LOUISVILLE FIRE RESCUE
A Comprehensive Plan of Fire and Emergency Services
2011-2016 Update
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# I. ACKNOWLEDGMENTS

## Fire Services Planning & Review Team Members

### Louisville Fire Department

<table>
<thead>
<tr>
<th>Year</th>
<th>Members</th>
</tr>
</thead>
</table>
| 2005 | Tim Parker, Chief of Department  
      | Michael Schick, Division Chief  
      | John Bollinger, Engineer  
      | Patrick Doran, Engineer  
      | George Codding, Firefighter  
      | Jackie Fry, Business Administrator  
      | Marcie Weber, Administrative Assistant  
      | Bill Dhieux, Fire Marshal  
      | Chris Mestas, Senior Inspector  
      | Walter Trotter, Master Mechanic |
| 2011 | Tim Parker, Chief of Department  
      | Michael Schick, Deputy Chief  
      | John Bollinger, Captain  
      | Jason Brewer, Lieutenant  
      | Ben Carter, Lieutenant  
      | Phil Meyer, Firefighter/Paramedic  
      | Brian Brindisi, Firefighter  
      | Shawn Stark, Engineer  
      | Jackie Fry, Business Administrator  
      | Marcie Weber, Administrative Assistant  
      | Chris Mestas, Fire Marshal  
      | Walter Trotter, Master Mechanic |

### Louisville Fire Protection District Board of Directors

<table>
<thead>
<tr>
<th>Year</th>
<th>Members</th>
</tr>
</thead>
</table>
| 2005 | David Yost  
      | Chris Schmidt  
      | Dan Ross  
      | John Sackett  
      | Eugene DiCarlo |
| 2011 | David Yost  
      | Chris Schmidt  
      | Dan Ross  
      | Terri Abbott  
      | Wayne Varra |

### Citizen Advisory Board

<table>
<thead>
<tr>
<th>Year</th>
<th>Members</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>Lee Schreiter</td>
</tr>
</tbody>
</table>
| 2011 | Paul Wood  
      | Keith Bobo  
      | Sterling Folden  
      | Chris Melvin |

### City of Louisville

<table>
<thead>
<tr>
<th>Year</th>
<th>Members</th>
</tr>
</thead>
</table>
| 2005 | Bill Simmons, City Manager  
      | Bruce Goodman, Police Chief  
      | Paul Wood, Planning Director |
| 2011 | Malcolm Fleming, City Manager  
      | Bruce Goodman, Police Chief  
      | Tom Phare, Public Works Director  
      | Bonnie Star, Economic Dev. Director  
      | Joe Stevens, Parks/Recreation Director  
      | Shelley Angell, Chamber of Commerce |

### Avista Hospital

<table>
<thead>
<tr>
<th>Year</th>
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</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>Sue Kirk</td>
</tr>
<tr>
<td>2011</td>
<td>Dr. Jeff Wu</td>
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II. EXECUTIVE SUMMARY
This report presents a re-evaluation of the existing Louisville Fire Protection District (LFPD) Comprehensive Plan. It also establishes new policy framework to implement the District’s current vision and the actions necessary to implement its goals. As in the past, the LFPD Comprehensive Plan was designed to support the City of Louisville Comprehensive Plan and an assessment of the surrounding District needs.

The LFPD has a history of using task forces and committees to increase participation in the District’s decision-making processes. The Louisville Comprehensive Plan of Fire and Emergency Services was developed by Chief Tim Parker and the LFPD Planning Team, with the approval of the District Board of Directors. *It should be noted that nearly all of the actions, policies, procedures, and programs recommended in the last plan have been accomplished.* We believe this is a remarkable department accomplishment and the entire LFPD team should be commended.

Finally, we believe that the new analysis and action plans provide a basis for future policymaking, as well as a method of ensuring quality and predictable fire and emergency services.

**Section II - Executive Summary** describes the overall approach, objectives, and scope of the study. It concludes with a summary of policy directions aimed at achieving the study’s goals. The Planning Team adopted a mission statement for the development of this report, which was reviewed and amended as necessary. The mission statement reads as follows:

> “The mission of the Louisville Fire and Emergency Services Comprehensive Planning Team is to provide a source of input and expertise to the development of the 5 - 10 year planning document for review by stakeholders and policymakers.”

The team’s objectives in this planning process were to: review the Louisville Fire Department’s basic organizational and performance requirements, identify the general goals for the comprehensive planning process, collect input on fire service policy and programming projections for the next 5-10 years, and evaluate the results of the last comprehensive plan operating period. These objectives were largely met through various meetings, work sessions, SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis group meetings, and 360-degree internal reviews.

The goal of this study was for the LFPD Management Team to provide the community with information needed to best manage resources in the next 5-10 year planning period. Planning conducted now will increase the District’s ability to maintain or increase levels of service, achieve cost savings, and decrease duplication of effort. In order to achieve project goals, the Planning Team developed a methodology that would result in findings and recommendations aimed at allocating fire and emergency resources in the future.
The study included a review of the following key factors:

- The District’s population and development growth trends and patterns
- The Fire Department’s operational policies and practices
- Basic fire protection practices and principles
- Overall District policy direction as it relates to fire and emergency services

**Section III – Introduction** provides a comprehensive description of the concepts used in defining response times, as well as an overview of critical task analysis and a review of fire station locations.

**Section IV - Overview of the Louisville Fire Protection District and City of Louisville.** This section includes the city’s growth patterns over the last 10 years and a description of the projected growth of the city, based upon its comprehensive general plan. It describes a city that has grown slowly but steadily in the past 10 years. Louisville was once centered on an older downtown business district but has now grown from that center. There is a general distribution of business and industry that is highly technical in building and occupational nature which presents hazardous operations concerns.

Currently, there is a minor to moderate amount of undeveloped land that is anticipated to be a part of the “in-fill” pattern of the city. The older downtown is located in the eastern central part of the city. To the south and east, the majority of the property is currently zoned for industrial use. Commercial and general services are around the city center while residential development is focused in the central corridor. The areas covered outside the city limits range from rural to slow growth residential. Extensive growth is not expected outside the city during this 10-year planning period with the exception of technical and industrial occupancies.

**Section V - Program and Practices** examines the actual program activity and preparation elements of the Department. It looks at everything from overall administration to specific activities like fire prevention, training and public education.

There are three distinct elements in this section that should be noted: code compliance, plans review, and public education. The Division of Life Safety and Fire Prevention (LSFPD) is responsible for coordination and management of all District LSFPD programs. It is designed to provide better coordination of plan checks, code enforcement and project reviews with city and county planning departments. The LSFPD has done an excellent job of incorporating modern fire prevention techniques into the construction and development process.
Section VI - Policy Direction and Recommendations is designed to identify decision points that need to be acted upon. It sets some targets and criteria that must be pursued if the Department’s capacity to perform is to be fulfilled by the end of this planning period. This section is also designed to implement change and keep the department’s growth parallel to the District’s growth. It is recognized that not every recommendation will be achieved; therefore, every desired outcome may not occur. Nevertheless, it is essential that these recommendations are at least considered.

Section VII - Performance Goals and Standards of Care describes the objectives under which the fire protection and emergency services operate. These goals reflect the Department’s desire to maintain its current level of service in light of increasing demands for service and the need to reduce response times. Each goal has specific associated objectives. All of the objectives are quantified, in order to provide performance measures for existing and future service.

Section VIII - Summary and Cost of Recommendations suggests an annual review of this plan should be conducted to determine if any of the triggering mechanisms occur. The plan also recommends that this document be reviewed every five years to determine if there are changes in the District that demand a new direction. This section provides a road map as to how changes should be developed and implemented. It does not suggest that there are any specific dates when changes should be made, except by the definition of the triggering criteria.

Executive Summary - 1

This planning activity included two distinct ways of collecting information. First was the creation and utilization of the Planning Team appointed by the LFPD Board of Directors. This was done to achieve a high degree of involvement in the community and to ensure review of the complex concepts that are part of contemporary fire protection and emergency services programs. The second was through one-on-one interviews with individuals in the community, and those in positions of authority in other areas of the city and county. This was done to ensure an accurate assessment of the whole system.

Executive Summary - 2

The statistical portion in Section IV displays a portrait of a District that will not likely change in any significant way over the next 5-10 years. The population is anticipated to increase, but the corporate boundaries are not expected to change significantly, however, “in-fill growth” will impact the population base. As a result, the District will become denser from the influx of population. If the assumptions made within this plan are linked to projections that change, the specific factors being evaluated may have to be recalculated. Changes in risk inventory or District boundaries may also result in a need to modify the assessments done during this planning period.
In Section IV, Overview of the Fire Department, we depict the Louisville Fire Department as an "all-hazards" or "all-risk" oriented fire protection agency that currently delivers fire prevention, fire education, fire suppression, and basic emergency medical services.

The Insurance Services Office (ISO) analyzes and classifies fire protection efforts to help establish appropriate fire insurance premiums. They assign a Public Protection Classification from 1-10. Class 1 generally represents superior property fire protection and Class 10 indicates that the area’s fire-suppression program doesn’t meet ISO’s minimum criteria. The LFPD’s ISO ratings are Class 4 within city limits and Class 9 in rural areas; however, the District is at risk of losing its current ratings. (The fire suppression capability rating has declined over the last two rating periods.)

The Planning Team believes that an ISO Class 4 is a good rating for a department of this size and it appears to be standard for departments in this area. For the majority of homeowners, and those in industrial & commercial occupancies that are not sprinklered, improving the District’s ISO rating will have a significant effect on lowering their insurance rates. However, a considerable increase in expenditures by the District will be required to achieve this objective should the Board of Directors choose to move forward.

*It is important to note that some substantial operational changes and improvements will be necessary to maintain the District’s current rating.*

The Department still operates two fire stations, however, the District has prioritized increasing its volunteer and career staffing levels in an attempt to ensure 24/7 coverage and deliver paramedic transport services. Since 2006, the District increased its fire suppression staff from 38 to 90 personnel; two are career chief officers, three civilian personnel, two fire prevention personnel and nine fire medics. The Planning Team also looked for ways to evaluate the relative cost of fire protection compared to similar sized departments. Using the cost per capita model, the current cost for emergency services is $115 per capita, compared to $60 in 2005 with an increase to 3.3 firefighters per 1,000 in population. The average for a district of this population class is about $200 per capita (2010 Data, see Appendix G). According to the International City/County Management Association, the average career staffing at the national level is one firefighter per 1,000 in population for career departments.

