows the distribution of medical calls, as a portion of total calls received by each station in 2013.

Figure 11: Incidents by First Due District, 2013



In 2013, close to half of all calls were received by stations with a 2-person apparatus in addition to the standard 4-person engine (Table *12: Volume of Incidents at stations with 2-person apparatus (2013)*).

Table 11 Volume of Incidents at stations with 2-person apparatus (2013)

Station	2-Person Apparatus Type	Approx. 2013 Incident Volume
1	Aerial	2,000
2	RC	1,000
4	RC	800
8	RC	1,000
9	HRS	500
11	Aerial	800
12	Aerial	1,700
17	HM	700
19	Aerial	500
21	RC	800
23	HRS	1,000
25	Aerial	200
26	RC	900
31	RC	600
32	RC	500
	TOTAL	**13,000**

4.2.3.3 Capacity to Respond

CFD should complete its 2-person MRU pilot project. Use of MRUs should be considered in areas and at times where the highest numbers of medical calls are recorded. These units should be staffed using the existing staffing compliment, rather than by adding 2 FTEs per unit. Alternatively, the 3-firefighter engine company trial that is recommended in the concentration and distribution section would provide the additional staffing for the MRUs. In either case the MRUs should not result in an overall increase of staffing.

One of the concerns raised in the interviews regarding the MRUs is that a 2-person crew may not have the capacity to deal with Echo calls. In cases where more responders are required, a first-on-scene MRU could initiate response, while other support resources were enroute. It would be similar to scenarios with a 2-person ambulance crew arriving first, with support crews arriving after.

BC's First Medical Response program uses smaller response vehicles other than fire engines with a crew of 4. For example, Vancouver Fire Rescue (VFRS) implemented Fire Medic response units for their busier stations. In these response areas where the station is staffed with a ladder and engine company, the ladder company is cross staffed to a crew cab pickup truck for the purpose of FMR responses. The initiative has proved to be cost efficient as well as operationally more effective to negotiate the transportation system and crowded streets. In the 3 years of the fire medic program the crew cab

response has not arrived at the scene of a structural fire without an engine or other firefighting capable resource on scene. Other services are using rescue vehicles with a crew of 2 firefighters as the primary EMS response unit. For CFD, MRUs could offer a variety of benefits to departments, including:

- Increased capacity for other apparatus to respond to non-medical calls
- Better response times compared to other apparatus
- More cost effective than sending than other apparatus to medical calls
- Reduced wear and tear on other apparatus

4.2.3.4 Integrated EMS and Fire Service Delivery

All recommendations made in this section for CFD's delivery of Emergency Medical Incident Response are made under the assumption that AHS remains the authority responsible for EMS delivery. A long-term consideration for CFD, however, is that the most efficient service delivery model would involve the total integration of ambulance (pre-hospital care) service into CFD. A study conducted by the Strathcona County Fire Chief approximately 15 years ago contended that the integrated model reduces overall costs by approximately 30%. It is acknowledged that this model would require a detailed and comprehensive business case and political support from The City of Calgary and the Province of Alberta, but it should be an option that the department is aware of and supportive of in the long-term

4.2.3.5 Reimbursement and Cost Sharing

In the absence of adequate compensation for providing EMS services, The City may want to consider whether or not there is a compelling business case for a significant modification to the service delivery approach for EMS services, including exiting EMS services all together. Regardless, The City of Calgary, like other communities in Alberta, needs to establish a formal agreement with AHS that outlines the following basic requirements:

- Expected levels of service, performance measures/goals that ensure the efficient use of CFD apparatus and personnel for medical calls
- Establish communication protocols and cost sharing with AHS regarding CFD response to medical calls
- Clearly defined roles and responsibilities

CFD should also seek clear definition of AHS's expectations in terms of which calls CFD will respond to. CFD could reduce the number of medical calls by eliminating or reducing its response to non-life threatening calls and focus its Emergency Medical Incident Response to life-threatening calls. This could be formalized in an agreement with AHS. If AHS requires CFD to respond to lower life risk calls this needs to be stipulated including cost reimbursement in the formal agreement with AHS.

Of the comparable communities analyzed, only Winnipeg is mandated, by Service Purchase Agreement, to provide EMS. In spite of this, only Winnipeg and Montréal receive reimbursement for their medical response. In Winnipeg, the amount of reimbursement the department receives in a year depends on the number of calls the

department responds to, whereas in Montréal, the amount of reimbursement depends on the department's response times for medical calls.

Table 12: Mandate and Reimbursement for Medical Response in Comparable Communities (2014)

	Calgary	Edmonton	Winnipeg	Toronto	Ottawa	Montréal
Mandate to provide medical response?	No	No	Yes[10]	No	No	No
Provide medical response?	Yes	Yes	Yes	Yes	Yes	Yes
Reimbursed for medical response?	No	No	Yes	No	No	Yes
How much and by which organization?	N/A	N/A	50% by patients via direct billing; 25% by WRHA through a Service Purchase Agreement; 25% by City of Winnipeg via property taxes	N/A	N/A	Annual grant from Quebec Ministry of Health - approx. $8 million, final amount is based on response time performance

[10] *Service provided through a Service Purchase Agreement with Winnipeg Regional Health Authority (WRHA)*

4.2.4 Recommendations – Emergency Medical Response

In addition to the recommendations presented in the Deployment and Response section of this report, CFD should also implement the following recommendations specific to medical call response.

Based on the current status of CFD's medical response, its limitations as a result of AHS, and the data we have reviewed, see the following benefits of these recommendations;

- Efficient use of CFD apparatus and personnel for medical calls
- Improved communication and cost sharing with AHS regarding CFD response to medical calls, including the formation of an agreement that addresses roles and responsibilities, medical call dispatch, and cost sharing

Recommendation #11: Maintain Emergency Medical Incident Response delivery

Maintain current delivery of Emergency Medical Incident Response while making better use of capacity by responding with all available apparatus, including engines, rescue units, and MRUs.

- *This should be a consideration when implementing recommendations for risk-based response in the Deployment and Response section of this report.*

Recommendation #12: Establish a Service Level Agreement with AHS

Establish an agreement with AHS for emergency medical response. For the basis of this agreement, CFD and AHS should use AHS response data regarding the type, frequency, and duration of medical calls to which AHS calls CFD. The agreement should:

- *Define and establish clear roles and responsibilities for both parties*
- *Ensure that AHS is committed to performance improvement measures that will minimize the impact of CFD operational readiness (i.e. – on-scene time, call volumes)*
- *Define a collaborative process for ongoing evaluation and improvement for medical response delivery*

Recommendation #13: Seek Cost Reimbursement from AHS

Establish an equitable framework for sharing the costs of medical response, including provisions for funding or reimbursement

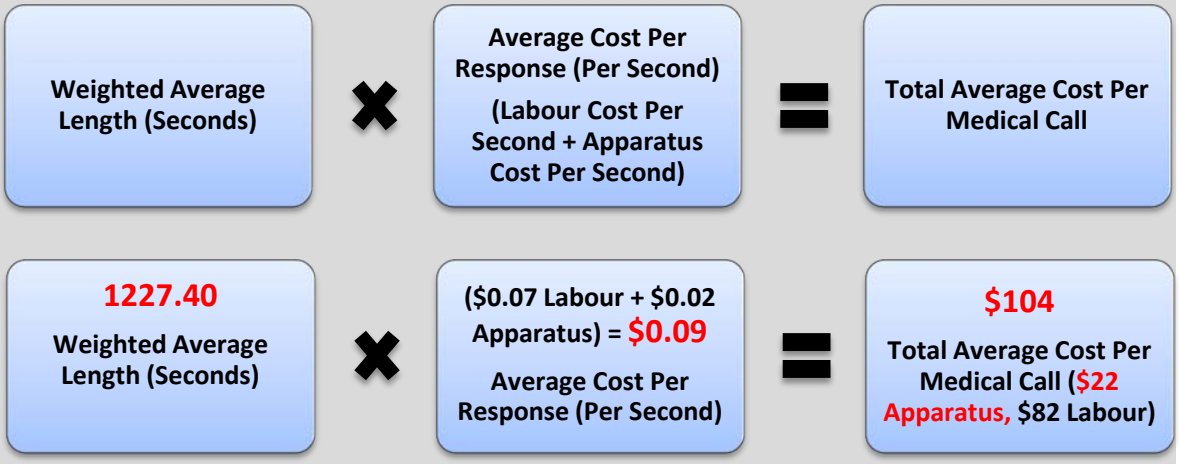
Keep AHS and CFD dispatch together in the same location. This would allow CFD and AHS to collaborate more closely for cross-training, call handling and dispatch during emergencies, and post-emergency follow-up.

Recommendation #14: Complete Medical Response Unit (MRU) pilot project

While this pilot is set to start in only the two stations with the highest number of medical calls, use of MRUs should be considered in more areas and at specific times where the highest numbers of medical calls are recorded. These units should be staffed using the existing staffing compliment, rather than by adding 2 FTEs per unit.

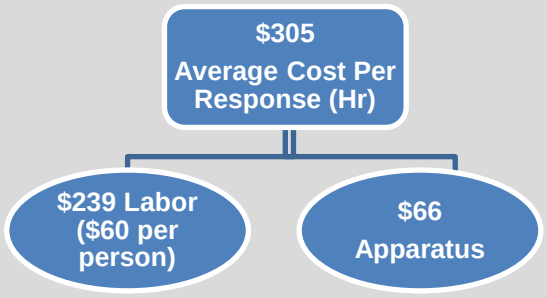
Cost Analysis

The current cost of responding to the average medical call (4-person engine response) is calculated using the following data:[11]



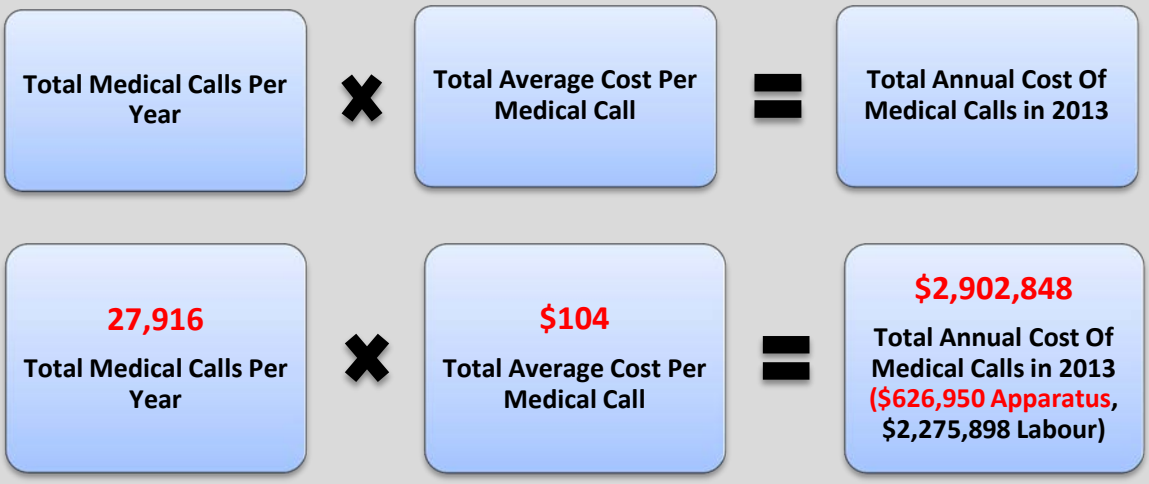
***Note:** The $304.99 for a 4-person engine response is broken down into $239.12 for labor (salary and benefits), $65.87 for apparatus costs (fuel, maintenance, depreciation)*

**Average length of medical call (1227.40) includes turnout, travel (including return travel), and on-scene time*

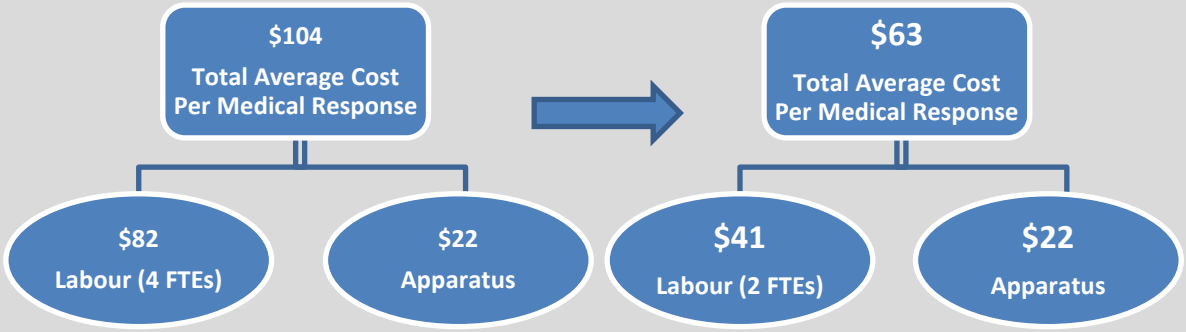


[11] *Average length of medical response data provided by CFD, Average cost per response calculated by CFD, *Note, numbers have been rounded for the purposes of this report*

The following calculation is used to determine the total cost of medical response in 2013:[12]