The LFD currently responds to approximately 1,400 emergencies per year, the majority of which are emergency medical calls. Calls for service have doubled from 1992 to 2010, which corresponds to an increase in population and commercial construction. Additionally, there was a 30% increase from 2000 to 2010, with limited population growth during that time period (using a 5-year moving average to calculate the increase in call percentage).
Goals have been established to manage the Department and in many cases they are utilized as a performance standard. The most important is the response time performance goal, which is for the fire department to arrive at the scene 90% of the time within 8 minutes from the time the department is notified of the call.

The Planning Team spent considerable time analyzing and evaluating this definition of response time (see Section IV, Fire Department Overview).

Executive Summary - 3

This document also reviewed fire station locations. Some basic assumptions were made utilizing current station locations and staffing patterns, automatic aid, and the proposed addition of a third fire station.

A sample of the fire station findings in Section III follows:

- Currently, the two Louisville fire stations alone provide a response to most of the concentrated values (e.g., downtown district, commercial occupancies) in the District, which is within the stated goal.

- Unfortunately, the District still has high-risk areas (as determined by RHAVE) that can't be served within the stated response goal (compounded by staffing availability and skills mix challenges). This has been an unresolved finding for some time; however, the District has taken several improvement actions to minimize this long-term issue. While facility improvements have been made since 2005 to better accommodate 24/7 operations at both stations, the construction of Fire Station #3 remains in the discussion phase.

- The current deployment pattern is subject to future changes that are outside the District’s control, therefore it’s imperative that station locations meet District needs. For example, the City has approved a new campus in South Louisville that could bring up to 10,000 employees and visitors into the District each day. The District should take the necessary steps to build a station to protect these high-risk, high-value properties.

- As identified in the 2005 assessment, an additional fire station is still required to provide response time coverage to areas that are currently outside the optimum response distances and areas that will be developed by 2013/2014.

The Planning Team reviewed these findings and developed a set of criteria that was incorporated into this document. The criteria for future fire station locations should be as follows:
• Provide service to areas that cannot be reached with existing stations
• Reach areas that have a measurable quantity of property or life at risk
• Reach areas where there is a workload that becomes statistically significant
• Improve the overall distribution of resources

Executive Summary - 4

Emergency medical services (EMS) continue to be a significant part of the Department’s program activity, which has an impact upon workload, training, professional development, and customer expectations. Moreover, Louisville has the 5th largest population in Boulder County and it remains a challenge to ensure adequate staffing on every call. This can, and does, have an impact on the effectiveness of the overall operation and delivery of service.

Most notably, however, the District has greatly improved its EMS response times by implementing a paramedic transport program in 2007. Providing its own EMS transports within the District has had a positive influence on the program and improved the quality of life of District residents.

As meaningful as the improvements have been, the Planning Team strongly recommends staffing the second ambulance to ensure quick response times in District #2 and improve the overall minimum staffing profile. Finally, the District should seek ways to ensure that minimum staffing is maintained, support all initial response requirements, and most importantly, meet the basic emergency service needs of the service area.

Executive Summary - 5

The Department’s ability to train and maintain firefighting skills is impacted by the lack of adequate training facilities and volunteer turnover. Over the last six years, the Department has made some meaningful improvements in its volunteer programs, going to a combination staffing model and transitioning to a predominantly duty crew in-station staffing model.

In spite of these improvements, there are several times during a 24-hour period that adequate coverage is not available. The lack of predictable resources has negatively affected the Department and could impact the community also.

The volunteer program continues to serve the community well and will continue to be a major component of the Department’s emergency services programs; however, the Planning Team believes that a more reliable staffing plan needs to be developed. This
does not necessarily mean that more people should be hired, but to design a system that will ensure 24/7 initial fire response coverage. The District Board and Management Team must also evaluate its combination staffing and make the necessary adjustments to ensure that a baseline capability is always available. The current combination approach has proven to reduce operational costs (over a full career staff) and strengthened all of its emergency services programs. However, if not addressed, staffing shortages will impact its ability to adequately serve the customer and possibly jeopardize firefighter safety. The District Board should determine what the minimum 24/7 baseline capabilities are for the District.

Executive Summary - 6

Like most fire departments today, the District is concerned with its ability to maintain the necessary funding to meet the community’s current and future fire protection and emergency services needs.

In developing this plan, the Planning Team believes that the District is in a unique position to complete some of the capital projects recommended in this document; however, the District can’t wait until all of its operating funds are exhausted before seeking a mill levy increase. Assuming the District can purchase a reasonably priced piece of land, it is conceivable that a modest station can be built with available funds and an aggressive savings plan. While the District has done a good job of managing its financial resources, it is unrealistic to believe that all of the 2011 Comprehensive Plan recommendations can be accomplished without additional support from the taxpayers. The question policymakers must answer is whether to move forward with these recommendations or accept the risks associated with current service gaps.

As with the 2005 Comprehensive Plan, it is reasonable and wise to take a graded approach when prioritizing funding to support these improvements and projects. To that end, the team recommends proposing a property tax increase of 2 to 3 mills for consideration by 2014/2015. The purpose of this increase is to construct a training and fleet service center, offset the increased cost of general operations, and establish a reserve fund to support hiring additional resources. The District must also maintain adequate funds to replace aging apparatus (with a priority of replacing Engine #2703), fully staff the second ambulance, and sustain a 24/7 baseline staffing model.

The six executive summaries outlined are intended to only highlight specific sections of this document. The Action Plan Summary, as described in the next table, defines the organizational priorities and outlines recommendations for consideration and implementation.

Note: Not all findings and recommendations that appear in this report are listed in the Executive Summary.
### Action Plan Summary