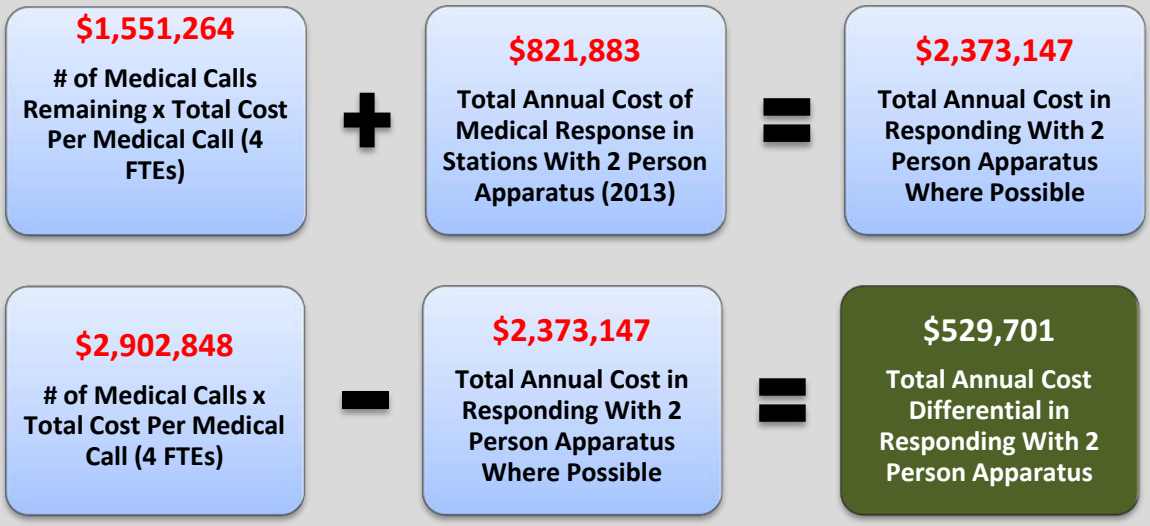
*If CFD were to send a 2-person apparatus to medical calls, the total operational cost per medical call would be reduced (from $103.99) by removing 2 FTEs from the calculation as shown below. This results in a **cost differential of $40.76 per medical call**.*



[12] *Total medical calls per year - OMBI 2013, provided by CFD*

To determine the total possible annual cost differential of sending a 2-person apparatus to medical calls, the 2013 volume of incidents at stations with a 2-person apparatus has been used in the following calculation to determine the cost of the calls that are currently being serviced with a 2 person apparatus:[13]

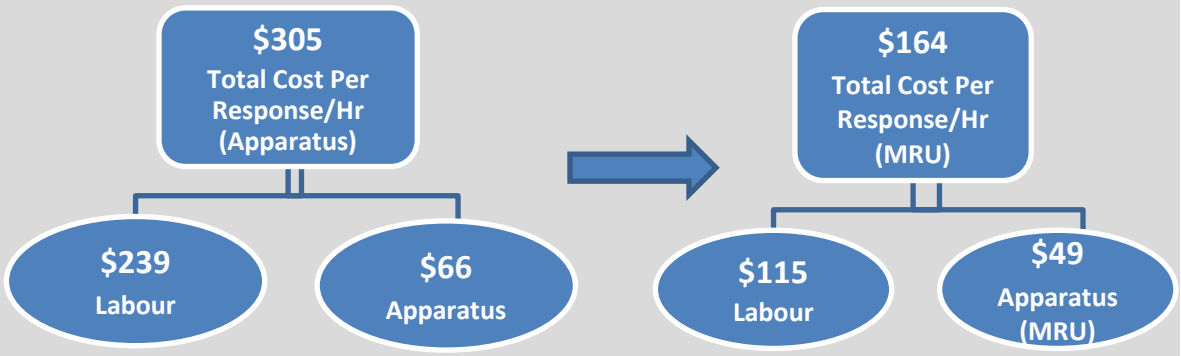
As noted previously, there were 27,916 medical calls in 2013, 13,000 were taken through stations with a 2-person apparatus. The remainder is 14,916 medical calls.



*The potential cost differential for 2013 would have been $ $529,701 by using the 2-person apparatus located in the 15 stations for 100% of medical calls. (*Note, the differential would be as a result of labour, no apparatus differential is expected).*

[13] *Incidents by First Due District, 2013 – Medical (non-MVC) vs. All Other Incidents, provided by CFD*

If CFD were to send a 2-person team, with a smaller MRU (truck etc.) to medical calls, the cost differential per hour of response would be:



If MRUs were deployed at the top 10 stations (by 2013 volume)[14], the total annual cost differential would be $579,397.65 ($70,287.13 in apparatus operating cost + $509,110.52 in labor costs).

As shown in the table below, the cost differential for the top 3 stations would equal the investment in their three MRUs ($87,500 x 3)[15]. The remaining MRU investments would be met in year 2.

It is recommended that the CFD conduct its MRU pilot program in the top 3 stations by medical call volume as outlined in the table below, to validate the potential cost differential of $257,244 versus using traditional specialty apparatus.

Potential Annual Cost Differential Using MRUs at Top 3 Stations:

$257,244

($31,207 Apparatus, $226,037 Labor)

[14] *Incidents by First Due District, 2013 – Medical (non-MVC) vs. All Other Incidents, provided by CFD*

[15] *Provided by CFD*

As shown in the table below, the cost differential for the top 3 stations would equal the investment in their three MRUs ($87,500 x 3)[16]. The remaining MRU investments would be met in year 2.

Table 13: Differential per year projected for MRUs deployed at 10 stations with highest number of medical calls[17]

Station #	Annual Medical Call Volume	Labour Costs	Apparatus Costs	Total Costs	MRU ROI Year 1	MRU ROI Year 2
1	2000	$84,500	$11,666	$96,166	110%	223%
12	1700	$71,825	$9,916	$81,741	93%	190%
22	1650	$69,712	$9,624	$79,337	91%	184%
14	1100	$46,475	$6,416	$52,891	60%	123%
23	1000	$42,250	$5,833	$48,083	55%	112%
8	1000	$42,250	$5,833	$48,083	55%	112%
2	1000	$42,250	$5,833	$48,083	55%	112%
26	900	$38,025	$5,250	$43,275	49%	100%
10	900	$38,025	$5,250	$43,275	49%	100%
18	800	$33,800	$4,666	$38,466	44%	89%
Total		**$509,111**	**$70,287**	**$579,398**		

Recommendation #15: Work with AHS to improve medical dispatch

The City and CFD should continue to work with AHS to improve the quality of medical dispatch to ensure that CFD is dispatched only when necessary or as defined in an agreement. The medical response impact on the CFD fleet is shown as follows:[18]

Table 14: Medical Volume

Medical Volume = 27916 Calls per Year	
Average Medical Incident Time	System Wide Impact on 44 Apparatus (41 Engines, 3 Quints)
1227.40 Seconds	9305.33 Hours/Year
20 Minutes	211 Hours/Engine/Year
0.33 Hours	18 Hours/Engine/Month

[16] *Provided by CFD*

[17] *Assumes the MRUs at these stations would be able to cover 100% of the medical calls currently being handled by heavy apparatus. Assumes that MRUs can be staffed with repositioning existing headcount vs. new hires*

[18] *Data provided by CFD*

Table 15: Estimated annual apparatus depreciation, with and without medical calls

Years in Use	1	2	3	4	5	6	7	8	9	10	11	12
Expected Usage Without Medical Response (Hrs.)	1000	2000	3000	4000	5000	6000	7000	8000	9000	10,000	11,000	12,000
Depreciation	$75,000	$75,000	$75,000	$75,000	$75,000	$75,000	$75,000	$75,000	$75,000	$75,000	$75,000	$75,000
Expected Usage With Medical Response (Hrs.)	1211	2422	3633	4844	6055	7266	8477	9688	10,899	12,110	Over threshold	Over threshold
Depreciation	$93,750	$93,750	$93,750	$93,750	$93,750	$93,750	$93,750	$93,750	$93,750	$93,750	N/A	N/A

The fleet hours required for response to medical calls removes 2 years from the life expectancy of engines, and accelerates depreciation of engines by $18,750 per year.

4.2.5 Recommendation Implications

Understanding the EMS is considered by most, including the CFD and general public, as a core CFD service, the recommendations are inclusive of retaining EMS within the CFD and working to improve efficiencies.

Delivering comprehensive EMS services relies on a good working relationship with AHS. In order to accomplish this, building a common understanding and clearly documenting service expectations and funding models is absolutely essential. As with the majority of great relationships between businesses, the ability to jointly develop service expectations, a division of responsibilities and service costs lies at the heart of a successful relationship.

While not simple, the CFD must drive dialogue between itself and AHS to collaborate on a service model for EMS that serves the needs of the public while also maintaining, if not enhancing, the level of services and response time for the public.

Additionally, the recommendations provide the basis for increasing the efficiency of the services currently provided by CFD. The need of CFD to continue to provide EMS services to the citizens of Calgary is essential. The expectation exists that CFD continue to respond to non-fire emergencies as it has in the past. Leveraging the recommendations in the previous section around Dynamic Deployment and Predictive Analytics, along with pilot testing the 2-person MRU will give CFD the evidence it needs to determine the validity, efficiency and effectiveness of the pilot through specific and measureable data.

4.2.6 Alternative considered but not recommended

Eliminating EMS Services from CFD

A thorough analysis was completed on the option of CFD eliminating EMS services, however, given the current expectation of public safety and the issues surrounding AHS performance for EMS, this alternative was not given any serious consideration.

The issues surrounding such an alternative are complex and elicit strong emotional response. There is an expectation, presented in the findings section that fire services include a significant EMS presence in most municipalities. Additionally, as approximately 50% of CFD calls relate to EMS, eliminating these services from the CFD would have far-reaching implications to staffing levels that could not be addressed without significant challenges.

The public expectation on response and service for EMS provide a strong foundation for CFD EMS, coupled with current AHS performance and coverage issues, provided the basis to eliminate this alternative from any serious consideration.

4.3 CFAI Accreditation

The accreditation process offered by the Commission on Fire Accreditation International (CFAI) is a comprehensive self-assessment model that assists fire departments in examining service levels and internal performance, comparing them to industry best practices, setting targets, and tracking progress. This allows departments to:

- Determine community risk and safety needs and develop community-specific Standards of Cover.
- Evaluate the performance of the department.
- Establish a method for achieving continuous organizational improvement.

Currently, CFD employs one FTE to manage its accreditation. The benefits of accreditation are as follows:

- Assure colleagues and the public that they have definite missions and objectives that are appropriate for the jurisdictions they serve
- Provide a detailed evaluation of the services they provide to the community
- Identify areas of strength and weakness within the department
- Create methods or systems for addressing deficiencies while building organizational success
- Encourage professional growth for both the department and its personnel
- Provide a forum for the communication of organizational priorities
- Foster national recognition by colleagues and the public
- Create a mechanism for developing strategic and program action plans
- Provides an avenue by which CFD can share lessons, challenges, questions, and ideas with other departments

Of the departments used in our community comparable, only Montréal has no plans to seek CFAI accreditation. Toronto does not yet have accreditation, but it is working towards achieving it in the next few years. Of the departments that are currently accredited, all indicated that they intend to continue to pursue accreditation. The departments noted the structure that promotes continuous improvement, external peer review, and networking opportunities as some of the reasons' they would continue to seek improvement (see Table 8).

Table 16: CFAI Accreditation in Comparable Communities (2014)

	Calgary	Edmonton	Winnipeg	Toronto	Ottawa	Montréal
CFAI Accredited?	Yes	Yes	No	No	Yes	No
Continuing Accreditation?	Yes	Yes	N/A	Working towards accreditation in 2016-2017	Yes	N/A
Why or Why Not?	Benefits of continuous improvement	Internal self-assessment, external peer review, and philosophy of continuous improvement are beneficial	N/A	N/A	Provides foundation for improvement, updated standards and best practices, and networking opportunities	N/A

The CFAI model employs an all-hazards response approach where response times are established for all incidents. CFAI also references NFPA 1710 (The Standard for the Organization and Deployment of Fire Suppression Operations; Emergency Medical Operations; and Special Operations to the Public; by Career Fire Departments); however, CFAI does not dictate ultimate response standards for a department. It is up to the department to set its own standards and demonstrate continuous improvement. In Calgary's case, they have adopted a 7-minute Response Time with the assembly of the ERF on scene within 11 minutes.

As a result, increasing target response times in certain areas will not impact CFD's accreditation. The CFAI accreditation process does not dictate a standard that departments must achieve; rather, it is a system that lets departments set response targets for themselves and work towards achieving them. By providing continuous improvement goals, CFAI accreditation will be beneficial to CFD in its transitioning to the dynamic response model.

4.3.1 Recommendations – CFAI Accreditation

Recommendation #16: Maintain CFAI accreditation

CFD should maintain its CFAI accreditation. CFD has been accredited three times, the cost of accreditation is relatively inexpensive to maintain. CFAI accreditation provides important opportunities for networking and collaboration, external peer review, and direction for continuous improvement.

In addition, CFAI accreditation offers the ability to measure performance against industry standards as the implementation of Dynamic Deployment and Predictive Analysis matures. The opportunity to assess the impact on overall CFD efficiency and effectiveness is critical throughout the pilot testing of the various recommendations. Benchmarking performance is one of the key success criteria to demonstrate progress, and using CFAI accreditation in addition to performance benchmarks offers the best use of department resources.

4.4 Recruit Training

The CFD's Training Academy provides the facilities necessary to conduct all employee orientation, recruit training, incumbent training, and specialized training for the department. While the CFD's training model of providing a '*Made in Calgary Firefighter'* has been in place for over 30 years. There are, however, more cost effective and proven alternatives for recruit training and orientation that will alternatively provide revenue opportunities for the Training Academy. Funding for the Training Academy has been sustainable over the past 30 years with a current annual budget of $9 million per year, however the cost output is higher than it needs to be given the potential for the facility to generate greater revenue. The CFD Training Advisory Board manages the direction and curriculum of the Training Academy, which has been audited and is currently certified by the Commission on Fire Accreditation International (CFAI).