<table>
<thead>
<tr>
<th>Priority</th>
<th>Recom Number</th>
<th>Summary</th>
<th>In Effect</th>
<th>Responsible Party</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>1</td>
<td>Fire Station #3 has been in the discussion phase for over 20 years. Existing and proposed new development in South Louisville, has impacted response times to high-risk/high occupancy occupancies. <em>(Finding #1)</em></td>
<td>24-60 months</td>
<td>Fire Chief</td>
</tr>
<tr>
<td>C</td>
<td>2/3</td>
<td>The Management Team and the Board of Directors should establish a funding mechanism and timeline to meet its future capital needs, specifically facilities. <em>(Finding #1)</em></td>
<td>24 months</td>
<td>Fire Chief/Board</td>
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<tr>
<td>C</td>
<td>4</td>
<td>Fully implement the paramedic transport program. The District maintains 2 ambulances, however it is only staffed with 1 ½ personnel. While this staffing model has served the District well, it’s had some unintended consequences. Engines are short-staffed when a firefighter is assigned to support the second ambulance. <em>(Finding #2)</em></td>
<td>12 months</td>
<td>Fire Chief</td>
</tr>
<tr>
<td>C</td>
<td>5</td>
<td>Re-engineer the existing staff scheduling system to better accommodate 24/7 coverage. Several modifications have been made over the past 5 years, however, significant periods of minimal or no response coverage remains. A career engine company should be considered. <em>(Finding #2)</em></td>
<td>12-60 months</td>
<td>Fire Chief</td>
</tr>
<tr>
<td>C</td>
<td>8</td>
<td>Modify current duty crew schedule. Increase length, include weekends, &amp; implement an e-scheduler and cell phone notification system. Evaluate the need for incentives to cover weakest periods. <em>(Finding #3)</em></td>
<td>12 months</td>
<td>Fire Chief</td>
</tr>
<tr>
<td>C</td>
<td>6</td>
<td>Improve skills mix and consider hiring career command staff to accommodate coverage and incident command and control. Improvement can be realized by certifying additional Driver/Operators and implementing the Battalion Chief staffing concept. <em>(Finding #2)</em></td>
<td>12-24 months</td>
<td>Fire Chief</td>
</tr>
<tr>
<td>C</td>
<td>7</td>
<td>Establish a baseline staffing and capabilities standard <em>(Standards for Cover)</em>. Using a graded approach, the District should work to a minimum staffing standard of 10 per day using any combination of staffing options. <em>(Finding #2)</em></td>
<td>12-60 months</td>
<td>Fire Chief</td>
</tr>
<tr>
<td>N</td>
<td>10</td>
<td>Improve EMS quality assurance program and physician advisor interface. The District should strengthen its current QA programs and have more interaction with its physician advisor. <em>(Finding #4)</em></td>
<td>12-24 months</td>
<td>Operations Chief</td>
</tr>
<tr>
<td>Priority</td>
<td>Recom Number</td>
<td>Summary</td>
<td>In Effect</td>
<td>Responsible Party</td>
</tr>
<tr>
<td>---------</td>
<td>--------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>N</td>
<td>9</td>
<td>At a minimum, the District should have one supervisor on each shift and at each station. <em>(Finding #4)</em></td>
<td>12-24 months</td>
<td>Fire Chief</td>
</tr>
<tr>
<td>N</td>
<td>12</td>
<td>Due to the EMS call volume and amount of activity, there should be a program manager dedicated to ensuring the quality and supervision of the program. The District has made significant advancements in its EMS programs since assuming transport responsibilities, but it lacks the necessary oversight and program supervision to ensure quality. The Planning Team believes that this can still be managed as collateral job function; however, it’s simply not practical under the current organizational structure. Training responsibilities require more than 70% of the time, which directly impacts EMS oversight. As outlined in the comprehensive plan, the EMS program would benefit from a dedicated Operations Chief or by implementing the BC concept. <em>(Finding #4)</em></td>
<td>12 months</td>
<td>Fire Chief</td>
</tr>
<tr>
<td>N</td>
<td>13</td>
<td>There has been a need for a dedicated training site for several years. The Department’s career/volunteer staff has doubled in the past 5 years, resulting in more training, and wear &amp; tear on city streets and private buildings. Most importantly, every time training must be conducted outside the District, it reduces overall protection of District residents and properties. <em>(Finding #5)</em></td>
<td>12-60 months</td>
<td>Fire Chief</td>
</tr>
<tr>
<td>N</td>
<td>14</td>
<td>Complete transition to the State of Colorado Driver/Operator certification. At a minimum, the District should initiate a dedicated wildland team and train all members to meet S130/190 certification. <em>(Finding #5)</em></td>
<td>12-36 months</td>
<td>Training Chief</td>
</tr>
<tr>
<td>N</td>
<td>15</td>
<td>The Department has a formalized and well-documented training program plan that meets all local, state, and federally mandated training. However, the Training Division should include annual drills and simulation as a part of its program. <em>(Finding #5)</em></td>
<td>12 months</td>
<td>Training Chief</td>
</tr>
<tr>
<td>N</td>
<td>18</td>
<td>Evaluate the funding necessary to maintain or reduce its current ISO rating. The District should also determine the benefits of the Center for Public Safety Excellence Accreditation and set a target date for implementation, if approved. <em>(Finding #8)</em></td>
<td>36 months</td>
<td>Fire Chief</td>
</tr>
<tr>
<td>Priority</td>
<td>Recom Number</td>
<td>Summary</td>
<td>In Effect</td>
<td>Responsible Party</td>
</tr>
<tr>
<td>----------</td>
<td>--------------</td>
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<td>-------------------</td>
</tr>
<tr>
<td>B</td>
<td>19</td>
<td>As a general business practice, the District should invest in a “technology refresh” every 3 to 4 years. Maintaining modern computers and software is no longer considered a luxury, but a necessity. <em>(Finding #11)</em></td>
<td>36 months</td>
<td>Fire Chief</td>
</tr>
<tr>
<td>N</td>
<td>9</td>
<td>Continue to replace fleet as outlined in Table #12. Moreover, additional specialized apparatus should be purchased to protect &amp; access open space, wildlife preserves, and agricultural lands. <em>(Finding #10)</em></td>
<td>Ongoing</td>
<td>Fire Chief</td>
</tr>
<tr>
<td>B</td>
<td>20</td>
<td>The District has implemented a formalized mutual aid agreement with surrounding area agencies and is part of the “Metro Mutual Aid” agreement with 50 participating agencies. The District should, however, implement an auto-aid program for areas of high-risk and longer response times. <em>(Finding #12)</em></td>
<td>12-24 months</td>
<td>Fire Chief</td>
</tr>
<tr>
<td>B</td>
<td>22</td>
<td>The District has done a remarkable job of developing a computer-based preplan program. That said, the strategies and tactics portion are lacking and should be updated. <em>(Finding #14)</em></td>
<td>36 months</td>
<td>Operations Chief</td>
</tr>
<tr>
<td>N</td>
<td>21</td>
<td>The Management Team and Board of Directors should determine the parameters or set points for requesting additional funding from the taxpayers. It’s not realistic to assume that current funding will support District needs beyond 2015. <em>(Finding #13)</em></td>
<td>12 month review</td>
<td>Fire Chief/ Board of Directors</td>
</tr>
<tr>
<td>N</td>
<td>5a</td>
<td>As a contingency, the District should consider and plan to supplement its career staff during staffing shortages. Staffing Station #3 should be considered as a longer term solution.</td>
<td>12-48 months</td>
<td>Fire Chief/ Board of Directors</td>
</tr>
<tr>
<td>N</td>
<td>5b</td>
<td>The District should consider increasing volunteer staffing to support its minimum baseline capability goals. If Recommendation #5a is implemented, the increase in reserves should be re-evaluated. <em>(Finding #2)</em></td>
<td>12-36 months</td>
<td>Fire Chief</td>
</tr>
<tr>
<td>B</td>
<td>18</td>
<td>Performing truck maintenance in a fire station has become a safety issue. Damage to buildings, apparatus, and personnel has occurred during maintenance. The District should move maintenance out of fire stations and, to the extent financially feasible, build a small maintenance facility. <em>(Finding #10)</em></td>
<td>12-60 months</td>
<td>Fire Chief</td>
</tr>
<tr>
<td>B</td>
<td>15</td>
<td>The District does have a documented public education program; however, it still lacks consistent implementation and coordination. Currently, there is no resource assigned to manage this function. <em>(Finding #6)</em></td>
<td>24 months</td>
<td>Fire Chief</td>
</tr>
<tr>
<td>Priority</td>
<td>Recom Number</td>
<td>Summary</td>
<td>In Effect</td>
<td>Responsible Party</td>
</tr>
<tr>
<td>----------</td>
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<td>--------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>B</td>
<td>11</td>
<td>Implement a community-based defibrillator program. The District should</td>
<td>12-60 months</td>
<td>Fire Chief</td>
</tr>
<tr>
<td></td>
<td></td>
<td>consider grants and private funding to facilitate this objective.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>(Finding #4)</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>16</td>
<td>The Management Team has done a good job of requiring sprinklers beyond</td>
<td>12-24 months</td>
<td>Fire Marshal</td>
</tr>
<tr>
<td></td>
<td></td>
<td>the minimum code requirements. However, it still lacks implementation of</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>the residential component of the 2009 ICC code. The District should</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>continue to work with the city to include this provision.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>(Finding #6)</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>17</td>
<td>Initiate an annual review of the Department’s specific goals for each</td>
<td>Annually</td>
<td>Board of Directors</td>
</tr>
<tr>
<td></td>
<td></td>
<td>program element. This review should include baseline and benchmark</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>performance measures for fire services. <em>(Finding #7)</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>5c</td>
<td>Along with the annual performance and accountability review of District</td>
<td>12 months</td>
<td>Fire Chief/</td>
</tr>
<tr>
<td></td>
<td></td>
<td>operations, it is always prudent to evaluate other delivery systems.</td>
<td></td>
<td>Board of Directors</td>
</tr>
<tr>
<td></td>
<td></td>
<td>While not considered a priority, the Planning Team believes that</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>evaluating consolidation options completes the operational review cycle.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>(Finding #2)</em></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Priority Definitions**

**(C) Critical:** Considered mission critical or directly related to the community’s safety envelope or firefighter safety. These are considered a generally higher District priority.

**(N) Necessary:** Required to maintain current service levels or essential to Fire Department operations and firefighter safety. Will improve public safety and prevention programs.

**(B) Beneficial:** Fire Department and District operations will benefit from these improvements. Is generally considered a lower priority, however overall public safety will benefit from these programs.
III. INTRODUCTION
Objectives of the Study

This study was undertaken to provide an objective and systematic evaluation and examination of the Louisville Fire Protection District (LFPD) policies, practices, and activities in the context of the District’s population, jurisdictional area, and well-established national standards. Moreover, the intent of this process was to help develop policy direction and respond to the need for service levels in the future. Finally, the intent of this update was to evaluate the progress and completion of recommendations outlined in the 2005 Comprehensive Plan and develop a new corrective action plan based on current conditions and assumptions. It was not the intent of this plan to develop new study methodology but to build upon the existing 2005-2015 Comprehensive Plan.

Scope of the Study

The process of defining the scope and objectives of this Plan consisted of an initial meeting with the LFPD Board of Directors, members and employees, planning personnel, and a citizen “Blue Ribbon” task force. A dialog between the affected stakeholders resulted in a basic development model consistent with a customer-centered planning philosophy. The scope of this Plan addressed questions related to values & mission, goals/objectives, community risk, demand for service, organization & staffing, development & concentration of resources, and levels of service & standards for response coverage for the next 5-10 years.

Study Methodology

Comprehensive planning consists of the following steps:

- Review existing conditions
- Formulate and develop options & alternatives to control or contain the District’s risk
- Formulate & implement decisions about the District’s future conditions

The purpose of this Plan is to serve as a single source of results from a variety of planning and administrative processes. The basic elements of this Comprehensive Plan include:

- A description of the stated direction of the Department, as reflected in the mission statement
• A description of the current and projected hazards in the community

• A series of “blueprints” for action that may be part of the budgetary process

• A description of how the District should monitor progress to ensure effectiveness

This Plan will also serve the governing body with an analysis of current conditions but will focus on near 5 to 7 year term forecasting, as well as a 20-year projection. The model that the LFPD utilized for the development of this Plan has the following elements:

• Existing LFPD Fire Department
• Risk Assessment
• Goal Identification
• Response Capabilities
• Response Reliability
• Historical Performance
• Program Activity
• Needed Changes
• Evaluation
• Performance Standards
• Policy Choices
• Budget Formulation and Adoption

The Comprehensive Plan Development Team relied heavily on a wide variety of information sources to prepare the Plan. These sources included:

• Current LFPD policies, practices, and techniques
• County/State legislative & regulatory provisions that impact operations
• International District/County Management Association (ICMA), City of Louisville
Overall Planning Assumptions

All planning documents are based on a series of assumptions. This Comprehensive Plan has been based on several assumptions concerning growth and our ability to provide adequate services. These assumptions are highlighted where appropriate. In addition to the assumptions specific to a particular chapter, this Plan is developed under the following broad assumptions:

- At build-out the District population will be between 26,000 - 29,000 and the population will continue to increase in age.

- The Fire Department will continue to experience increases in calls beyond the build-out due to in-commuting, job growth, and increased citizen expectations. While the current economic downturn has slowed development, calls for service are expected to increase over the next 10 years.

- The number of EMS calls will increase at a greater rate than other call categories.

- The District is expected to stay a predominantly volunteer fire department for the next 5-10 years, however, there will be some increase in career staff to support a 24/7 baseline capability requirement.

- The District’s funding source will remain somewhat unstable due to impacts of urban renewal authorities, lower assessed property values, and an increase in commercial/residential foreclosures. This is a significant change from the last evaluation. That said, the District expects an increase its assessed value due to the proposed construction of the new ConocoPhillips campus.

- Enforcement of District fire codes will continue to minimize fire risk in commercial and multi-family structures. Strong code enforcement and compliance will remain a District priority and the city government supports all of the provisions outlined in the newly adopted 2009 ICC Code.
Overall Project Goals

The overall goal of this Comprehensive Plan is to provide a quality community fire defense and emergency services system that:

- effectively utilizes resources to maintain a safe environment to protect life and property based upon contemporary standards;
- provides the community with an array of services that educate citizens and businesses on preventative measures, code enforcement, and personal & environmental safety in a community-oriented partnership;
- subscribes to the principles of engineering, education, enforcement, and extinguishment to mitigate existing and emerging fire problems;
- maintains a medical service program consistent with a high quality of life;
- meets the needs of a changing population, demographics, and economic factors through periodic internal and external assessments.
IV. OVERVIEW
Department Mission and Vision

The Louisville Fire Department (LFD) is an “all-risk” agency that responds to fires, emergency medical calls, hazardous material incidents, and other related emergencies (e.g., public assists, water removal, community hazard conditions). The current population of the District is approximately 19,000 within the city of Louisville and an additional 5,000 outside Louisville city limits, but within the LFPD service area.