Based on the Training Academy Review provided by CFD, the Training Academy has undergone several updates throughout the years and the CFD has done an adequate job of keeping up with technology and standards. Based on interviews, there is a need for more internal training and staff development that could potentially be accommodated at the training academy. There are also opportunities to accommodate other potential revenue-generating activities at the facility.

4.4.1 Objective

The purpose of this section is to identify how the CFD can best maintain the quality of its training program while increasing its efficiency and to identify ways in which the CFD can attract and accommodate revenue generating activities in order to use the training facility more efficiently.

Based on our preliminary findings and information collected during the interview process, the objective of this assessment is to identify how the CFD can best maintain the quality and professionalism of its training programs, while creating a more cost efficient and sustainable program. This review is focused on identifying means by which the CFD can organize and balance their recruit training and incumbent training to ensure operational skills proficiency.

4.4.2 Current State

In the early 1990s, the National Professional Qualifications Board (NPQSB) and the International Fire Service Accreditation Congress (IFSAC) accredited institutions to provide firefighter training and certification in accordance with the National Fire Protection Association (NFPA) Standards. More than 38 American states and 8 Canadian provinces provide this recognized training and certification. In Alberta, training courses are only available at Lakeland College and certification is sanctioned through the Office of the Fire Commissioner.

Most fire departments in North America have moved to hiring new employees as graduates from these accredited fire service training institutions, as they certify pre-employment trainees in accordance with NFPA 1001[19] Professional Qualification Standards, while reducing training costs incurred by the departments.

[19] *NFPA 1001 Standard: This standard identifies the minimum job performance requirements (JPRs) for career and volunteer fire fighters who duties are primarily structural in nature.*

All students that attend these institutions pay their own way and graduate with credentials that will allow them to apply for firefighting jobs in many municipalities. Once hired by a fire department, these recruits are generally required to take part in a department-specific orientation program prior to commencing work.

Currently, the hiring of pre-qualified employees from accredited training institutions is a common 'best practice' in the fire service in North America. Doing so provides a substantial cost benefit for fire departments, as the majority of the cost of training is incurred by the recruit. Once hired, recruits need only attend training to confirm skills and receive an orientation of the department. Hiring pre-qualified recruits also demonstrates a candidate's aptitude and commitment towards the fire service and their firefighting/medical skills prior to hiring, meaning that the department must take fewer risks in selecting and training recruits. The downside of this practice according to the some of the interview feedback was the inconsistency of the training curriculum within the institutions that deliver the NFPA 1001 program.

Currently, CFD provides a standard recruit training program of up to 17 weeks based on NFPA equivalencies and CFD standards. A one-week practicum in a fire station to transition the new recruit into his or her new career is also included in the 17 weeks. This is in addition to the new recruits' pre-employment requirements, and any previous training he or she may have received. It should be noted that this program is based on having the maximum recruit amount of 42 and can be scaled back depending on how many recruits they have for that class.

The increased timeframe provides more training time for core competencies and more effective training that produces fewer failures. The expanded program includes a new Fire Ground Survival Program, a new one-week in-station practicum, and more time for medical training.

While CFD's recruit training program has yielded a high percentage of quality recruits and, according to our interviews, has notably enhanced the culture of the department, it is a resource-intensive program in terms of both time and budget. Recognizing training from external institutions could present a substantial cost reduction for CFD, without necessarily compromising the quality of recruit training.

Input received during the interview process indicates that in its current state, the CFD's training program is too long and should be scaled back in order to improve efficiency and lower training costs. Some of the positive response on the current recruit process indicated that although there were good candidates coming out of the Recruit Training Program and there was a higher success rate, the overall length is too long and the subsequent cost of the program is higher than normal.

4.4.3 Findings

The following points are our key findings during interviews and staff surveys:

- The Recruit Training Program has undergone a number of iterations over the years with the latest being expanded from 12 weeks to 17 weeks in 2013 to accommodate for the varying degrees of experience and industry knowledge of new recruits. This is intended to be a scalable model; however, most interviewees felt the program was too long.
- All previous credentials held by candidates enhance their chances of being selected in the application stage, but provide neither guaranteed employment, nor reduced training requirements upon employment.
- The majority of those interviewed agreed with the military philosophy of hiring the best candidate for the job with the right attitude, and then providing that candidate with the appropriate training.
- The cultural background of the uniform implies the recruits are learning from someone with experience and authority and that the core competencies need to be taught by uniformed staff for credibility.
- Comments were made in the interviews and in the responses to the staff survey regarding the revision of the Candidate Physical Ability Test (CPAT) standards, and the need to increase the fitness levels of the recruits to ensure a high level of physical fitness.
- Due to the focus on recruit training in the past five to ten years, incumbent training has declined and interviewees indicated that there is an urgent need to re-vitalize incumbent training.
- In past years, there have been various informal discussions with other departments regarding recruit training programs; however, CFD has not completed any formal comparable studies with other departments.
- Of the five communities we used as comparable benchmarks, only Edmonton Emergency Services does a similar program and their program duration is 12 weeks with no practicum. The other four departments (Toronto, Winnipeg, Ottawa and Montreal) hire recruit candidates who already have their NFPA 1001 certification from accredited training institutions. These four departments have pre-operational training and orientation that range in duration from three weeks to 14 weeks (see *Table: 20).*

4.4.4 Recommendations – Recruit Training

Based on the opportunities for improvement identified, the following are the benefits of implementing the recommendations in this Final Report:

- Reduce spending on recruit training
- Increase incumbent training

Recommendation #17: Reduce duration of recruit training and orientation

CFD should reduce the current 17-week recruit training and orientation program by accepting candidates who have graduated with NFPA 1001 certification from an accredited and CFD approved training agency. For example, by reducing the training and orientation program to 8 weeks, CFD would significantly reduce the overall cost of in-house recruit training and orientation. This would also free up resources for incumbent training, as well as create capacity at the training academy for external revenue-generating opportunities.

As seen on Table 17 (p.65), there is a vast variation in how much time other fire departments train and orientate new recruits prior to full employment. This variation is based on their individual needs and local requirements. CFD is no different in this case and should ultimately determine the amount of time necessary to train and orientate new recruits by assessing their needs and requirements prior to activating the recruit for full duty. In addition to the NFPA 1001 curriculum the recruit has already been exposed to, items such as skills verification, employer expectations, on-duty requirements, standard operating procedures, equipment specific orientation, HR requirements, etc. could be part of the training and orientation program.

It was also noted by CFD that the Training Officer (TO) $/Day is based on a cost recovery model which suggests that TO salaries and benefits are included, as well as overhead for operating the Training Academy.

The current cost associated with the CFD's current maximum 17 week training period versus 8 weeks is outlined in the table below.

Length (Weeks)	17 Weeks	8 Weeks
Training Officer Days	472	222
Training Officer $/Day	$750	$750
Recruit Hourly Wage	$27	$27
Total Cost	**$1,057,161**	**$497,487**

*The potential cost savings in moving to an 8-week program could be **$559,673** per recruit class. Again, the amount of weeks CFD would apply depends on their needs and requirements after accepting a fully NFPA 1001 certified candidate.*

*Potential cost differential for training can also be realized by utilizing civilian instructors in the place of CFD Training Officers. This results in a **$400 cost per day vs. a $750 Training Officer cost per day**. The result is a total cost of **$419,746** for an 8-week program.*

Potential Cost Differential in Moving From a 17 Week Course, to a 8 Week Course, and/or Utilizing Civilian Training Officers:

	8 Weeks	8 Weeks/Civilian
Differential Per Class	$559,673	$637,414
Differential Per Recruit	$14,351	$16,344

Recommendation #18: Eliminate recruit practicum

CFD should eliminate the one-week practicum from its recruit training program. Although this is a relatively new addition to CFD's recruit program, there is no evidence that it is necessary, particularly as it is the only one of the comparable departments to include such a component in its recruit training program.

Recommendation #19: Use non-uniformed staff for non-technical training

CFD should use non-uniformed staff or external training agencies for non-technical training. For example:

- *Critical Incident Stress Management*
- *Pet Safety/Animal CPR*
- *LRT (Light Rail Transit) Awareness*
- *Disability Management*
- *Customer Service*
- *Diversity and Inclusion*
- *Management/Leadership*

Recommendation #20: Partner with external training institutions

CFD should explore partnerships with external training institutions to deliver pre-employment training. These partnerships would allow CFD to dictate the type of candidates it receives during pre-employment screening to uphold the CFD's entry and certification criteria.

Partnerships could include arrangements for non-technical training and incumbent training. They could also extend into allowing CFD to host or provide accredited training programs to other municipalities or industries using CFD's facility and qualified staff.

External partnerships should also be explored with industrial users such as companies and associations. Developing these partnerships may allow the facility to improve or expand by way of donations of props, upgrades and capital investment.

Recommendation #21: Increase investment in incumbent training

CFD needs to increase its investment in all aspects of incumbent training. Medical and rescue training were identified during our interviews as having been deferred over the years due to increased focus on recruit training.

An option would be to continue providing localized incumbent training in the 4 quadrants of the City, rather than at the Training Academy. This would free up more capacity at the Training Academy and would eliminate some overtime costs associated with travel and/or down-time.

In reviewing the potential to use non-uniformed or external training agencies for non-technical training, the following should be considered:[20]

Table 17: Internal Training Officer and External Instructor Costs

	Cost Per Hour	Cost Per Day	Current Annual Contact Hours	% of Total Training Time	Cost
Training Officer	$100	(7.5 hours) $750	41,748	88%	$4,174,800
External	$50[21]	(8 hours) $400	5,648	12%	$282,400
Total			**47,396**		**$4,457,200**

The incremental potential differential of using external (non-uniformed) training officers in the place of uniformed training officers is shown below in Table 19. Costs are based on the current number of incumbent training contact hours, which is 47,396 – 5,648 (or 12%) of which are led by external instructors, and 41,748 (or 88%) of which are led by internal Training Officers.

Table 18: Internal Training Officer and External Instructor Hours per Annum

% of Contact Hrs. Led by External Instructors	# of Hrs. Led by External Instructors	Total Cost for External Instructors (@$50/hr.)	# of Hrs. Led by Internal Training Officers	Total cost for Internal Training Officers (@$100/hr.)	Total Instruction Cost	Potential Differential (based on current costs)
Current number of incumbent training contact hours using external instructors						
12	5648	$282,400	41748	$4,174,800	$4,457,200	N/A
Estimated incremental potential differential using external instructor						
20	9479	$473,960	37917	$3,791,680	$4,265,640	$191,560
30	14219	$710,940	33177	$3,317,720	$4,028,660	$428,540
40	18958	$947,920	28438	$2,843,760	$3,791,680	$665,520
50	23698	$1,184,900	23698	$2,369,800	$3,554,700	$902,500
60	28438	$1,421,880	18958	$1,895,840	$3,317,721	$1,139,479
70	33177	$1,658,860	14219	$1,421,880	$3,080,741	$1,376,459

[20] *Data Provided by Calgary Fire Department*

[21] *Cost provided by Lakeland College (Vermilion AB)*

4.4.5 Recommendation Implications

Bringing the length and structure of CFD recruit training in line with other comparable communities offers a substantial cost differential for CFD without sacrificing the training quality or recruit readiness, and freeing-up capacity of the Training Academy and Training Officers to offer fee-based training to non-CFD clients. Building on the already strong training academy and looking for efficiency and effectiveness advantages offers CFD the ability to get recruits to deployment readiness faster.

Additionally, utilizing external training partners provides CFD with greater reach within the community and can produce advantages that reach far beyond the specifics of recruit training. Access to new and innovative training methods, building community involvement in to previously underutilized relationships and expanding recruitment capabilities are the main implications of these recommendations.

4.4.6 Alternative considered but not recommended

During the analysis of options, consideration was given to completely outsourcing CFD training to a qualified external training partner. While this option likely would result in cost efficiencies, the alternative was discounted as a possible solution with the following rationale:

- Quality control over recruit training would be challenging to maintain with an external service provider.
- An external training provider would be capable of delivering the technical training for CFD, but the standard operating guidelines for CFD, currently delivered with the existing training approach may not get covered completely. The result would impact every aspect of quality of new recruits leading to potential public and staff safety risks.
- The outsourcing of training is contrary to the culture and vision of the CFD and does not meet the objectives of the CFD core value proposition.

4.5 Training Academy

The Calgary Fire Department (CFD) trains its members at the Fire Training Academy consisting of two major buildings and a number of other facilities. The training academy is capable of training most courses, weather permitting, on a year round basis to provide skills proficiency and safety related programs.

Common feedback received from the interview process is that the Training Academy is not being used to its full potential. The Academy is a well-equipped training facility that could generate more activity and potential revenue.

The Academy has been used by neighboring fire departments on an intermittent, partial cost recovery basis. There has also been some specialty team training with outside departments in the Heavy Urban Search and Rescue (HUSAR) and Aquatics Rescue. The Academy can be used year round and there are multiple sources for revenue development, including neighboring fire departments, other City of Calgary departments, and general industry including oil and gas. The academy and its resources could instruct a variety of courses to city departments on a fee for service basis. Currently, however, there is no formal business or marketing plan to generate revenue for the Academy.