The Fire Department goals, objectives, and activities are aligned directly with the mission of this Department. The fundamental purpose behind having a mission statement is to provide a definition of core competencies that the organization brings to protect the residents of the fire protection district. The LFD mission statement was developed in a collaborative effort among the firefighters, command staff, and District personnel.

**LFD Mission Statement**

“It is our mission to preserve life and property and to promote public safety for the citizens of the Louisville Fire Protection District. Our committed and well-trained professionals provide quality fire prevention, public education, fire suppression and emergency medical services. We honor our volunteer heritage using innovative strategies and methods to improve our service delivery.”

Furthermore, the Department has established a vision statement that supports the District’s future goals and expectations for excellence.

**LFD Vision Statement**

“Our vision is to provide best in class fire protection and emergency medical services to our community in a professional manner with an emphasis on customer service and fiscal responsibility.”
Organization of the Fire Department

District Divisions

The Department includes five divisional areas:

- Administration
- Tactical Operations
- Life Safety and Fire Prevention
- Training and Professional Development
- Fleet and Facilities Maintenance

The current LFPD Organizational Chart is shown in Figure 1.

Fire Stations

The Department consists of two fire stations. Headquarters (Station #2) is located at 895 Via Appia Way. This station, originally built in 1988, was remodeled in 2000 to accommodate gender and staffing considerations and provide for improved staffing facilities.

The downtown station, located at 1240 Main Street, was constructed in 1972. In 2010, the District approved an extensive remodel to extend the service life of the facility and provide 24/7 staffing capabilities. By renovating the structure, the District was able to save a substantial amount of capital, and perhaps most importantly, save the taxpayers a significant amount of money. This was considered a major accomplishment that was recommended in the 2005 Plan.

Staffing Configuration

The Department currently has 70 uniformed volunteers, 9 career fire medics, one full-time fire marshal, and three civilian personnel (a full-time business administrator, part-time administrative assistant, and full-time mechanic). Uniformed administrative personnel include the Fire Chief and a Deputy Chief of Training and Professional Development. Each career position is assigned a 5-day work schedule and the volunteer staff and fire medics respond to emergency calls as needed.
Figure 1 - LFD Organizational Chart
**Fire Station 1**

The downtown station at 1240 Main Street is a predominantly volunteer station with newly provided gender accommodations. It serves as the main facility for Department meetings and training sessions.

The station is not staffed from 0700 - 1600 each weekday; however, there are a few responders available evenings, weekends and holidays.

Station #1 is equipped with an 80 ft. E-ONE aerial (Quint), a single E-ONE Class A pumper, a Type 6 brush truck, and an ambulance. There are currently 19 volunteer firefighters assigned to this station with two career firefighter/medics.

**Fire Station 2**

Station #2 is considered Fire Department headquarters and was designed to accommodate 24-hour personnel assignments. The station currently has eight offices for District and command staff. This station is considered a predominantly combination station (career/volunteer) with personnel having the option to staff either a 10-hour day shift or 12-hour night shift.

Seven dorm rooms were added in 2001 to accommodate overnight crews. Station #2 is equipped with a 105 ft. E-ONE aerial platform, two E-ONE Class A pumpers, an ambulance, and a Type 6 engine (brush truck). Currently, approximately 56 volunteer firefighters and two career firefighter/medics are assigned to this station.

With the Department’s two stations and existing staffing policy, there is an equivalent of one engine company in service for the majority of each day. While current in-house staffing maintains 3 - 5 personnel for approximately 20 hours each business day, there is still no “constant staffing” or “critical minimum” staffing standard.

The District has made some significant improvements in transitioning to a more performance-based system for staffing; however, it’s still subject to significant gaps when there are only career medics responding to fire-related emergencies. Typically, when a shift is short due to absences for any reason, volunteers are expected to respond from home to fill the vacancy or a walk-in is welcome to take the open shift. It should be noted that there is no identified contingency for ensuring available resources at any one time, except for mutual aid.
Fire Station 3

Station #3 is currently in the discussion phase; however, the District owns existing property at So. 88th St. and Campus Dr. and has been in discussions to secure a new property located in the vicinity of So. 88th St. & W. Dillon Rd. Any one of these new sites will accommodate most District operational needs, with the exception of a training center.

When built, this new station will serve the south side of the District which is primarily comprised of high-risk properties including, but not limited to: the ConocoPhillips campus, schools, hospitals, and the Colorado Technology Center. It is expected that Station #3 may need to be staffed by career personnel sometime in the near future to meet increased demands and expectations for service with the development of the ConocoPhillips campus.

Emergency Call Responses

Upon receiving an emergency (911) call at the Boulder County Communications Center, a tone is sent which activates all LFD pagers and stations. The tone is followed by a voice description of the nature of the call. In-District firefighters are expected to respond to their assigned stations and staff the appropriate vehicles. When a duty crew is at the station, they respond as the first due engine company, to be followed by additional apparatus from each station as necessary.

While this practice is still a fundamental part of the LFPD response protocol, it is increasingly difficult to predict when pager call-out volunteers are available. Pager call-out responses have dropped from an average of 10 responders per call in 2004 to 2.5 responders per call in 2010. This is not a new trend in the American volunteer fire service, nor was it unpredictable.

The District has done an admirable job of transitioning to a more performance-based staffing system, where volunteers staff a station for a specific time period vs. responding from home. While this concept has proven relatively successful, the impact of fewer and fewer available responders has negatively affected the overall performance and readiness of the District.

Volunteer Firefighters (Line Personnel)

Personnel assigned to deliver the Department’s emergency services programs are called “line” personnel. They are required to respond to emergencies as outlined above. Line personnel are assigned to either Station #1 or Station #2, depending on where they
live in the jurisdiction. Members who do not reside in the District are typically assigned to Station #2 only.

All line personnel receive a nominal reimbursement of expenses through a call reimbursement program, a shift allowance for those who shift a minimum of 5 hours, a pension for completion of 10 - 20 years of service; and for the newest members, an IRS approved 457e length of service award (LOSA).

Additionally, all firefighters must complete a probationary year during which they are certified by the State of Colorado as Firefighters, Emergency Medical Technicians, and Hazardous Materials First Responders.

**Career Firefighter/Medics (Line Personnel)**

The District has supplemented its traditional volunteer program with a scheduled staffing of three personnel and a minimum staffing of two. These firefighter/medics have been cross-trained in suppression activities and are primarily responsible for delivering the Department’s EMS program.

This was a recommendation in the 2005 Comprehensive Plan that has proven to be beneficial in improving LFD daily operations and delivery of Advanced Life Support (ALS) level of care to District residents. That said, it has not been entirely without its own set of problems. Due to greater demands on the volunteer forces and fewer in-district volunteer residents, career staff are responding to an increasing number of fire-related calls without the benefit of an engine company. While there was some understanding that there could be fewer members responding to “routine minor medical” calls, the District didn’t anticipate the rise in no response to fire-related emergencies.

**Management Staff**

The Fire Chief is responsible for managing the resources used to protect the District. However, since fire and other emergencies strike 24 hours a day, 365 days a year, this cannot be done in normal business hours. Therefore, volunteer and career officers are required to fulfill some of these activities in the Chief’s absence. Since there is not a full-time operations chief or career line officers, all chief officers remain in communication and do their best to cover the District most of the year.

**Automatic Aid Agreements**

Currently, the LFD doesn’t have any automatic aid agreements (where an outside agency will respond automatically to calls within the District). As recommended in the 2005 Comprehensive Plan, the District has taken action to join the Denver Metro Mutual Aid Agreement, as well as form agreements with every agency surrounding the District and two private ambulance companies.
Overview of the District

Population and Household Growth

The District’s single largest customer is the city of Louisville, which is located in the western portion of a high-growth northern Denver metro area (see Tables 1 & 2). Over the next 20 years, this area is expected to grow at twice the rate of the region as a whole. Much of this growth is projected to be in the Broomfield County area. Louisville grew at a compound average annual growth rate of 3.1% between 1990–2008, a considerably faster rate than either Boulder County or the Denver metro area over this period, but not as fast as the immediate surrounding communities.

The household size within the District has declined from 2.68 to 2.61, while the average household size in Boulder County has increased. This is most likely a reflection of an aging population.

Table 1 - Population Growth

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Louisville</td>
<td>12,870</td>
<td>18,937</td>
<td>18,577</td>
<td>18,376</td>
</tr>
<tr>
<td>Lafayette</td>
<td>14,552</td>
<td>23,197</td>
<td>24,179</td>
<td>24,453</td>
</tr>
<tr>
<td>Superior</td>
<td>251</td>
<td>9,011</td>
<td>10,932</td>
<td>12,483</td>
</tr>
<tr>
<td>Broomfield</td>
<td>24,636</td>
<td>38,272</td>
<td>47,521</td>
<td>55,889</td>
</tr>
<tr>
<td>Boulder County</td>
<td>225,339</td>
<td>291,288</td>
<td>288,603</td>
<td>294,567</td>
</tr>
<tr>
<td>Denver Metro Area</td>
<td>1,848,319</td>
<td>2,400,570</td>
<td>2,360,945</td>
<td>2,784,228</td>
</tr>
</tbody>
</table>

Source: US Census Bureau; Denver Regional Council of Governments; ESRI, Inc., Dept of Local Affairs Demography Division.

Table 2 - Household Growth

<table>
<thead>
<tr>
<th>Household Growth</th>
<th>1990</th>
<th>2000</th>
<th>2006</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Louisville</td>
<td>4,779</td>
<td>7,216</td>
<td>7,270</td>
<td>7,537</td>
</tr>
<tr>
<td>Lafayette</td>
<td>5,479</td>
<td>8,844</td>
<td>9,657</td>
<td>9,632</td>
</tr>
<tr>
<td>Superior</td>
<td>88</td>
<td>3,381</td>
<td>4,111</td>
<td>4,496</td>
</tr>
<tr>
<td>Broomfield</td>
<td>8,734</td>
<td>13,842</td>
<td>15,215</td>
<td>21,414</td>
</tr>
<tr>
<td>Boulder County</td>
<td>88,402</td>
<td>114,680</td>
<td>122,994</td>
<td>119,300</td>
</tr>
<tr>
<td>Denver Metro Area</td>
<td>737,806</td>
<td>939,971</td>
<td>1,007,303</td>
<td>1,101,774</td>
</tr>
</tbody>
</table>

Source: US Census Bureau; Denver Regional Council of Governments; ESRI, Inc., City of Louisville; and Leland Consulting Group Dept of Local Affairs Demography Division.
Age Distribution

As shown in Table 3, Louisville’s age distribution is slightly older than the surrounding communities in Boulder County. Of particular importance to the Fire Department, is the higher rate of “baby boomers” moving toward retirement.

Table 3 - Age Distribution

<table>
<thead>
<tr>
<th>Age Distribution (2010)</th>
<th>City of Louisville</th>
<th>City of Lafayette</th>
<th>City of Superior</th>
<th>City of Broomfield</th>
<th>Boulder County</th>
<th>Denver Metro Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 19</td>
<td>26%</td>
<td>28%</td>
<td>34%</td>
<td>28%</td>
<td>26%</td>
<td>27%</td>
</tr>
<tr>
<td>20 to 34</td>
<td>15%</td>
<td>18%</td>
<td>20%</td>
<td>20%</td>
<td>23%</td>
<td>22%</td>
</tr>
<tr>
<td>35 to 44</td>
<td>15%</td>
<td>16%</td>
<td>19%</td>
<td>16%</td>
<td>14%</td>
<td>15%</td>
</tr>
<tr>
<td>45 to 54</td>
<td>20%</td>
<td>17%</td>
<td>17%</td>
<td>15%</td>
<td>15%</td>
<td>15%</td>
</tr>
<tr>
<td>55 to 64</td>
<td>14%</td>
<td>13%</td>
<td>7%</td>
<td>11%</td>
<td>12%</td>
<td>11%</td>
</tr>
<tr>
<td>65 to 74</td>
<td>5%</td>
<td>5%</td>
<td>2%</td>
<td>6%</td>
<td>6%</td>
<td>6%</td>
</tr>
<tr>
<td>75+</td>
<td>5%</td>
<td>3%</td>
<td>1%</td>
<td>4%</td>
<td>4%</td>
<td>4%</td>
</tr>
<tr>
<td>Median Age</td>
<td>40.9</td>
<td>37.6</td>
<td>32.5</td>
<td>36.4</td>
<td>35.8</td>
<td>35.9</td>
</tr>
</tbody>
</table>

Source: US Census Bureau; Denver Regional Council of Governments; ESRI, Inc., City of Louisville; and Leland Consulting Group.

Household Incomes

Corresponding to education levels, household incomes in the District are approximately $85,379 and among the highest in Boulder County (see Table 4). Overall, Boulder County incomes skew considerably higher than the Denver metro area as a whole.

Table 4 - Household Incomes

<table>
<thead>
<tr>
<th>Year</th>
<th>Median Household Income</th>
<th>Percent Increase</th>
<th>Average Household Income</th>
<th>Percent Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>$68,357</td>
<td></td>
<td>$82,721</td>
<td></td>
</tr>
<tr>
<td>2003</td>
<td>$75,307</td>
<td>10.2%</td>
<td>$93,759</td>
<td>13.3%</td>
</tr>
<tr>
<td>2008</td>
<td>$85,379</td>
<td>13.4%</td>
<td>$109,717</td>
<td>17.0%</td>
</tr>
<tr>
<td>2010</td>
<td>$90,346</td>
<td>5.82%</td>
<td>$114,384</td>
<td>4.25%</td>
</tr>
</tbody>
</table>


The median household income in Louisville is expected to grow to approximately $100,000 (13% over the 2003 median estimates) by the year 2008. The average household income is projected to increase to $109,717 (17% over the 2003 income estimates). Note: the average District customer has an expectation for quality district services that rival larger communities in Boulder County.
While the LFPD has been successful in meeting most of these expectations, it has been a considerable challenge for the Department to provide consistent and predictable response times. It should also be noted that growth is expected to be greatest in households earning $100,000 or more annually. There will be a decrease in the number of households for every other income level.

**Transportation and Commuting**

The 2000 Census found that approximately 22% of District citizens are employed in the city of Louisville. Most of the residents who work, commute out of Louisville and drive alone (78% of the employees). Over 1/3 traveled 10 - 20 minutes to work, one-way.

**Existing Traffic Volume**

While the city maintains an adequate transportation grid to facilitate safe and easy transportation for District residents, the system continues to see heavy traffic growth as other surrounding communities expand.

Residential growth in Broomfield & Superior and commercial growth in Broomfield County have had a significant impact on local traffic density. While the City continues to make improvements as funding becomes available, traffic volume continues to negatively impact emergency response.

**Existing Daily Traffic Volume That Impacts the Need for Services**

The number of vehicles at various points throughout the District is shown below. It is evident that the higher traffic loads on So. McCaslin Blvd. and South Boulder Rd. could impact not only response times, but the number and types of calls.

<table>
<thead>
<tr>
<th>McCaslin Boulevard</th>
<th>Vehicles / Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>W. Dillon Rd. to US 36</td>
<td>39,300</td>
</tr>
<tr>
<td>W. Cherry St. to W. Dillon Rd.</td>
<td>30,800</td>
</tr>
<tr>
<td>Century Dr. to W. Cherry St.</td>
<td>26,500</td>
</tr>
<tr>
<td>Via Appia to Century Dr.</td>
<td>24,500</td>
</tr>
<tr>
<td>N. Washington Ave. to Via Appia</td>
<td>20,400</td>
</tr>
<tr>
<td>W. South Boulder Rd. to Washington Ave.</td>
<td>16,300</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>State Highway 42</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Pine St.</td>
<td>9,200</td>
</tr>
<tr>
<td>Pine St. to CTC Blvd.</td>
<td>10,300</td>
</tr>
</tbody>
</table>
Dillon Road
So. McCaslin Blvd. to Dahlia St. 14,200
Dahlia St. to So. 88th St. 14,900
So. 88th St. to So. 96th St. 11,500
So. 96th St. to So. 104th St. 14,200

South Boulder Road
So. McCaslin Blvd to N. Washington Ave. 17,400
N. Washington Ave. to Via Appia 17,200
Via Appia to State Hwy 42 29,200

Via Appia
So. McCaslin Blvd. to Tyler Ave. 13,200
Tyler Ave. to Lafayette St. 10,900
Lafayette St. to South Boulder Rd. 10,200

Economic Development
Given the District’s central location along the US 36 corridor, between Broomfield and Boulder, the community is strategically placed to capture a share of the regional business growth. That said, the City of Louisville has taken a more aggressive look at removing development barriers.

The City is currently exploring target areas of investment and opportunities to encourage a competitive mixed growth model (Figure 2). Over the past two decades, Louisville has been at the forefront of Boulder County communities in maintaining its fiscal health; however, over the past five years, the city has been significantly impacted by business closures and relocation to other communities.

The City continues to invest in the community to attract new businesses. As with most established suburban communities, the Fire Department’s fiscal challenge in the future will be maintaining the high level of fire protection and emergency services, that its residents have received in the past, with a declining or stagnant population growth.
Community (District) Risk Assessment

The LFPD has a wide variety of structure and life safety risks associated with the occupancies present. To assist in the achieving a standardized risk assessment for LFPD structures, the Planning Team used a computer software developed for the International Association of Fire Chiefs. The software is called “RHAVE” (Risk, Hazard, and Valuation Evaluation). A structural fire risk analysis was performed on facilities within the District. Common fire and life safety factors, such as fire flow and code
compliance for life safety, were used to help determine a risk classification. The three classifications applicable to the District are:

- **Low Risk** - Small commercial structures that are remote from other buildings.

- **Moderate Risk** - Normal single-family residential structures and commercial areas under 10,000 sq. ft. without high-hazard or high fire load contents.

- **Significant Risk** - Structures that contain built-up areas of substantial size with a high concentration of property representing a substantial risk of loss of life, a severe financial impact on the community, or an unusual potential damage to property in the event of fire. High-risk occupancies include schools, hospitals, strip shopping malls, apartment buildings, industrial areas, technology campuses, etc.

Occupancies designated as target hazards were also evaluated. The results indicated that 90% of the District’s occupancies are low to moderate risk. Significant risks were senior housing, hospitals, large industrial facilities (CTC), educational & research occupancies (ConocoPhillips & schools) and strip mall shopping areas.

**Areas of Significant Risk**

Assisted living housing areas (e.g., Balfour, Balfour Cherrywood, Wellspring, and Avista Hospital) have a high life safety risk, as many of the occupants are non-ambulatory with limited mobility. These types of occupancies received the highest risk assessment due to the possibility of high loss of life in the event of fire. Construction of these occupancies is designed to minimize the spread of fire; however, smoke inhalation is a major concern.

The “Old Town” Louisville area along Main Street remains a particular concern because the buildings have a significant historical value and cannot be replaced. These buildings pose a risk hazard to firefighters and occupants due to age and type of construction. It is also likely that a fire could spread rapidly if early detection and rapid intervention of the fire is not achieved. If the District were to have a large fire in this area, it would likely have a financial impact to the business area, as well as damage to the significant pride District residents have in the Old Town area.

Large retail spaces such as Lowe’s, Home Depot, Kohl’s, and area grocery stores pose the next highest risk. While these occupancies do not normally pose a high life safety risk, they have a significant monetary value in stock. Additionally, a large fire in one of these occupancies would have a negative impact on the District and the community as a whole.
Heavy industrial areas are the last to fall into the high-risk category. These include the Colorado Tech Center (CTC), businesses off of Centennial Parkway, and the soon to be constructed ConocoPhillips global research and training campus. The economic impact on the community and the District would be large because of the loss of jobs, property value, and sales tax revenue.

Apartment buildings are considered on the edge between moderate and significant risk. This is mainly due to the number of residents who occupy the structure at any one time; and is particularly true in the city of Louisville, as many of these structures were not built with the benefit of fire sprinklers.

Louisville schools fell into a moderate risk category. All schools have early detection systems which can be activated quickly and some have been recently retrofitted with fire sprinklers.

The fire suppression actions required at a typical fire scene vary greatly depending on the risk level. In order to successfully manage such incidents, fire companies must be quick and perform multiple tasks simultaneously. Louisville’s fire history has shown that at least twice as many resources are required to manage a fire in a significant risk occupancy than a fire in a low to moderate risk occupancy. This is typically due to the fire flow requirements, search & rescue, and other coordinated activities. Fortunately, most of the fires within the LFPD are in structures in the low to moderate risk category. These fires are generally handled with the resources dispatched on a first alarm assignment.