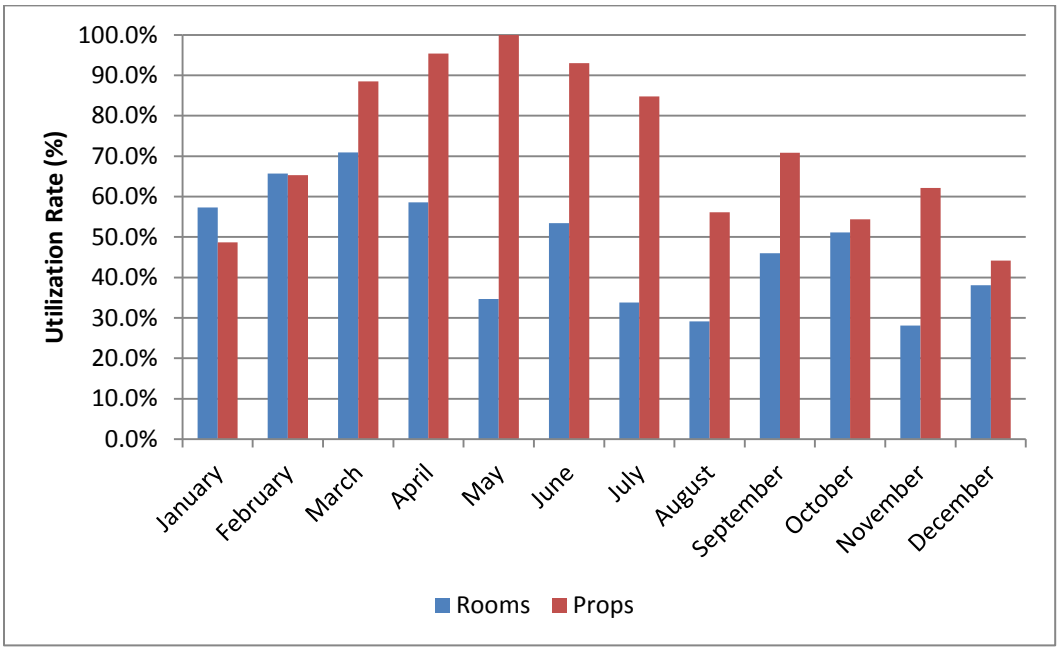
4.5.1 Objective

Based on the preliminary findings and information collected during the interview process, the objective of this assessment is to identify ways in which the CFD can balance operational basics with a focus on identifying strategies to attract and accommodate revenue-generating activities with the aim of utilizing the training facilities more effectively.

4.5.2 Current State

Although there were some peak times, overall utilization in 2014 was only 42.23% for classrooms and 71.94% for training props.

Figure 12: CFD Monthly Utilization Rate for Rooms and Props (2014)



4.5.3 Findings

There was some feedback on the function of the Training Academy and its current practice of generating revenue. The general consensus from the interview process was that the Training Academy is not being used to its full potential.

4.5.4 Recommendations – Training Academy

Based on the opportunities for improvement identified, the following are the benefits of implementing the recommendations in this report:

- Increase the overall usage of the Training Academy
- Generate revenues for the Training Academy

Recommendation #22: Develop a Training Academy Business Plan

CFD needs to create a business plan for the Training Academy and treat the facility as business opportunity. This plan should include:

- *Situation Analysis*
  - *Forecasts*
- *SWOT Analysis*
- *Goals/Objectives*
- *Strategies/Tactics*
  - *Targets*
  - *Short-term tasks and processes*
  - *Long-range plans*

Recommendation #23: Market the Training Academy facility and props to other users

Market the facility and/or services (training and facility use) to other City of Calgary departments. There are a number of training programs that can be delivered by the CFD staff that some City of Calgary departments may be buying elsewhere.

- *Fire extinguisher training*
- *First Aid and CPR*
- *Confined Space*
- *Self-Contained Breathing Apparatus (SCBA)*

Market the facility and/or services (training and facility use) to other Municipalities.

- *Travel to Calgary is generally more attractive to neighboring municipalities than travelling to Vermillion or other institutions.*

Market the facility and/or services (training and facility use) to the industrial sector.

- *There are a number of industrial sectors that go to training institutions around Canada and into the US, including:*
  - *Oil and Gas*
  - *Mining*
  - *Railroad*

Cost Analysis

The following is an analysis of the current utilization of classrooms and props within the Training Academy in 2014[22], reviewing the potential revenue that could be generated in future years, based on the excess capacity that was logged in each month of 2014. It is understood that the smoke tower was unavailable for a period of time in December 2014, artificially lowering utilization that month. The potential incremental revenue for classroom utilization is based on a classroom charge out rate of $200/day. For prop utilization, it is based on the following list of props and charge out rates:

Table 19: List of props and charge out rates

Prop Charge Out Rate	# of Props Available at this Rate	Potential Revenue per Day
$500/Day	6	$3,000
$450/Day	1	$450
$400/Day	2	$800
$250/Day	3	$750
	Grand Total	**$5,000**

Table 20: Classroom utilization and potential incremental revenue, 2014 (based on classroom charge out rate of $200/day) [23]

	2014 Utilization	Total Capacity	Excess Available	Available Capacity to Sell
Jan	57%	22	9	$1,800
Feb	66%	19	6	$1,200
Mar	71%	20	5	$1,000
Apr	59%	21	8	$1,600
May	35%	22	14	$2,800
Jun	53%	21	9	$1,800
Jul	34%	22	14	$2,800
Aug	29%	20	14	$2,800
Sep	46%	21	11	$2,200
Oct	51%	22	10	$2,000
Nov	28%	19	13	$2,600
Dec	38%	21	12	$2,400
			Theoretical Total	**$25,000**

[22] *Training Year in Review Presentation, provided by CFD (Assumes Hours Available: Mon-Fri @ 10hrs/day, not including stat holidays)*

[23] *Assumes 100% utilization (every day, maximum available hours per day)*

Table 21: Prop utilization, 2014 (based on $5,000/day total charge out potential)[24]

	2014 Utilization	Total Capacity	Excess Available	Available Capacity to Sell
Jan	49%	22	11	$61,325
Feb	65%	19	6	$33,450
Mar	89%	20	2	$11,150
Apr	95%	21	0	$-
May	100%	22	0	$-
Jun	93%	21	1	$5,575
Jul	85%	22	3	$16,725
Aug	56%	20	8	$44,600
Sep	71%	21	6	$33,450
Oct	54%	22	10	$55,750
Nov	62%	19	7	$39,025
Dec	44%	21	11	$61,325
			Theoretical Total	**$362,375**

Available capacity to sell
(Classroom + Props)
$387,375

There is also additional potential revenue from reducing recruit training by 9 weeks.

- *45 days at $200/day for a classroom = $9,000*
- *45 days at $5,000/day for props = $258,750*

Available Capacity to Sell (Classroom + Props) **$387,375** + **Potential Incremental Revenue from Reduction in Recruit Training** **$267,750** = **Potential TOTAL Incremental Revenue for Training Academy** **$655,125**

[24] *Assumes 100% utilization (every available day, maximum available hours per day), potential revenue for props includes the revenue for one instructor/training officer*

4.5.5 Recommendation Implications

The facilities the CFD has at its disposal for training are unparalleled. Increasing utilization and opening up new revenue opportunities provides CFD with a unique and untapped means by which to enhance the cost structure of the department.

Accordingly, the CFD should treat training and the academy as a business solution that can be leveraged. Through a strategic assessment and development of a succinct business plan could open up new, previously untapped markets for additional revenue, increasing resource efficiency. An additional benefit would be the ability to gain market awareness, enhance communication, and engage in new relationships.

SECTION 5
ASSET AND FACILITY MANAGEMENT

5.1 Introduction

Asset management is defined as the 'coordinated activity of an organization to realize value from assets'. In turn, assets are defined as follows: 'An asset is an item, thing or entity that has potential or actual value to an organization'. This definition is deliberately wider than physical assets but these form an important focus for most organizations.

A proper asset management program will also enable the fire department to examine the need for, and performance of, assets and asset systems at different levels. Effective asset and facility management will enable the application of more defined approaches towards managing the organization's assets over the different stages of its life cycle (which can start with the conception of the need for the asset or facility, through to its disposal or decommissioning, and includes the managing of any potential post disposal liabilities).

CFD has millions of dollars' worth of assets in the form of vehicles, equipment and fire stations. Management of these assets is critical to the department demonstrating fiscal responsibility with its assets.

Procurement is defined as the processes to acquire goods and services for the department (or organization). Presently CFD does work with Corporate Purchasing in relation to asset management and procurement.

5.2 CFD Fleet Management

5.2.1 Current State

CFD has millions of dollars' worth of assets in the form of vehicles and equipment. Management of these assets is critical to the department demonstrating fiscal responsibility with its assets.

Table 22: CFD Asset Composition, April 2015

Apparatus	Total Number of Units
Aerial	4
Boat	10
Car	17
Emergency	21
Engine	53
Generator	1
Mobile Command	2
Quint	12
SUV	22
Tanker / Tender	3
Trailer	38
Truck	39
Van	39
Total	**261**

Apparatus lifespan varies depending on the type of apparatus and its use. Current Underwriters Laboratories of Canada (ULC[25]) and NFPA 1901 Standard for Automobile Fire Fighting Apparatus Standards recommend up to 15 years for front line apparatus, plus another 4 to 5 years as backup. Of course this is dependent on frequency of use and scheduled maintenance. CFD is meeting these requirements, and in many cases is even retiring apparatus before the defined lifespan. While early apparatus retirement ensures quality of the department's apparatus, it is not an efficient use of resources. Based on the community comparable, there may be a more dependable and manageable approach that ensures capital assets receive the funding when needed.

Another factor that contributes to the cost of CFD's asset management program is its fleet management. In most municipalities, including Calgary, fire department asset management is managed centrally by the municipal corporation in order to take advantage of synergies

[25] *Underwriters Laboratories of Canada (ULC) is an independent product safety testing, certification and inspection organization. www, canada.ul.com -*

with other fleet and facilities management programs. Calgary, however, CFD has taken on its own fleet management. The main reason for doing so is operational readiness.

Based on interviews conducted, this program enables the department's needs to be addressed directly, and the level of service is likely higher than it would be if another municipal department or a third-party were to take it on. While these are important benefits, CFD's in-house fleet management has further raised the cost of the department's asset management program.

In an effort to further improve its processes and efficiencies, CFD commissioned a Logistics & Infrastructure Business and Organizational Review that was completed in January 2015. That report contained two primary recommendation themes: implementation of asset management best practices and technology, and re-organization to align with the City of Calgary asset management department in order to leverage skills, capacity and supply agreement, tool, etc.

This section of the ZBR review is targeted at identifying ways that CFD can adapt its apparatus life-cycling and fleet management programs in order to improve efficiency and lower its relatively high cost per apparatus.

5.2.2 Findings

The following observations were made from the staff surveys and interviews conducted:

- The CFD asset management program is a City of Calgary model that is based on the ISO 55000 standard, and tailored it to fit CFD's needs.
- The present asset management and procurement program is serving the fire department well as it allows for total control in relation to securing and maintaining their assets.
    - Apparatus Availability target is 80%. Fleet is meeting or exceeding this for all apparatus except for Quints and Aerials.
    - As of 2014, 19% of the fleet is beyond the manufacturer's recommended life. They also have approximately 20% of the fleet as "Spares".
    - Improvements could be made in tracking utilization of apparatus and ensuring more regular rotation of units from high-utilization stations to lower-utilization stations to balance the workload across the whole fleet to avoid engines aging-out or wearing-out prematurely.
    - CFD Fleet connects with Operations twice per day to schedule maintenance activities based on real-time operational requirements, requiring a significant degree of flexibility and accommodation on the part of fleet, and typically results in some preventative maintenance and 200-hr inspections being deferred.
- Results from interviews and surveys indicate that some staff think that the quints are unnecessary apparatus for CFD and that alternatives should be explored.
- The Fleet Operations section of Logistics and Infrastructure does not currently manage all facets of the light fleet on a consistent basis, specifically maintenance forecasting and coordination, vehicle assignment tracking, and data collection.

Table 24: Asset management structure and facilities in comparable communities (2015)

	Calgary	Edmonton	Winnipeg	Toronto	Ottawa	Montréal
Same or different management as rest of municipality?	Program based on corporate model but is controlled in-house by CFD. Corporate procurement staff used at CFD exclusively. Warehousing and maintenance of CFD equipment are done by CFD	All city departments follow city's corporate asset procurement policy and procedures	WFPS uses Winnipeg Fleet Management Agency's (WFMA) centralized asset management program	Same as other city divisions	Mostly the same system, but fire department has greater ability to sole source	All procurement goes through central city purchasing system
Department has its own fleet maintenance facility?	CFD has a dedicated facility for maintaining and repairing its frontline apparatus	City has a dedicated facility and staff for repair and maintenance of fire apparatus	WFPS manages heavy fleet and equipment maintenance	TFS has its own maintenance facility where it performs all equipment and fleet repair except body repair, engine/transmission work, spring replacement, and tire replacement	Use the city facility for all maintenance	All mechanical work done by Fleet Management Department. Fire Department works primarily on small equipment
Other fleet maintenance facilities?	CFD also uses corporate services and external vendors for some of its maintenance and repair work	Fleet Services is a city branch that performs all repair and maintenance for fire apparatus. External contractors do repair and maintenance of communication equipment	Heavy fleet vehicles sent to external repair facilities with demand exceeds WFPS capacity. Light fleet maintained by WFMA	Very occasionally use private vendors when capacity is overloaded	City facilities shared with Parks, Buildings, and Ground Services	Apparatus maintenance is performed at a city fleet management facility. They have a shop and staff dedicated to the fire fleet

- Of the five community comparables, Ottawa and Montréal have fire department maintenance performed almost entirely by the city. Similarly, in Edmonton and Winnipeg, the cities perform most the fire department maintenance, other than a small amount that is contracted to external vendors. In Toronto on the other hand, the fire department performs most of its own maintenance, other than a small amount that is contracted to external vendors.
- With any maintenance program, there is a need for one or more of the mechanics at a fleet facility to be Emergency Vehicle Technician (EVT) certified so they can perform specialized repairs and annual checks on the fire vehicles. This would be the consideration if the City's Fleet Services took on all of CFD's fleet
- CFD should review its present fleet maintenance program to see if there are options for cost savings in relation to working closer with the City's Fleet Services. Many fire departments work with their fleet services to take full advantage of their EVT's for specialized work. Whereas, the City's Fleet Services can take on much of the other non-EVT related work.
    - CFD currently works through the City to purchase its light-duty vehicles. This appears to be working well, although Fleet Services has indicated that its ability to purchase vehicles outside of a specified budget limit could potentially be leveraged by CFD to purchase apparatus that is deemed operationally necessary when CFD's approved capital budget is insufficient.