The largest concentration of high-risk areas is in the Station 2 primary response areas (Figure 3). It should be noted however, that Station 1 is responsible for covering the historic Old Town area that is considered irreplaceable and which would require a fast and sizable mitigation force to manage a major incident. (Currently, Station 1 is closed from 0700 - 1600 each business day.) There are also a considerable number of moderate to high risk occupancies in the south end of the District (District #3) which must rely on stations outside of the recommended response area.

**Risk Assessment Concepts**

The District also recognized the concept of “acceptable risk” and has been aggressive in defining the community’s risk profile. When assessing the community’s risk, the Fire Marshal’s Office has evaluated the community against probability, consequence, occupancy risk, demand zone, and community profile. While this has not been well-documented, the risk assessment has helped support the evaluation for resource deployment strategies, probability of an event occurring, and the consequence of the event. There are four possible relationships between structures or conditions and the distribution of fire stations.
Figure 3 - Areas with Significant Risks

Figure 4 conveys the range of possibilities of an event occurring and the consequence should an event occur. The District was evaluated against various structural conditions in the community and placed the various occupancies into four boxes. This was accomplished with a formula that looks at such things as construction type, occupancy factors, life safety, and values at risk. This results in four different combinations of consequence and probability as shown on the next page:
**Figure 4 - Probability vs. Consequences**

![Figure 4 - Probability vs. Consequences](image)

**Level of Effort**

The LFPD currently provides a level of service for fire protection and EMS at a per capita cost of $115. A comparison of the per capita costs for several other Front Range fire protection districts is shown in Figure 5. The LFPD ranks as the second lowest of 14 fire departments.

The LFD’s staffing model is currently 84 career and volunteer personnel assigned to the Tactical Operations Division for the purpose of providing emergency services. On average, the Department has 3.9 firefighters on the first vehicle responding to each call with an in-station reserve status of 2.5 firefighters.

It should be noted that while the firefighters receive a nominal call reimbursement and shift stipend, they are still considered volunteers.
Community Fire Experience

Based primarily on data representing the city of Louisville, the District’s population has grown at a rate of about 3.1% per year over the past 20 years, to the current population of approximately 24,000 - 25,000. Since population generally correlates with call volume, it was expected that calls or demand for service would also increase.

Figure 6 displays what the growth in calls for service has been over the last 20 years. The number of emergency calls reached a peak in 2010. While most of the increased volume over the past 10 years correlates roughly with the end of the most recent growth phase, it also shows how an aging community can impact call volume with no population gain. EMS calls, when compared to all other causes, are still increasing – in fact, they have doubled over the last 10 years.

Currently, the service level is approximately 1,400 calls per year for a population base of 24,000. This is an average of approximately 3.83 calls per day. This generates 56 calls per 1,000 population per year. Extrapolated to the 2020 population, we would expect calls for service to increase to 1,700 calls per year. This is approximately 4.7 calls per day or about a 30% increase over the current daily call volume.

As emergency events do not occur on a regular schedule, there will ultimately be days of higher and lower activity (Figure 7) as well as a variation during the day (Figure 8).
Figure 6 - Call Volume per Calendar Year

![Graph showing call volume per calendar year from 1991 to 2009.](image)

Figure 7 - Call Distribution Throughout the Week (2010 Data)

![Graph showing call distribution throughout the week from Monday to Saturday.](image)
Figure 8 - Call Distribution Throughout the Day (2010 Data)

Call Counts By Hour of Day

Figure 9 shows increases in service demand are related to emergency medical calls more than any other type of call. This is not considered unusual as this is a national trend. Fortunately, the number of calls for fires has not increased which could be attributed to a variety of reasons. The District’s fire prevention activities over the past two decades, for example, have most likely had a significant positive impact on the frequency and even the average severity of fires. Medical emergencies are less susceptible to the prevention and mitigation strategies that are highly successful on fires.

Pre-Fire Planning

The LFD has an active pre-fire planning program, however it is still in its infancy. The Department has prioritized “target” hazards or occupancies with high population or property value. From a risk evaluation perspective, the District has over 450 commercial and business occupancies that are evaluated against the target hazard criteria.

While the program is continuing at a steady pace, the generation of preplans is limited to a small number of career personnel with support of one volunteer member with IT experience. Since the last comprehensive planning period, the Department has completed approximately 200 preplans, which have been incorporated into its new e-mapping system. Each fire apparatus is now equipped with a laptop and all preplan data is readily available. It is projected that it will take another 3 years before the preplan program is fully matured and integrated into daily LFD operations.
Fire Flow

Fire flow must also be addressed when considering risk factors because it represents the specific resistance to control of an individual structure. Fire flow is an assessment of the water supply needed once the structure has become fully involved. This assessment is based on defining the problem that will occur if the structure is totally involved, thereby creating the maximum demand upon the fire suppression services.

The Insurance Service Office (ISO) has provided the District with a report that indicates the District has a wide range of fire flows being evaluated by the insurance industry. As with population, fire flow has a direct relationship to station locations and engine company distribution and concentration. As the District becomes denser and the call demand increases, high flow occupancies may not receive the initial attack complement as quickly as desired.

The LFPD currently requires fire flow calculations with all plan review documents. Additionally, every new commercial and industrial building is evaluated to ensure that the building has the necessary fire flow available. Finally, the City Water Department maintains the water supply system and periodically performs fire flows on its hydrant system.
Water distribution systems outside the city of Louisville are maintained by various water districts; however, some of these areas fall short of the necessary fire flow requirements. The LFD has developed a quick attack strategy complimented with mutual aid to compensate for area specific low fire flows. In general, fire flows are more than adequate to meet the current community risk hazards and the overall performance of the looped grid system is strong. As a result, the District retained its Class 4/9 rating from the ISO.

Based on the current ISO rating, the District decreased to 23.50% credit, out of 40% total, for its water supply; decreased to 7.62% credit, out of 10%, for receiving and handling alarms; and, increased to 31.94% credits, out of 50%, for fire department operations. The District’s overall credit rating went from 68.16% to 62.03% (out of a possible 100%) in a 10-year period (Table 5). The District’s Class 4 rating is similar to other area communities (Table 6).

While the District has maintained its Class 4 rating, it is at risk of being decertified to an Class 5 rating if improvements are not made in each category. This would be considered a significant impact to District residents, as it has a direct relationship to their insurance rates.

That said, the Planning Team strongly believes further investments in maintaining and improving the ISO rating is a desirable goal, however, it will be very expensive to mitigate. Moreover, many of the corrective actions necessary to improve are not entirely within the District’s control (e.g., water supply and receiving & handling fire alarms). Fire Department programs and services to meet this milestone are a desirable goal. Further recommendations are outlined in Section VI - Programs and Policies.

**Table 5 - Public Protection Classes**

<table>
<thead>
<tr>
<th>PPC</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>90.00 or more</td>
</tr>
<tr>
<td>2</td>
<td>80.00 to 89.99</td>
</tr>
<tr>
<td>3</td>
<td>70.00 to 79.99</td>
</tr>
<tr>
<td><strong>4</strong></td>
<td><strong>60.00 to 69.99</strong></td>
</tr>
<tr>
<td>5</td>
<td>50.00 to 59.99</td>
</tr>
<tr>
<td>6</td>
<td>40.00 to 49.99</td>
</tr>
<tr>
<td>7</td>
<td>30.00 to 39.99</td>
</tr>
<tr>
<td>8</td>
<td>20.00 to 29.99</td>
</tr>
<tr>
<td>9</td>
<td>10.00 to 19.99</td>
</tr>
<tr>
<td>10</td>
<td>0.00 to 9.99</td>
</tr>
</tbody>
</table>
Table 6 - Louisville Fire Protection District ISO Rating Comparison

<table>
<thead>
<tr>
<th>City/District</th>
<th>ISO Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Louisville</td>
<td>4</td>
</tr>
<tr>
<td>Broomfield</td>
<td>4</td>
</tr>
<tr>
<td>Erie</td>
<td>5</td>
</tr>
<tr>
<td>Longmont</td>
<td>4</td>
</tr>
<tr>
<td>Boulder</td>
<td>4</td>
</tr>
<tr>
<td>Lafayette</td>
<td>4</td>
</tr>
<tr>
<td>Boulder Rural</td>
<td>5</td>
</tr>
</tbody>
</table>

Classification of Occupancies and Construction Types

The District’s occupancies and construction types are significantly diverse and present a challenge to the emergency services component. The District has a good balance of residential, business, and industrial occupancies; and, the District Fire Marshal’s Office ensures that the majority of the higher hazard occupancies meet the minimum fixed and passive fire protection requirements.

The LSFPD has indicated there are 596 occupancies that require permits under the International Fire Code and 38 occupancies that are classified as state-licensed care facilities. Considering a factor of business startups and shutdowns, the total number of technical inspections (life safety & code compliance) is approximately 693 each year. The remainder of the LFD workload is distributed among plans review, field consulting, planning meetings, acceptance testing, and business license inspections.

It’s important to recognize that the risks in the city and district are distributed throughout the response area, yet at the same time, there are concentrations of responses. Based upon an overall review of LFPD zoning maps, preplan data, and mixture of other data sources, the fire problem in the District can best be described as:

- Downtown business district
- Industrial park development
- Big box stores
- Multi-family housing
- Main transportation corridors
Research development

These risk categories are arrayed in the District in accordance with current and past land use policies.

**Developmental Trends**

The District’s growth has been systematic, slow and incremental over the past 10 years. The 2005 Comprehensive Plan presents the projection of further growth that will require enhancement of current emergency services.

The Planning Team recognizes the current economic downturn will impact growth over the short term. The trend line for issuance of building permits is not necessarily congruent with increases in fire service demand since other factors besides population can cause increases in development activities.

As outlined in the District’s Comprehensive Plan, changes in population type directly impact fire service demand. For example, populations that become older and additional care facilities continue to cause a change in the demand for EMS services. Comparatively, the fire problem, and therefore fire risks of the future, will emerge from these growth trends also, albeit slower that the previous 10 years.

If we assume that very little redevelopment will occur in the next 20 years, the fire risk inventory will still include a variety of problems. It will include everything from the earliest construction and occupancy characteristic from the historical downtown area, to the most highly protected occupancies using automatic detection & sprinkler systems, to the low risk.

For the purpose of comprehensive planning, the following assumptions were considered:

- The community and the District have a wide range of structural and occupancy conditions. In-fill growth will generally be of lower risk category than the existing structures, with the exception of South Louisville. For the most part, this is a direct result of strong automatic sprinkler codes.

- Individual projects may result in fire flows or risk categorization higher than adjacent projects. For example, the new ConocoPhillips project located in District #3.

- Redevelopment or tenant improvements in specific projects can change the nature and classification of risk in existing buildings.
Funding

The amount of funding received by the LFPD via property taxes is shown in Table 7.

**Table 7 - Annual Funding From Property Taxes**

<table>
<thead>
<tr>
<th>Year</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>$1,029,095</td>
</tr>
<tr>
<td>2004</td>
<td>$1,052,684</td>
</tr>
<tr>
<td>2005</td>
<td>$1,031,638</td>
</tr>
<tr>
<td>2006</td>
<td>$1,088,971</td>
</tr>
<tr>
<td>2007</td>
<td>$2,475,142</td>
</tr>
<tr>
<td>2008</td>
<td>$2,690,604</td>
</tr>
<tr>
<td>2009</td>
<td>$2,711,861</td>
</tr>
<tr>
<td>2010</td>
<td>$2,870,887</td>
</tr>
</tbody>
</table>

While the LFPD has done a good job of managing its financial resources and has taken the appropriate measures to ensure a stable budget, it is not immune from the recent current economic recession or other state and local tax limiting initiatives. Moreover, the District’s available funding continues to be impacted with a slower growth pattern which is further compounded by a 25-year “Urban Renewal Authority” implemented by the City of Louisville. Yet to fully materialize, it is estimated that the URA alone could impact District revenues by $3.2 million dollars over the next 25 years (based on City consultants).

Most notably, since the 2005 Comprehensive Plan, the District was proactive and proposed increasing the approved mill levy by 3.5 mills. Fortunately, the taxpayers supported this initiative which allowed the Management Team and policymakers to implement a transport EMS program, renovate Station #1, and start upgrading the apparatus fleet.

As in the past, the District still utilizes a strategy of saving unused budgets to fund capital equipment and as a means to update the emergency fleet and critical operational equipment. This practice has worked well over the years and it has allowed the District to avoid overleveraging itself. This practice has proven to be very beneficial during this recessionary period.

It should also be noted however, there are some inherent limitations to this policy. When and if it becomes necessary to increase line personnel staffing, there will be significantly less funding for capital projects and critical infrastructure. District Management and the Board of Directors have set an 8-10 year goal before seeking another mill levy increase. The Planning Team believes this is a realistic goal providing the assessed value of the District doesn’t decline; sufficient qualified volunteer resources can be maintained; and, there is no expectation of reduced response times or a 24/7 baseline capability.
Also, based on the decline of in-district volunteers and the current turnover rate, it may not be realistic to achieve a baseline capability without a mill levy increase, capital bond, or both. The District does have some financial flexibility, however it’s not clear what, if any, revenue impact there could be after the next two property reassessments. This concern could have a significant impact on District operations and implementing the activities outlined in this document. Finally, the District Board of Directors and Fire Department Management have completed, or nearly completed, all of the initiatives set forth in the 2005 Comprehensive Plan and should be commended for having the commitment and discipline to complete what they promised the taxpayers.

That said, policymakers should continue to be proactive in their pursuit of developing a “Best in Class” protection and service level for its residents. Currently, the District allocates approximately 40% of its budget to people and pensions, 10% to capital, 50% to non-labor and 0% to reserves. These estimates include the expected increase cost of staffing the second ambulance in 2011 and completion of the Station #1 renovation.

**Deployment and Response Analysis**

**Deployment**

The primary reason for providing emergency services is to arrive at the scene of a fire before the fire grows to a level that destroys life and property. The primary mechanism the LFPD uses for the delivery of that service is the individual volunteer fire companies, housed in a fire station supplemented by a minimum staff of two career firefighter/medics. Moreover, a secondary reason the LFD exists is to arrive at the scene and provide both basic and advanced life support.

One of the most basic questions that the District has to address in providing emergency services is, how quickly must service be delivered to significantly improve a negative situation? This is one of the most common questions raised in discussing a community’s fire protection and emergency service needs. In order to better understand the rationale for setting response times, reference must be made to three accepted models for performance. Two of these models compare the onset and escalation of the incident and the arrival of intervention force. These two models are called “Standard Time-Temperature Curve” and the “Utstein Criteria”. The third standard is the NFPA Standard 1710 (Organization and Deployment of Suppression, Emergency Medical Operations and Special Operations to the Public by a Career Fire Department) and NFPA Standard 1720 (Organization and Deployment of Suppression, Emergency Medical Operations and Special Operations to the Public by a Volunteer Fire Department).

Finally, this report also evaluated the data provided in the NIST Technical Report on “Fireground Field Experiments”. This report represents the results of more than 60
laboratory and residential fireground experiments designed to quantify the effects of various fire department configurations on the most common types of fire, low hazard residential structure fires. It also helps quantify the effectiveness of crew size, first-due engineer arrival time, to completion of 22 fireground tasks and the effect on occupant and firefighter safety. These models are explained in limited detail below.

**Standard Time-Temperature Curve**

The standard method of assessing the need for dealing with fire growth is based upon the time-temperature curve outlined in Figure 10. The Standard Time-Temperature Chart displays a sequence of time that starts when a fire breaks into open flame and terminates when the fire destroys the occupancy or origin when there is no intervention by a fire protection action.

This figure also displays the various elements of time that come into existence as a fire grows in size and complexity. Reading the chart from left to right, you can see that for every moment the fire is allowed to increase it generates more and more of a threat to the occupants. This does not mean that that every fire goes to these extremes. What it does mean, is that every fire that has reached an open flame production has the possibility of going to that stage, provided it is unchallenged.

The figure also illustrates that there are points in the curve in which other interventions can occur. The chart reflects the activation of smoke detection and sprinkler head devices, which if they are properly positioned and maintained, will result in either notification or an actual intervention on the fire. Fire station response is based on the probability that most fire scenarios are created where there are few interventions. Based upon being aware that a fire exists, the Louisville Fire Department must be notified and then respond in a timely fashion to avoid destruction of life or property.

Figure 10 illustrates the planning notion that a 5-minute response time is appropriate to achieve the operational objective of keeping the fire within a room of origin. The standard fire service performance objective for career departments for this target is 90% of the time.
Utstein Criteria

There is a corollary time sequence that has been developed to set standards for emergency medical services. The Utstein criteria is based on a study that was conducted to determine how long a person could survive if they were deprived of either oxygen or blood circulation. The Utstein study demonstrated that a person who has lost circulation or breathing ability has a very low percentage of survivability after a period of 5 minutes. When the time exceeds 8 minutes for life-saving intervention, the survivability rate decreases to practically zero (Figure 11 and Table 8).
Response times for trauma victims are also critical. Medical researchers have linked response times for EMS to survival of major trauma victims. In one study, survival of major trauma victims who were expected to survive were linked to short response times (average 3.5 minutes); and trauma patients who were expected to survive but didn’t, were linked to longer response times. What is most important to recognize about these statistics is that 55% of the District’s call load (2000-2010 Data) can be attributed to medical emergencies where time is a critical component to survival. Currently, the Department averages 6.1 minutes to provide ALS (2010 Data).

The Department has significantly improved its performance against the 90th percentile ALS response requirements of 7 minutes 59 seconds. Currently, the Department is responding to 90% of EMS calls within 8.25 minutes.
Table 8 - Survival Rates for Cardiac Arrest by Intervention Time

![Graph showing survival rates for cardiac arrest by intervention time]

NOTE: Both of these time-response models have been utilized by cities and fire protection districts across the nation to establish response time criteria.

NFPA 1710/1720

NFPA 1710 and 1720 were designed to provide the fire service with a defined set of deployment and performance standard expectations. These standards assume that the fire department must maintain a staffing complement and response time criteria to effectively mitigate a 1,700 sq. ft. fire, and the standard assumes no credit for auto-detection or suppression. Additionally, 1710 specifies minimum response times for cardiac EMS intervention. While these standards are still based on consensus, they are now considered an industry standard.

By definition, NFPA 1710 does directly apply to the LFD staffing and deployment model due to the fact that the LFD is protecting a population of over 24,000 people. However, NFPA 1720 best applies to the Louisville Fire Department (a predominantly volunteer department supplemented with a career staff).

NFPA 1720 charges the authority having jurisdiction (LFPD) with developing these deployment and staffing standards to meet the community's expectations. Typically, these deployment standards are promulgated based on the Community Risk Management Plan and the risk associated with the storage, use and transportation of hazardous materials.

Based on that evaluation, the LFD has established an aggressive standard to meet the District's hazards and aging community profile. While these response and deployment standards fall short of the career standard, they are considered a significant effort considering its combination status. In establishing the LFD response time goal, the
Planning Team evaluated the most critical components that influence response times and provided a consensus for expected performance for a modern suburban community like Louisville.

**NIST Report on Fireground Field Experiments**

Most of the staffing standards in the past have been based on consensus standards and operating experience, this report provides a more scientifically based study of the effect of different crew sizes and firefighter arrival times on the effectiveness of the fire service to protect lives and property. In general, the study confirmed the fire service’s understanding of the impacts or effects that various factors have on fire growth, firefighter safety and effectiveness. They qualified:

- 4-person engine crews were more effective than 3 to 2-person crews
- Quicker response times result in less exposure to occupants
- Primary search can be achieved quicker & more effectively with a 4-person crew
- Laddering and ventilation is more effective with a 4-person crew
- It takes longer to advance a hoseline with a 2-person crew than a 4-person crew
- A 2-person crew was not as effective slowing fire growth as a 4-person crew

While these conclusions were simplified for the purpose of this document, it does illustrate the necessity of adequate staffing and quick response times. They can significantly impact both occupant survivability and firefighter safety. (See April 2010, *NIST Report on Residential Fireground Field Experiments*)

**Components of Response Time**

The 5 key factors that impact a fire event are:

- **Detection Time** - Early discovery increases the occupant’s probability of escape and results in quicker response for the fire department.

- **Notification Time** - This is the amount of time it takes to notify the fire department. Boulder Regional Communications Center (BRCC) averages a 1 minute 16 second notification for top priority fire and rescue calls. This is a critical component in the system as it directly affects fire growth and survivability. It should be noted the BRCC is
35% higher than the national average, however significant improvements will be made with the investment in new (Tri-Tech) computer-aided dispatching.

- **Turnout Time** - This is the time between notification of dispatch and the first vehicle leaving the station enroute to the scene.