5.2.3 Recommendations – CFD Fleet Management

Based on the opportunities for improvement we've identified the following benefits can be realized with the implementation of these recommendations:

- Improve cost management of the light vehicle fleet (both procurement and maintenance)
- Optimize cost effectiveness for apparatus maintenance by identifying the value of having Fleet Services perform maintenance.
- Adopt a system for monitoring the cost per vehicle over the course of a vehicle's lifespan in order to identify ways to optimize and extend vehicle lifespans.

Recommendation #24: Keep the specification process for specialty apparatus and equipment in-house

The specification process for specialty apparatus and equipment should remain in-house with CFD. CFD's specialty apparatus are unique to the fire service and therefore the greatest level of familiarity with these vehicles exists within the CFD's operations and fleet departments. CFD currently engages with Supply for procurement to ensure that a competitive process is in place when purchasing new apparatus.

Recommendation #25: Keep maintenance of specialty apparatus in-house

The maintenance of specialty apparatus should remain in-house with CFD. As above, CFD has the appropriate expertise in-house, specifically the EVTs. Also, the high degree of availability and coordination with Operations is best accommodated by keeping this function in-house vs. managing this through an external service provider such as City of Calgary Fleet Services or a third party.

Recommendation #26: Out-source maintenance of light duty vehicles

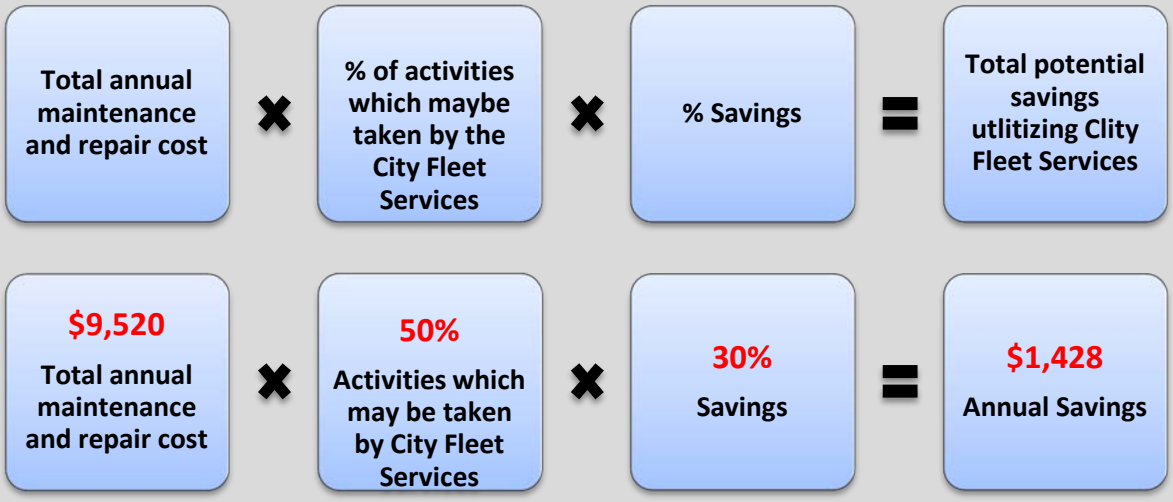
CFD should continue to out-source maintenance for other light duty vehicles to corporate services and third-party providers. CFD should define a schedule of services which are more optimally delivered through Fleet Services vs. 3rd party service providers. Optimal would include a combination of cost and turnaround time. This schedule should be reviewed at least annually and updated where appropriate. CFD should also establish a standard up fitting package for light-duty vehicles with an eye to reducing up fitting costs and ongoing maintenance/parts inventory costs.

There is potential for cost savings in the area of light fleet vehicles. Currently, CFD contracts most of its maintenance activities to external (non-City of Calgary) sources. If CFD were to utilize Calgary Fleet Services for maintenance activities, there may be up to a 30% savings from the private sector's market rates, based on interviews with CFD and Calgary Fleet Services. The potential cost savings are shown below:[26]

Table 24: Light Fleet Cost Benefit Analysis

Maintenance and repair cost per km/vehicle	$0.07
Average use per year	8,000 Km
Annual maintenance and repair cost per vehicle	**$560**
Number of CFD owned units (cars)	17
TOTAL annual maintenance and repair cost (light fleet)	**$9,520**

Assuming that 50% of the current maintenance activities could be taken on by City Fleet Services (the other 50% would continue to be outsourced to other 3rd parties), the potential savings is calculated as follows:



[26] *Light Fleet Cost Breakdown, provided by CFD*

Potential Savings Utilizing City Fleet Services

$1,428

Note: *Turnaround time will need to be a consideration in the potential to utilize City Fleet Services on a case by case basis.*

Recommendation #27: Engage City Fleet Services to manage the light fleet

In order to address the current state of light maintenance forecasting, vehicle assignment tracking, and data collection, CFD should determine the costs and operational feasibility of fully outsourcing the management of the light fleet to City Fleet Services. CFD should work with City Fleet Services to define a service agreement, which CFD can then evaluate. If management of the light fleet is not outsourced, CFD will need to construct a plan to more effectively forecast needs, as well as track, collect and analyze data. In addition to the need for software for these purposes, an additional FTE may be needed to assist in this capacity.

Recommendation #28: Implement advanced Lifecycle Management Software

CFD should implement more advanced lifecycle management software in order to better track, care for, and extend the life expectancy of frontline apparatus. This would ensure that preventative maintenance is more tightly tracked, and the rotation of apparatus from high usage stations to lower usage stations to avoid early retirement/replacement.

This added software will provide valuable data for failure analysis and more even usage across the entire fleet. This combined with more rigorous/documented asset management practices will ensure that the CFD gets the optimal utilization from it apparatus.

5.2.4 Recommendation Implications

In line with the recommendations from Section 4 regarding the maturation of Dynamic Deployment and the implementation of Predictive Analytics, tying these solutions together with an integrated Asset Management solution will enhance the overall efficiency and effectiveness of CFD.

As with many businesses and civic departments, the ability to gather business intelligence and provide thorough decision-making information offers CFD the opportunity to quantify the improvements across the organization in terms of asset utilization, apparatus deployment and resource effectiveness.

The real value is in executing a comprehensive technology strategy and roadmap with the ultimate goal of providing CFD leadership with real-time business intelligence and predictive reporting leading to greater overall effectiveness. Additionally, the data gathered from an integrated business intelligence warehouse offers the opportunity to execute an efficiency review and deliver the foundation of continuous improvement – which is at the heart of the ZBR process.

5.2.5 Alternative considered but not recommended

Outsourcing Maintenance and Management of the Frontline Apparatus Fleet

It is understood that there have been previous considerations of moving the maintenance of the apparatus fleet outside of the CFD. There are limited private sector options – the specialized service of maintaining fire engines and other apparatus requires EVTs which are available through some equipment dealers but in very limited capacity, making reliance on these service providers prohibitive due to the need to maintain a high level of availability.

Another option would be to transfer the maintenance and management of the CFD fleet to Fleet Services, essentially turning the CFD fleet facility into a satellite location of City Fleet Services. This would transfer the staff (including Local 255 mechanics) under management outside of CFD which would introduce complexity to the labour relations environment. There would also be added process costs associated with the liaison function between CFD Operations and City Fleet Services on a daily basis. Ultimately, the transfer of fleet operations from CFD to City Fleet Services would allow the fleet to benefit from the expertise and resources of a large fleet service organization – addressing some process and analysis gaps that exist within the CFD today; however, there would be added complexity by moving this operation outside the CFD. The added complexity would be in labour relations as well as in day-to-day coordination/communication with CFD Operations.

The fleet operation would need to be governed under a comprehensive service level agreement, requiring dedicated management from both CFD and City Fleet Services to monitor and maintain the relationship. The CFD would also be expected to pay on a full cost-recovery basis for this service, which may represent a material change in the budgeted cost of fleet management and maintenance.

5.3 Mixed-Use Facilities

Decision-making regarding the location, timing, and type of station to construct is similar to the decision-making that must occur as part of the City's Growth Management Strategy. CFD also considers capital and operating expenditures, availability of leading infrastructure such as roads, water distribution, land supply, cross-departmental sharing of resources and funding availability. Mixed-use stations are one way to improve collaboration and planning effectiveness in the development of new community and emergency facilities. Mixed-use can apply to a mix of municipal uses, or to a mix of both municipal and private uses. While both can increase the efficiency of spatial use, mixing both municipal and private uses has additional benefits:

- There are financial benefits anticipated for mixed-use facilities that include non-municipal uses, as the total space to be leased and the associated utilities would likely be lower than for a building specifically for municipal uses.
- Mixing municipal uses with non-municipal uses promotes visibility and participation in communities.

5.3.1 Current State

Calgary currently has two mixed-use fire stations (No. 6 and No. 10), and does consider the opportunity to utilize multi-service centers that may involve Police, Emergency Medical Services and in some cases other City Services such as Animal and Bylaw Services or Community and Neighborhood Services. With planning and collaboration, CFD and the City

can better identify ideal locations for new fire stations, as well as opportunities to work with other municipal departments and with community developers to identify other uses that co-exist with new fire station developments. While new station developments are the obvious target for mixed-use developments, there are also opportunities within existing stations to achieve these benefits as well.

5.3.2 Findings

- Later in 2015, the City will be introducing the Integrated Civic Facilities Program
- Timing is key when contemplating mixed-use facilities, particularly with regards to:
    - Identifying a civic need
    - Identifying an appropriately sized piece of land and reserving it
    - Determining the zoning depending on the use
    - Need to start the process at the ASP level
- CFD is in the process of working with developers to establish fire stations as leading infrastructure ensuring capital and operating funds are in place before the area can be developed and thereby create risk that will be difficult to manage.
- There are 3 fire stations currently in planning that are anticipated to be part of the larger mixed use developments.
    - Cornerstone
    - Varsity
    - South Macleod / Belmont
- CFD is currently not synced with future development of Area Structure Plan.

5.3.3 Recommendations – Mixed Use Facilities

Based on the opportunities for improvement we've identified the following benefits can be realized with the implementation of these recommendations:

- Effective and efficient placement of new fire stations
- Increased use of multi-use fire stations
- Increased collaboration with The City of Calgary for effective planning for future communities

Recommendation #29: Identify opportunities for multi-use stations

CFD should continue to work with other City business units to identify opportunities for multi-use stations, including co-location with other City functions and/or co-location with private uses such as residential and retail which may also have revenue opportunities.

- *This model could yield possible revenues*
- *Cost of the building or rent maybe reduced*

Recommendation #30: Develop multi-use compatibility profile

CFD should develop a compatibility profile for a multi-use facility. This could be facilitated by using a planning/multi-use checklist for all new fire station proposals.

Recommendation #31: Identify opportunities to request provisions from developers

The City should identify opportunities to require developers to provide CFD space in new buildings.

Recommendation #32: Designate a CFD liaison to participate in the multi-use facility planning process

Recommendation #33: Collaborate in identifying multi-use facility opportunities

The City and CFD should work together in identifying opportunities of multi-use in future fire station located in the communities of Cornerstone, Varsity and South Macleod / Belmont. Referencing lessons-learned on previous multi-use projects is also recommended.

Recommendation #34: Maintain involvement in planning processes for new communities

CFD should continue to be involved in planning processes for new communities. This would include the theoretical response times along with providing the planning department with estimates for operational costs of any proposed new fire stations.

5.3.4 Recommendation Implications

As public scrutiny regarding the use of municipal capital investment continues to grow, The City of Calgary as a whole; needs to continue to look for effective and efficient investment opportunities. Mixed-use facilities (where appropriate) offer an opportunity to achieve investment synergies. An additional benefit is the ability to enhance public perception that investment dollars are being used wisely.

At the core of the mixed-use opportunity is the ability for the CFD to demonstrate civic leadership. Through deep involvement and leadership in the planning process, CFD can demonstrate its commitment to civic well-being beyond the realm of public safety and extend out in to investment efficiency through exploring mixed-use facilities.

SECTION 6
CONCLUSION

The Calgary Fire Department is a leader in the field of fire and emergency response, both in terms of the level of service provided and the forethought given to growing and adapting its service to meet the demands of a changing city. In the face of a tightening budget, however, the City of Calgary and CFD are using the City of Calgary's ZBR process to evaluate the costs and gains associated with each of its lines of services, and identify where improvements and innovation can be made in effectiveness and efficiency.

The common theme throughout our assessment has been that in terms of service rationale, scope of service, and level of service, CFD is almost entirely on target. The effectiveness of CFD's services is also excellent. This challenged the ZBR team to look beyond the numbers in front of us and to connect with the internal stakeholder base as well as industry expertise to bring forward not only effective and efficient recommendations, but also those that are innovative.

A thorough review of CFD's services, has identified three (3) distinct areas with high potential for improvements in efficiency, effectiveness and innovation; Organizational Efficiency and Effectiveness, Resource Optimization and Facility and Asset Management. Within those three areas, we have provided a total of 34 recommendations for improvement consideration.

It is clear that CFD has a substantial amount of resources to work with, but needs to adopt better ways of managing them in order to continue to provide quality services in an efficient way. Implementation of the recommendations in this report will position CFD well to accommodate; city growth, a changing workforce pool while maintaining excellent community relationship.

APPENDIX A
ACRONYMS

ADC	Assistant Deputy Chief
AED	Automated External Defibrillator
AHS	Alberta Health Services
ALS	Advanced Life Support
ASP	Area Structure Plan
BC	British Columbia
BCAS	British Columbia Ambulance Service
BLS	Basic Life Support
CBRNE	Chemical, Biological, Radiological, Nuclear and Explosive
CEMA	Calgary Emergency Management Agency
CFAI	Commission Fire Accreditation International
CFD	Calgary Fire Department
CMA	Canadian Medical Association
CPAT	Candidate Physical Ability Test
CPR	Cardiopulmonary Resuscitation
DC	Deputy Chief
DDS	Dynamic Deployment System
E3	Effectiveness, Efficiency and Evaluation Program
EMR	Emergency Medical Responder
EMS	Emergency Medical Service
EN	Engine
ERF	Effective Response Force
EVT	Emergency Vehicle Technician
FMR	First Medical Response
FTE	Full-Time Equivalent
HM	Hazmat
HR	Human Resources
HRS	Heavy Rescue Service
HS&E	Health, Safety, and Environment
HUSAR	Heavy Urban Search And Rescue

IAFF	International Association of Fire Fighters
ICS	Incident Command System
ISO	International Organization for Standardization
IFSAC	International Fire Service Accreditation Congress
IV	Intravenous
JPR	Job Performance Requirements
LRT	Light Rail Transit
MPDS	Medical Priority Dispatch System
MPDS	Medical Priority Dispatch System
MRU	Medical Response Unit
MVC	Motor Vehicle Collision
NFPA	National Fire Protection Association
NPQSB	National Professional Qualifications Services Board
OMBI	Ontario Municipal Benchmarking Initiative
PCP	Primary Care Paramedic
PM	Predictive Modeling
PSC	Public Safety Centre
PSAP	Public Service Access Point
RAP	Resource Allocation Plan
RC	Rescue
RMS	Records Management System
ROI	Return On Investment
SCBA	Self-Contained Breathing Apparatus
SLRTT	Service Levels Response Time Targets
SOC	Standards of Cover
TFS	Toronto Fire Service
TO	Training Officer
ULC	Underwriters Laboratories of Canada
US	United States
VFRS	Vancouver Fire Rescue Services
WFMA	Winnipeg Fleet Management Agency
WFPS	Winnipeg Fire Paramedic Service
WRHA	Winnipeg Regional Health Authority
ZBR	Zero-Based Review

APPENDIX B
LITERATURE AND DATA REVIEWED

2005-2012 CFD Service Level and Response Time Targets (SLRTT)
2005-2012ytd SLRTT Targets and Actual Results
2011 Comparative Cities Benchmarking Survey Consolidated Results
2012-2014 Business Plans and Budgets
2012 Citizen Satisfaction Survey
2012- OMBI Performance Measurement Report
2012 OMBI Performance Measurement Report
2014 Heavy Fleet
2014 Light Fleet
2014 Recruitment Calendar Events
Accreditation1
Administration Monthly Report - December 2013
AHS Lease Revenue, 2010-2013
Alberta Safety Codes Act Revised Statutes of Alberta 2000 Chapter S-1
ARFF
Automated Scheduling Telestaff Value for Money Assessment
Budget for Tuscany Fire Station
Bureau of Information Services, IT Services Profile (Navid Nafisiyazdi, Bureau Chief Information Services)
Business Plan Budgets
Business Plans Budgets 2012-2014 Approved Complete
Business Plans Budgets 2012-2014 Approved CSPS
Calgary Fire Department 2014 Standards of Cover
Calgary Fire Department Standards of Cover 2014
Capital & Technology Programming December 2013 Edit
Capital and Operating Budget for Seton, Evergreen, Symons Valley
CFAI 1999 Recommendations - CFD ACR 1-4
CFAI 2004 Recommendations - CFD ACR 1-4
CFAI 2009 Recommendations - CFD ACR 1-4
CFAI 2014 Recommendations - CFD ACR 1-4
CFD 2009 Annual Report
CFD 2010 Annual Report
CFD 2011 Annual Report
CFD 2012 Annual Report
CFD 2012-2014 Business Plan
CFD 2013 Annual Report
CFD Admin Org Chart (April 2011)

CFD Apparatus Redeployment Table and Guidelines (Updated Dec 22 2014)
CFD Audits and Assessments Overview 2013
CFD Budget 2012-2014
CFD Budgeted FTE and Actual Employee Counts by Union, Type 2010-2014
CFD Code of Conduct (106-16)
CFD Demographics by Division 2014 11 07
CFD Demographics by Union 2014 11 07
CFD Dynamic Deployment Model - Apparatus Redeployment Guidelines Final (Dec 2006)
CFD Fire Training Academy 2009-2019 Capital Plan
CFD Fleet Inventory (Feb 2015)
CFD GIS Mapping Analysis - FIREVIEW DRAFT 3
CFD GIS Mapping Analysis - MapLogic - Draft 3
CFD Jan 2014 Final Presentation (U of A Research Study)
CFD Job Specs – Fire Chief, Deputy Chief, Manager Strategic Services,
CFD Led 2011 Comparative Cities Benchmarking Survey Consolidated Results
CFD Light Fleet Cost Breakdown
CFD Light Fleet Review Project 2013 (Final)
CFD Occupational Health and Safety 2009 – 2011 Strategic Health Plan
CFD Occupational Health and Safety 2009-2011 Strategic Plan
CFD Org Chart Jan 2015
CFD Org Chart Mar 2014
CFD Org Chart Jul 2014
CFD Org Chart Nov 2014
CFD Org Chart Jan 2013
CFD Org Chart Sep 2011
CFD Org Chart Jan 2012
CFD Org Chart Jul 2010
CFD Org Chart Apr 2010
CFD Org Chart Nov 2009
CFD Org Chart Mar 2009
CFD Org Chart Jan 2009
CFD Org Chart Oct 2008
CFD Org Chart Aug 2007
CFD Org Chart Apr 2006
CFD Org Chart Nov 2005
CFD Org Chart Jun 2005
CFD Org Structure 2005-2015
CFD Out of Town Response Fee Schedule (2013)
CFD Out-of-Town Fee Schedule
CFD Performance Improvement Program Report – Executive Summary (Aug 2012)
CFD Performance Improvement Program Report August 2012 w/Executive Summary

CFD Records Information Management Strategic Plan 2011 – 2014
CFD Records Management Strategic Plan 2011-2014
CFD Recruit Prerequisites
CFD Self-Assessment Manual 2014
CFD Service Levels and Response Time Targets (Jan 2008)
CFD Sustainability Plan 2011-2021
CFD Value for Money Programs and Services Assessment
CFD ZBR Supporting Documents and Reference Items by Service Index
COC Bylaw 25M2002 Emergency Management Bylaw
COC Bylaw 37M84 Operations of a Fire Department
COC Bylaw 40M2003 Fire Fees Bylaw
Community Safety1
Community Standards Training December 2013 (FINAL Jan 22)
Community Standards, Training, Recruitment (June 2014)
Cost Per Incident by Station 2013
Cost Per Incident by Station 2013 (April 2 2014)
Cover Letter for Performance Measures - 09-29-2014
Cover page VFM Overview
CS&PS Project Business Case – Heavy Fleet Lifecycle (Deputy Chief, Greg Wilkes)
CSPS Action Plan (2015-2018)
CSPS Citizen Expectations and Perceptions Research - Fire and PSC Results (2012)
CSPS Citizens Expectations and Perceptions Research – Fire and PSC Results (2012)
December 2014 Operations Report First-in Unit
Discrimination, Threats and Acts of Violence (534-5)
Diverse Inclusive and Respectful Workplace Plan - Jan 28 2015
Emergency Response Infrastructure Investment Plan (2014-2023), December 2013
Employee Relations Monthly Reporting -Dec 2013
Engine Data
Equipment & Supply
Facilities Maintenance
Fire Annual Report 2012
Fire Recruitment Inclusion Plan
Fire Stations and Apparatus (Apparatus Redeployment District Map) (Dec 2014)
First Due District Map (Feb 2015)
Fitness & Wellness VFM
Flame spread, injuries and deaths, fire loss, out of city responses, 2005-2014
Fleet Asset Condition Descriptions
Fleet KPI Report May 2014
Fleet Maintenance
Fleet Maintenance Monthly KPI Report August 2014 (Deputy Chief, Greg Wilkes)
FPB Car Cost Analysis Summary

GIS Mapping
HSE, Administration (June 2014)
Human Rights (156_10)
IAFF Diversity Report
Indicators and Performance Measures Summary (Sept 2014)
Indicators and Performance Measures Summary_09-29-2014
Innovation Fund Application
KPI Report (Fleet) 2014 in Review
Light Fleet Review Project (Deputy Chief, Greg Wilkes)
Light Unit Cost Report
Literature Review Report
Logistics & Infrastructure and Capital, Monthly Report to FET (Deputy Chief, Greg Wilkes)
Management and Leadership
Management Team
Various Maps
Medical First Response Analysis Presentation (Oct 2014)
Medical First Response Analysis Presentation (Nov 2014)
Medical Response Unit Visual Doc (July 2014)
MGA Revised Statutes of Alberta 2000 Chapter M-26
Monthly Activity Report Personnel Hours by Incident Type June 2014
Monthly Report LI December FINAL
New Station Staffing
New Station Staffing Budget
NIST Report on High-Rise Fireground Field Experiments (April 2013)
NIST Residential Fire Ground Field Experiments (April 2010)
NIST Tech Note 1661 Report on Residential Fireground Field Experiments (Apr 2010)
NIST Tech Note 1797 Report on High-Rise Fireground Field Experiments (Apr 2013)
OMBI Data Sharing – Public Reporting Protocol (Feb 2008)
OMBI Fire Measures 3 Year Data Table 2011-2013 (Feb 26 2015)
OMBI Fire Measures Data Dictionary (Feb 26 2015)
Operations
Operations Report (Dec 2014)
OPS Year-end (Jan 2014)
Overtime – Firefighters Historical
Program 41 & 42 Dashboard (June 2014)
Province of Alberta Safety Codes Act Revised Statutes of Alberta 2000 Chapter S-1
Public Affairs Statistical Report - APR 2014 Final
Published CFD 2012-2014 Business Plan
Recruit Demographics 2014 at 2015 Jan 6
Recruitment Action Plan - Female Focus
Recruitment Inclusion Plan

Remedy Group Monthly Summary Report - CFD Tech Sustainment 2009-2014
Remedy Group Monthly Summary Report - CFD Vendors 2009-2014
Requested Budget Breakdown for Salaries
Respectful Workplace (187_19)
Response Time Performance Summary (2014 Annual Report)
RFI - AHS CFD Joint Medical Response (August 2014)
RFI – Medical Incidents Summary 2006-2012 (Jan 2013)
RFI - Memo for Standing Policy Committee CPS (September 15)
RFI – MVCs on Scene Time (Nov 2013)
Single 2-person unit response, 2014
Service Profile 2 – Facilities Emergency Response Vehicle Equipment and Resources
SLRTT Targets vs Actuals 2005-2014
Standard Preventative Maintenance Jobs
Strategic Services Monthly Report (July 2014) August 19
Summary of CFD Evaluation and Performance Measure Reporting (Dec 2013)
Summary of OMBI Data Sharing and Public Reporting Protocol (Jan 2013)
Training Administration Review Dec 14 2011
Training year in review PPT (Mar 2015)
Unit Cost History FSET Vehicles
Value for Money Audit April 29 (PPT)
VFM Equipment & Supply 1
VFM Facilities Maintenance 1
VFM Fleet Maintenance1
VFM Recruitment
VFM Training Academy
ZBR – 8 Minute Response Time Model (All Stations) Mar 2015)
ZBR – 8 Minute Response Time Model (Future Stations) Feb 2015)
ZBR Template (Fleet Operations))
Zero Based Review Method
WMC Calgary Fire Department Logistics & Infrastructure Business and Organizational Review (Feb 2015)

APPENDIX C
COMMUNITY COMPARABLE BENCHMARKING GUIDE

General Stats

1. Please provide information from the last 5 years, where possible.

	2010	2011	2012	2013	2014
Service Population					
Service Area (km^2)					
Municipal Budget					
Fire Services Budget					
Fire Services Training Budget					
Number of Fire Stations					
Number of Firefighters					
Workforce Diversity Stats (if available)					
Average Cost per Response					
Target Response Time					
Percent Response Time Achieved					
Average Response Time					
Average Cost per Medical Response (if different)					
Fire-related Deaths (per 100,000 people)					
Fire-related Injuries (per 100,000 people)					
Fire-related Dollar Losses (per 100,000 people)					

2. Please also provide us with your response data from the last 5 years, where possible.

	2010	2011	2012	2013	2014
Total Responses					
Medical Responses					
Fire Responses					
Motor Vehicle Incident Responses					

Management and Leadership

3. What is the management structure of your department? If your designations are different than those identified, please fill in the rows accordingly.

Title	In-Scope or Out-of-Scope (Yes or No)	Total
Deputy Chiefs		
Assistant Deputy Chiefs		
Battalion Chiefs		
Platoon Chiefs		

4. What are the specific portfolios of your Deputy Chief(s)?

Title	Roles and Responsibilities

5. How long has the current management structure been in place?
    a. Have there been any recent changes? If so, please explain.
    b. Are you expecting any changes to your structure in the near future? And if so, why?
6. What professional development programs are available to support your management?
    a. Are these in-house or external?
7. What performance measures do you have in place to evaluate the performance of your management?
8. What processes or opportunities do you have in place for growth and succession planning?

Medical Response

9. Is your department mandated to provide medical response?
10. Does your department provide medical response?
    a. If so, what level of medical response?
    b. What is your standard/minimum deployment for medical response?
11. Is your department reimbursed for medical responses?
    a. If so, how much, and by which organization?
12. What are key factors of your medical response that make it either efficient or inefficient?
13. What are your department's biggest challenges in providing medical response?
    a. How does your department address, or plan to address these challenges?

Concentration, Distribution, and Standard of Cover

14. Is your department CFAI accredited?
    a. If so, will you continue to seek accreditation? Why or why not?
15. In your opinion, what are the key challenges you see in providing adequate response coverage to your community, now and in the future?
    a. How does your department address, or plan to address these challenges?
16. What response standards or targets does your department use for response time?
17. Is your department meeting/exceeding these standards, or still working towards them?
18. What is your standard/minimum deployment for responses other than medical response?
19. Does your department use a specific response model? (For example, Calgary uses a Dynamic Deployment model)
    a. Is this model working for you? Why or why not?
    b. Have you changed this model recently or do you plan to change it?
20. Is your current response model sustainable for your department?
    a. What improvements (if any) would you make to your response standards/targets (response time or deployment)?
    b. What improvements (if any) would you make to your concentration and distribution of resources in order to improve your response capabilities?

Asset Procurement and Management

21. Is your asset procurement and management program the same or different than that used by other departments in your municipality?
22. Please describe the strengths and weaknesses of this program?
23. What standards govern the lifecycle of your apparatus? If standard lifecycles vary depending on the type or deployment status of apparatus, please explain these differences.

24. Does your department have its own apparatus maintenance facility? If so, how much of your department's mechanical maintenance does it perform?

25. Are there other municipal departments or external agencies that perform some of your maintenance? If so, what types of maintenance do they provide?
    a. Please explain costs associated with these other maintenance providers.

26. What improvements could be made to your department's asset management program?

Recruit Training and Orientation

27. What are your pre-requisites for individuals wishing to apply to your department as new recruits? (Include external training requirements)

28. How long is your pre-operational orientation training?

29. Do you offer any pre-application orientation or training courses?

30. Do you consider training from external institutions in your selection of new recruits?
    a. If so, which institutions and training programs do you recognize?
    b. Does external training change the amount of training a recruit must complete in-house? If so, please explain.

31. What are the components of your new recruit training and orientation program?
    a. Are these conducted in-house by department staff?
       If so, are these union or non-union staff?
    b. If not, where are they conducted and who conducts them?

32. Do your recruits receive full or partial compensation for pre-operational training or orientation?

33. What is the total compensation offered to your recruits during their training/orientation period?

34. What are the strengths of your recruit training and orientation program?

35. What are the weaknesses of your recruit training and orientation program?

36. In your opinion, are your current training and orientation costs sustainable for your department?

37. What improvements do you think could be made to your training program?

Training Facility

38. Does your department have a dedicated training facility?
    a. If so, is the facility shared with any other municipal functions or other users?
    b. If not, where are your new recruits trained?

39. Does your training facility generate any revenue?
    a. If so, please explain.
    b. Is this revenue at a cost recovery level, or a profit level?

40. In your opinion, is your training facility used to its full capacity?

Diversity and Inclusion

41. Does your department have a policy regarding diversity and inclusion?
    a. If so, are you able to share?
42. Is a diverse workforce a priority for your department?
    a. Why or why not?
43. What are key obstacles to workforce diversity and inclusion in your department?
44. Does your department include diversity in its messaging and promotions?
    a. If so, how?
45. Does your department target “diverse” groups in its recruitment campaigns?
    a. If so, how?
46. Does your department include diversity training to its staff and new recruits?
    a. Is this training mandatory?
    b. Is this training ongoing?
47. Does your department provide any additional support or mentoring for “diverse” applicants or staff members?
    a. If so, please explain.
48. Does your department have any partnerships with diversity groups in your community?
    a. If so, with what groups?
    b. What have been the results of these partnerships?
49. Has your department conducted a survey amongst staff regarding diversity and inclusion in the workforce?
    a. If so, what were the results?
50. What improvements (if any) would you like to see in your department regarding diversity and inclusion?

APPENDIX D
INTERVIEW GUIDES

Management and Leadership

1. In your opinion, does CFD's current management effectively and efficiently support CFD staff and department needs?
2. Does the current management facilitate good relationship building with other City of Calgary departments?
    a. What are some examples of how it does or does not?
3. Does the current structure facilitate effective communication both up and down?
    a. Why? Or Why not?
4. Is the current structure effective for both managers and employees? Is the ratio of managers to other employees adequate?
    a. If not, in your opinion, what would be appropriate?
5. In your opinion, is the current matrix organizational structure working well?
    a. What are its strengths and/or weaknesses?
6. What are the pros/cons, or risks/benefits to using Managers vs. Deputy Chiefs or Assistant Deputy Chiefs?
7. What professional development programs/services are available to support managers in developing their management/leadership skills?
8. What performance measures are in place to evaluate the performance of managers (at various levels)?
9. Is there the ability for in scope staff to take on out of scope positions (on a temporary basis) to allow for personal growth and succession planning?
10. How should the department ensure reasonable opportunities for development that would support succession plans for key management areas?
11. Should the department determine the correct balance for control? Accountability? Motivation?
12. Describe your ideal management structure for CFD.

Diversity and Inclusion

1. Does CFD or the City have a diversity statement and policy in place?
2. In your opinion, what does diversity mean in terms of the CFD?
3. Does CFD have a diversity committee or a representative in a City committee with the goal of promoting diversity and inclusion in the organization?
4. In your opinion, are the existing diversity policies meeting the needs of CFD?
5. What role does diversity play in CFD's promotional and recruitment activities?
6. What role does diversity play in CFD's hiring process?
7. Overall, are staff embracing diversity in the workplace?
    a. Are there any exceptions?
    b. Why do you think this is the case?
8. Have there been instances of bullying, harassment, or other demonstrations of intolerance?
    a. In your opinion, what caused these events, or what causes this type of event in general?
9. Has CFD built relationships with external diversity groups? (e.g. women's groups or teams, LGBTQ groups, cultural groups)
    a. If so, what sort of responses and results have you seen from these relationships?
10. Have there been instances where firefighters have encountered diversity-related issues during service delivery? (E.g. responding to calls, community relations, awareness campaigns, enforcement, etc.)
11. Does CFD have a training program in place to better prepare its staff in dealing with diversity issues that may arise when dealing with the public? Have they been successful?
    a. For diversity issues that may arise in the workplace?
    b. Are these programs part of recruit training?
    c. Is this training ongoing?
12. Has CFD or the City of Calgary conducted a survey amongst staff regarding diversity and inclusion in the workforce?
13. In your opinion, does the present diversity program promote a positive environment within CFD?
14. Has the diversity program led to an increase in diverse applicants and new recruits?
15. Are there any improvements you would like to see based on your experience with this program?
16. In your opinion, are there risks associated with a lack of diversity in the CFD?

Medical Response

1. What types of medical assistance calls does CFD respond to? For example Delta and Echo categories
    a. Has this always been the case, or has this changed in recent years?
2. In your opinion, should CFD be responding to calls for medical assistance a part of its core services?
3. In your opinion, are medical assistance responses over tasking the emergency response system capacity?
    a. If so are there any situations or examples that come to mind?
4. What is CFD's response protocol for medical calls? (ALS, BLS)
    a. Are crews adequately trained for this type of response?
5. In your opinion, is the current response system sustainable and efficient?
6. What would be the most effective and efficient way for CFD to respond to medical calls?
7. Is splitting up the engine, rescue, or ladder companies an acceptable risk?

Recruit Training Program

1. Does the CFD have a standard (duration, content, and competency) for recruit orientation and training?
    a. If so, what is that Standard?
2. How long has the current system been in place?
    a. Have there been changes or enhancements in the past few years?
    b. If so, were the enhancements effective?
3. Does the CFD consider previous training or credentials when orientating new recruits?
4. In your opinion, what are the benefits or drawbacks of the various pre-employment programs that are available?
5. Does CFD have any documented evidence that accepting pre-employment training has not worked in the past?
    a. If so, what were the issues?
6. Has CFD explored partnerships with external training institutions to deliver training to CFD standards?
7. Do you feel that the current system is serving your department effectively and efficiently?
8. Has the CFD done any comparable studies with other departments to validate the current system?
9. Are CFD's programs peer reviewed or audited by external training organizations from time-to-time?
10. What are the pros/cons associated with using non-Union instructors for recruit/incumbent training? (From an efficiency/effectiveness perspective)
11. In your opinion, are there deficiencies in CFD's recruit training and orientation program?
12. Are there any improvements you would like to see based on your experience with new recruits?

Training Academy

1. In your opinion, is the training facility being used to its full potential?
2. What is the budgeting process for the Training Academy facility? How the budget (operations & capital) is set each year? Is it based on last year's performance? Based on a % of overall budget? Based as a formula based on headcount of existing firefighters + projected recruits?
3. Is there a revenue target set each year for non-CFD revenue? If so, how is it developed or approved?
4. What are the sources of revenue for training (programs/facilities/overhead)? Specifically, what non-CFD revenue is generated? And from where?
5. What is the process for targeting & pursuing external (non-CFD) revenue? Who approves these targets/pursuits? Are there guidelines/policies in place?
6. How is pricing set for external (non-CFD) users of the facility?
7. Has anyone done study to forecast possible revenues from the facility?
8. Have there been any studies or initiatives done to market the facility to outside users or other city departments to further its usage?
9. Have there been any interests from outside agencies, industry or learning institutions to use the facility?
10. Are there any improvements that can be made to the facility that would be an attraction to other municipal departments or external users?
11. How could incumbent training be done differently to optimize capacity and efficiency for the facility?

Concentration, Distribution, Station Location, and Standard of Cover

1. Are CFD's current response standards (in terms of time and manpower) adequate? Or are they too stringent or lenient?
    a. In your opinion, how should CFD determine its response standards?
2. What would be the impact risk of reducing manpower and response times to EMS calls?
3. Have there been previous studies or models developed to estimate the costs associated with increasing/decreasing response times? For example – to reduce response time by 30 seconds, using the existing stations & deployment models, it would take $X in the form of Y headcount increases, $Z capital purchases, etc.
4. How do you see Calgary's demands for service growing in the future?
5. How do you see levels or types of risk changing?
6. What types of CFD services do you see increasing or decreasing?
7. Has CFD's shift to a Dynamic Response Model improved service levels?
    a. How has or will this approach improve CFD's ability to manage changing and growing risks, as well as costs?

Asset Procurement and Management

1. Please give an overview of your present asset procurement and management program.
2. Is CFD's AMP a stand-alone program or is it based on a template used by other internal departments?
3. What aspects of asset procurement and management are prescribed by City of Calgary procedures or policies, as opposed to being left to the CFD's discretion?
4. What other departments within the City are involved in the CFD procurement process and why?
5. Do the asset procurement and management programs for the fire service and the City complement each other in any way?
    a. How or how do they not?
6. Has the department done any comparable studies with other fire departments and/or internal City departments to substantiate the effectiveness of the current program?
7. What analysis has been conducted to compare procurement through the City vs. external suppliers (cost savings/turnaround time)?
8. Does the present procurement program allow for flexibility in purchasing amounts?
    a. Are these amounts realistic in today's economy (based on the high cost of some equipment)?
9. In your opinion, is the current asset procurement and management program serving your department well?
    a. Why or why not?
    b. What improvements would you suggest?
10. Are there any other deficiencies in the current asset procurement and management program that you have noted?
    a. What have been the impacts of these deficiencies on service provision?
    b. What improvements would you suggest?
11. Have there been any improvements to the current AMP in recent years?
    a. Have they been successful?
    b. Why or why not?
12. What performance measures are in place (for the business unit, down to the individual employee) related to asset procurement and management?

APPENDIX E
CFD FIREFIGHTER SURVEY

Emergency Response Service

1. Currently, what do you see as the biggest challenge in providing adequate emergency response coverage to Calgarians?
2. What are the biggest challenges you see in providing adequate emergency response coverage to Calgarians in the future?
3. Do you have any ideas or experiences that could help address these challenges?

Medical Response

4. In your opinion, should CFD continue to provide medical response?
   - □ Yes
   - □ No

   Please explain
5. What would be the impact(s) if there were increases or decreases in the scope or level of medical response provided by CFD?

Training and Orientation

6. In your opinion, would any of the following orientation activities be useful to CFD applicants prior to taking the recruitment test? Check all that apply.
   - □ Orientation to the physical test
   - □ Practice sessions for the physical test
   - □ Orientation to the aptitude test
   - □ Orientation to the department
   - □ Question and answer session with CFD staff members
   - □ Female applicant-specific orientation opportunities
   - □ Other:
7. Please indicate the degree to which you agree or disagree with the following statement.

   Space is provided for any explanation or comments that you wish to provide.

   "CFD has a strong recruit training and orientation program."

□	□	□	□	□
Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree

8. In your opinion, are there any improvements that could be made to the recruit training and orientation program?

9. Please indicate the degree to which you agree or disagree with the following statement. Space is provided for any explanation or comments that you wish to provide.

"There is support and mentorship available to me within CFD should I want or need it with regards to my current position and/or personal and professional growth."

☐	☐	☐	☐	☐
Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree

10. What improvements do you think could be made to ongoing training and mentorship for CFD staff members?

Diversity and Inclusion

11. Please indicate the degree to which you agree or disagree with the following statement. Space is provided for any explanation or comments that you wish to provide.

"A diverse workforce should be a priority for CFD."

☐	☐	☐	☐	☐
Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree

12. Please indicate the degree to which you agree or disagree with the following statement. Space is provided for any explanation or comments that you wish to provide.

"There is an adequate amount of diversity and inclusion training provided to all CFD employees."

☐	☐	☐	☐	☐
Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree

13. What improvements would you like to see regarding diversity and inclusion in CFD?

APPENDIX F
LIST OF TABLES, IMAGES, MAPS

APPENDIX G
ZBR CONSULTING TEAM RESUMES

Isaac Comandante

Manager, Emergency and Response Consulting Services

Experience

Isaac has been involved in the fire, safety and rescue industry since 1988. Isaac's career has revolved around consultation and business development of emergency related services such as emergency management and resources. Isaac has also been involved in Project Management for Municipal and Industrial Emergency Response Planning and Training, and Emergency Services Master Plans. He has experience in practical theory and instruction for various safety and rescue disciplines such as Confined Space Entry and Rescue, and Technical Rope Rescue.

Isaac has also been an active member of numerous national associations related to municipal and industrial emergency response and management. Some of Isaac's accomplishments include the creation of various training programs and simulation units used for rescue. Isaac was also instrumental in introducing the first nationally recognized annual industrial emergency conference and expo.

Isaac's professional skills and accomplishments have included:

- Management and Coordination of field and office staff for multi-national training firm
- Project Management and Coordination for Fire and Emergency Response Plans and Fire Master Plans
- Co-authored several safety and rescue training manuals and materials for delivery both online and in-classroom setting
- Concept development and coordinated online technical training programs (ICS, Technical Rope Rescue, Code) for a number of large municipalities
- Prepared municipal emergency plans covering a variety of possible major disasters for a number of municipalities and counties
- Conducted training for the various agencies and industries associated with safety and emergency response.

Education

- Business Administration, University of Calgary
- Train the Trainer, Southern Alberta Institute of Technology
- Loss Control and Accident Prevention, 641 Canada
- Technical Rescue, Westpoint Rescue

Memberships

- Alberta Fire Chiefs Association (AFCA)
- Alberta Industrial Fire Protection Association (AIFPA)
- Fire Chiefs Association of British Columbia (FCABC)
- Saskatchewan Association of Fire Chiefs (SAFC)
- Ontario Fire Chiefs Association (OAFC)
- Canadian Association of Fire Chiefs (CAFC)

Jeff Carlisle

B.A., M.A. Leadership, CFO

Senior Technical Advisor
Director/EMS Emergency Services
Operations and Management

Experience

Jeff Carlisle has over 37 years of experience in fire services progressing from Fire Fighter to Fire Chief/Regional Fire Chief. Jeff is currently the Fire Chief for the City of Kelowna, British Columbia. Prior to active service in the municipal fire service, Chief Carlisle served in Canadian Forces posts across Canada and progressed through the Canadian Forces Fire Service. Career highlights include being a member of a NFPA standards board, Canadian Fire Service delegation leader for NATO, and leading the development of aircraft rescue and firefighting standards for the Canadian Forces.

In 1998, Jeff retired from the Canadian Forces Fire Services and accepted a Deputy Chief position with the Fort McMurray Fire Department in 1999. In 2000 he was appointed as Regional Fire Chief for the Municipality of Wood Buffalo.

In 2008 Jeff took up the position of Fire Chief for the City of Vernon and in 2011 he moved into his current position in Kelowna.

Jeff has been involved in numerous projects that involve fire and emergency services including Regional Municipality of Wood Buffalo, Parkland County Fire Master Plan and City of Prince Albert Fire & Emergency Services Master Plan.

In 2010, Jeff completed a visiting international fellow program with the Australian Institute of Police Management. As a Syndicated Director for the Australian Fire and Emergency Service Executive Development Program, he coached senior Fire Officials in strategic planning and contemporary leadership concepts. He has gained a first-rate reputation for providing critical and key input into project recommendations.

As a consultant, Jeff has worked on fire service master plans, fire service reviews, fire station reviews, emergency and disaster management and community risk assessments.

Education

- Master of Arts, Leadership, Royal Roads University
- NFPA Fire Service Instructor, Fire Officer, Fire Investigator, Public Fire Educator & Fire Fighter

Memberships

- Former Alberta Fire Service Advisory Committee (FSAC) member
- Canadian Association of Fire Chiefs
- Fire Chiefs' Association of British Columbia
- International Association of Fire Chiefs

Professional Designations

- Chief Fire Officer (CFO), Canadian Association of Fire Chiefs
- Canadian Forces Decoration (CD)
- Local Assistant to the Office of the Fire Commissioner, British Columbia

John Conley, CRM, AEM

Training Manager / Emergency Management Specialist

Experience

John experienced a rewarding 30 year career with the Calgary Fire Department that included a 12 year term as Media & Public Affairs Manager and three years as Emergency Management Coordinator. He brings with him a wealth of real life experience having worked through a multitude of major emergency incidents.

John provides a unique combination of a strong communications and training background, with extensive media and public relations, along with comprehensive knowledge of emergency management. As EM Coordinator, he was involved in the re-development of the corporate emergency management plan analyzing the hazard identification/ risk analysis profile. John also managed the development and implementation of corporate wide training programs and was Emergency Operations Manager for major activations

Education

- Incident Command System (ICS) 100 – 400
- ICS Training Provider – Alberta Emergency Management Agency
- Risk Management Certificate Program – University of Calgary (2008)
- Emergency Operations Centre Management – Canadian Emergency Management College – Ottawa (2007)
- Emergency Site Management – Canadian Emergency Management College – Ottawa (2006)
- Marketing Management Certificate Program - University of Calgary (2003)

Accreditation

- Canadian Risk Management (CRM), Global Risk Management Institute
- Associate Emergency Manager (AEM), International Association of Emergency Management (IAEM).

Memberships

- Alberta Industrial Fire Protection Association (AIFPA)
- Canadian Association of Fire Chiefs (CAFC)
- International Association of Business Communicators (IABC)

Richard P. McCullough

Senior Technical Advisor
Director/EMS Emergency Services
Operations and Management

Experience

Rick brings a wealth of technical and leadership expertise to any fire and emergency services project. He has more than 40 years of experience with progressively increased responsibility in the fire and emergency service sector. He has held positions that include fire fighter and helicopter search and rescue crewman in the Canadian Navy, Airport Fire Fighter and Fire Chief, Principal of the Saskatchewan Fire College, Saskatchewan Fire Commissioner for 16 years, the Assistant Managing Director and Fire Commissioner for the Alberta Emergency Management Agency (AEMA) and currently the Director (Fire Chief) of Fire & Protective Services for the City of Regina.

His vast experience in the fire service has given Rick the opportunity to develop and implement strategic and operational plans across a broad spectrum of emergency response environments. The key to Rick's success is his leadership in developing, applying, and mentoring fire protection and prevention programs where his expertise has provided advice and problem solving resources to the fire services and citizens across Canada

Rick is skilled at building and maintaining effective, productive relationships with staff, senior management and clients. He is committed to the highest levels of professional and personal excellence towards Health, Safety and the Environment.

Rick's professional skills have also included:

- Chairing the Provincial and Territorial Policy Advisory Committee for the National Fire Code of Canada.
- Co-chairing the development of the OH&S requirements and Saskatchewan Fire Fighter Code of Practice
- Co-Chairing the Alberta High Intensity Residential Fire investigation resulting in building code changes
- Chairing the Alberta Fire Service Advisory Committee with a final report delivered to the Minister regarding the changes required in the Alberta Fire Service including the equipment and training standards, leadership, public education, awareness and liability.
- Serving on Fire Advisory Councils and Standards Development Organizations including Underwriters Laboratories of Canada, the Canadian Standards Association and Underwriters Laboratory Inc.
- Serving as President of the Council of Canadian Fire Marshals and Fire Commissioners (two terms)
- Serving on the International Fire Service Accreditation Congress Board of Governors (14 years)
- Ex-officio member of The Canadian Commission on Building and Fie Codes
- Initiating accreditation for Regina Fire & Protective Services under the CPSE Commission on Fire Accreditation International

Education

- Western Oregon State College, Bachelor's Degree in Fire Service Administration (Partial)
- University of Regina, Certificates in Business Administration, Personnel Administration, Public Relations.
- College of New Caledonia Prince George, B.C., Business Administration, Diploma

Additional Training and Certificates

- Leadership (Instructor)
- Managing Emergency Operations Center
- Environmental Emergency Planning and Response
- Leadership Program Instructor
- Arson and Fire Investigation Instructor)
- Helicopter Search and Rescue
- Strategic Planning Facilitator
- Alternative Dispute Resolution

Memberships

- International Association of Fire Chiefs
- Canadian Association of Fire Chiefs
- Canadian Council of Fire Marshals and Fire Commissioners Life Member
- Underwriter Laboratory Inc. Fire Council
- National Fire Protection Assoc.

BEHR

Lyle Quan

BAppBus:ES, B.Ed, CFO

Senior Technical Advisor
Fire/EMS Emergency Services
Operations and Management

Experience

Lyle Quan has over 33 years of experience in the emergency services field that encompasses Policing, EMS and Fire. Lyle retired as Fire Chief from the City of Waterloo, Ontario.

Since 2000, Lyle has been an instructor for two Canadian Universities where he teaches courses in the fields of Fire Service Management, Incident Management, Strategic Planning, Crisis Management and Leadership.

Since 2006 he has been a member of the Commission for Fire Service Accreditation International (CFAI). He presently serves as a Team Lead on evaluating fire services throughout North America and is also a member of the organization's Technical Advisory Program (TAP) that is contracted to assist fire departments in their efforts to achieve accreditation with the CFAI. The TAP team will work with the department in developing their strategic plan, standard of cover evaluation and a complete self-assessment of the fire department to look for areas of improvement in attaining accreditation.

In 2010 Lyle became a contributing committee member with the NFPA where he serves on the 1201 and 1250 standards committee which encompass:

- Providing fire and emergency services to the public, and
- Recommended practice in fire and emergency service organization risk management

In 2012 Lyle became a lead instructor for the Ontario Fire College for the Fire Officer III and IV programs, which are based on the NFPA 1021 standard for fire officers.

Throughout his career, Lyle has worked with many organizations in both a public (as fire chief) and private (as a consultant) capacity to improve the organization's efforts in such areas as developing training programs, meeting the needs of the community by evaluating the present service levels (and abilities) or in developing risk mitigation and management initiatives.

As a consultant, Lyle has worked on fire service master plans, fire service reviews, fire station reviews, emergency and disaster management and community risk assessments.

Education

- Bachelor of Business in Emergency Services, Lakeland College
- Bachelor of Adult Education, Brock University
- Masters Certificate in Municipal Management, Schulich School of Business/York University

Memberships

- Ontario Association of Fire Chiefs
- International Association of Fire Chiefs

Professional Designations

- Chief Fire Officer (CFO), Center for Public Service Excellence
- Enforcer for NFPA 1201 and 1250 Standards
- Regional Assistant to the Office of the Fire Marshal, Ontario

Will Fong

CMC, PMP

Public Sector Advisory Services

Experience

Will Fong is a Partner with MNP's Management Consulting practice, and the subject-matter expert for MNP's Project Management training programs. He brings more than ten years' experience in project management, business process improvement, stakeholder engagement and strategy to the MNP team

Will has worked extensively in the public sector with various provincial ministries, municipalities and post-secondary institutions. His work with these organizations has focused primarily on business process improvement, organizational effectiveness and strategic planning.

Will combines his project management expertise with his experience providing operational analysis, business planning and process improvements in Canada, the United States, Europe and China

Will has recently worked closely with Behr Energy on a detailed operational review of the Calgary Fire Department, adding organizational design, financial analysis and lean process improvement expertise to Behr's significant fire service expertise.

Other public sector operational consulting engagements include:

- Transportation Investment Corporation (Port Mann Bridge project planning)
- Worksafe BC (Project Management Training)
- AlbertaWorks (operational review & lean process redesign for front-line service delivery)
- Alberta Child & Youth Services (Project Management)
- Edmonton Child and Family Services Authority (Employee Benefits Feasibility Study)

Education

- Bachelors of Commerce, University of Calgary

Memberships

- Canadian Association of Management Consultants
- Project Management Institute

Professional Designations

- Certified Management Consultant (CMC)
- Project Management Professional (PMP)

MNP