- **Travel Time** - Travel is influenced by the distance between the emergency event and the fire station, road conditions, traffic, weather, time of day and how fast the apparatus can safely travel. This is one of the most significant time intervals for the LFD due to staffing configurations and the locations & number of fire stations.

- **Setup Time** - This is the time between arrival of the first engine company and the initial attack on the fire or EMS intervention. Setup time varies with the type of incident. In addition, individual and team training, station staffing, equipment availability and response area familiarity all have a profound effect on setup times.

Most structure fires require 12-16 firefighters to perform effectively without undue fatigue (consistent with NFPA 1710). The LFD realizes that career staffing at this level is not fiscally realistic, however the Department does average a total of 15.6 firefighters on a structure fire, 12 of whom are volunteers.

An important distinction from the 2005 assessment is that it can take a longer period of time to achieve this number since most of the volunteers are responding from outside the stations and from longer distances. Typically, the Department has fewer personnel available during the time period of 0700-1900 each day. While transitioning to a duty crew staffing concept has improved some aspects of its response profile, there has been a steady decline in responders even though the total number of responders has increased (Figure 12).

When fewer firefighters are available, smaller fires are more difficult to extinguish and the chance of firefighter injuries increases. While these realities still affect the Department’s ability to manage an incident safely, implementing the proposed response and staffing plan outlined in this document could significantly improve the Department response profile and baseline capabilities of the District.

See Appendix D for LFPD compliance to NFPA 1710.

**Existing Standards of Response Coverage**

The LFD currently provides services from two stations utilizing a rather traditional approach to providing emergency service with a predominantly volunteer combination staff. Typically, firefighters respond from one of two stations depending on where they
reside in the District. The District allows volunteers to either make a percentage of the total calls per month or shift at Station #2 an average of once per week. Volunteers do not respond to the scene unless specifically approved by a chief officer.

**Figure 12 - Firefighters per Call Compared to Firefighters on the Department**

![Graph showing comparison between firefighters per call and firefighters on the department over time.](image)

**Demand and Capacity Issues**

Every fire department has some acceptable level of delay resulting from simultaneous calls. To avoid all delays associated with simultaneous calls is cost-prohibitive. However at some point, simultaneous calls push the department beyond its capability and drain the system to a point where service delivery becomes inadequate. That said, the Louisville Fire Department is experiencing an average of 6.1% of its calls as simultaneous (calls within 20 minutes of a previous call, 2010 Data).

Before 2005, the Department didn’t have a documented or published standard for response times or expected performance. In mid-2004 the Department's command staff recognized this deficiency and significantly reduced the turnout time interval by increased training and implementing volunteer staffing during the day at Station #2. Figure 13 shows the average response times by month for 2004-2010, as well as the 90th percentile for responses.

**Longer Travel Distances Increase Response Time**

Fire and emergency service delivery systems are typically geographically based. Living close to a fire station usually correlates to prompt service. However, as the distance from the fire station increases, or as access to an area becomes restricted, response times typically extend. This factor is also compounded in this department due to the current staffing profile.
For example, Station #1 is normally closed from 0700-1600 each workday, requiring Station #2 to handle all fire suppression calls in the District. Additionally, Station #2 has a very limited career staff of one fire medic. While the current rationale for staffing LFD fire stations is logical and certainly cost-effective, it generally causes extended response times or gaps in service when no volunteers respond or on duty.

**Figure 13 - Average Response Times**

To help remedy this, the Management Team will move one of its ambulance crews to Station #1 in the near future which should have a positive impact on response times. The LFPD has done a remarkable job of improving its recruitment of new volunteer firefighters (Figure 12) for staffing the weekday and weekend day shifts. Since the 2005 Comprehensive Plan, both response times and the overall in-station baseline staffing capability has improved, however the Department’s new challenge is to overcome the effects of fewer and fewer off-duty firefighters responding to calls.

**Time of Day/Day of Week Affect Response Times**

The Louisville Fire Department responds to significantly more calls between the hours of 0700-1900 than between 1900-0700. This statistic is particularly important due to the current daytime staffing availability. Currently, the Department averages 7.6 personnel per call during the daytime, down from 9.8 in 2005. Conversely, the Department averages 8.1 firefighters during nighttime shifts and on weekends, down from 10.6 in 2005. As indicated above, the Department has seen a significant reduction in the
average number of firefighters per call and this is of particular concern to the Department’s Management Team.

On average, there has been a reduction of 5 firefighters per call over the past 6 years, in spite of an increase of over 40 firefighters from 2004. Again, this is particularly important when 66% (2010 Data) of the Department’s calls for service are during the 0700-1900 work period.

Response Time Goals

The LFD Management Team has adopted a response time standard that reflects a new emphasis on total customer satisfaction and concentrates on initial response intervention. While the standard is considered aggressive for a predominately volunteer/combination department, it represents a focused effort to improve the District’s overall response policy.

That said, the LFD has established a goal of providing fire services within eight minutes for 90% of all calls. This is based upon Policy Goal #1 established in the 2005 Comprehensive Plan. In general, the policy states that the Department’s performance should improve to adequately protect the District’s current risk and growth.

While the District has made significant progress in reducing turnout and response times, there remains a significant challenge to meet the established goal. Moreover, the District has established a “stretch goal” to respond to Basic and Advanced Life Support calls within 7 minutes 90% of the time with a “baseline goal” of 8 minutes on all rescue calls.

Since implementing a transport EMS program, the Department has not met its established response time standard of 8 minutes (current response performance is 8:25). Medical studies have linked survivability in cardiac arrest to having CPR administered within 4-6 minutes, however, it’s not considered realistic or financially feasible for most fire departments to be on scene in this time frame. The District continues to strive to meet its established response time goals and is confident that the baseline goal will be met now that Station #1 is staffed with an ALS medic unit.

Measuring Response Time Performance

There are essentially two ways to measure response time performance:

Average Performance Measurement – All response times are added together and averaged. If the average is less than the performance goal, it is considered satisfactory. Using this method, up to half the total number of calls could take longer than 6 minutes and can create a credibility gap for services.
Percentile Performance Measurement - Using this method, the response times are stacked in ascending order. Then the total number of calls generating a response within 8 minutes is calculated as a percentage of the total number of calls. When using this method, only 10% of the total number of calls should take longer than the number of minutes stated in the performance goal. According to the American Heart Association and the NFPA, a 90th percentile or 90% standard is now considered the industry standard.

The Department has traditionally measured response time utilizing averages of all times, not including alarm processing time. However, the Planning Team recommended that percentile average was more in line with what the community expects from its emergency services provider. Measuring the outcome expectations will be further discussed in detail later in this document.

EMS Capabilities

A Historical Summary of EMS

Emergency medical services (EMS) has been an evolving system both in the Louisville Fire Protection District and Boulder County for the past 30 years. Fire departments and EMS share a tradition steeped in paramilitary traditions. Many concepts used on the battlefield such as rapid medical evaluation and treatment have proved effective when designing a comprehensive community system for the delivery of EMS.

Communities recognized quickly that fire departments were the obvious choice for providing EMS because fire stations were already strategically located and they had emergency communication capabilities and personnel trained to function during times of crisis. During this evolitional process, citizens of the LFPD received EMS services for over 25 years directly from the LFPD. However, as the call load increased and the availability of ALS volunteers diminished, the District implemented a tiered medical approach. In 1990, the District and Avista Hospital conducted a joint venture for providing part-time paramedics in Louisville. Funding for this program was by way of a subsidy underwritten by Avista Hospital. While the concept was sound, the program was operational for only one year. The primary reason that the program failed was due in part by lack of program direction, supervision, and elimination of funding from Avista Hospital.

The District then contracted paramedic services from A-1 Ambulance Service. A-1 was the primary provider of ALS in Boulder County for several years and was the logical choice to provide paramedic level service to the District. This relationship was short-
lived as A-1 was acquired by American Medical Response (AMR) and assumed all of A-1’s contractual obligations. AMR provided services to the District for nearly four years, until the company’s commitment to smaller markets like Louisville diminished and the corporation was incurring substantial financial losses company-wide.

In 1999, the District contracted with Boulder County Paramedics (BCP), a local non-profit startup ambulance company. The District enjoyed a great working relationship for several years with BCP. Because BCP only served the communities of Louisville and Lafayette, the District had quicker response times and increased availability of ambulances.

While the service level during this time was considered satisfactory, it became apparent that BCP would not be able to continue servicing the District without a substantial subsidy. The District did provide several cost avoidance proposals, however it was not in line with BCP’s corporate strategy. The contract was allowed to expire and the District implemented the provisions outlined in the Boulder County contract with Pridemark Paramedic Services, LLC.

On November 1, 2004, Pridemark assumed the ALS functional responsibility for Louisville Fire Protection District. After transitioning to Pridemark, it remained a tiered system in that the Louisville Fire Department provided Basic Life Support (BLS) with trained firefighters at the Emergency Medical Technician (EMT) level. The tiered EMS concept is designed to have BLS crews stabilize the patient until definitive advanced care arrives.

What’s vitally important to the tiered concept is that both BLS and ALS be provided with definable performance standards and, most importantly, that it meets customer expectations and industry standards. More specifically, it is the District’s long-standing goal of meeting the well-established “Chain of Survival” as described by the American Heart Association. The AHA indicated that the chances of survival are improved when the following sequences of events occur rapidly: early access to pre-hospital care system (911), early CPR, and early Advanced Cardiac Life Support (ACLS) provided by paramedics.

If any link in the chain is weak or missing, the chance of survival is diminished and there will be a predictably poor performance result. Multiple studies over the years now confirm that ACLS should be provided within 4-6 minutes. Because EMS continues to be the largest call for service component in the District, this program area will be a major focus of the planning teams.

The tiered system seemed to work well within the LFPD and was considered a cost-effective way to deliver EMS to District residents; however, the ambulance contractor didn’t believe that Louisville was a good fit in their system. In 2007, the LFPD chose to bring the EMS delivery system back into the Fire Department in an effort to ensure a
standardized level of service was maintained. This program change has proven to be beneficial for the customer, the community, and Fire Department operations.

**2011 Critical Performance Analysis**

While the District maintained contracted ACLS capability since 1990, it was plagued with inconsistency and high turnover of EMS providers. There were several compounding factors that affected the overall quality of this program; however, the provider did meet the contractual expectations outlined in the county performance contract.

Unfortunately, due to events beyond the District’s control, residents were negatively impacted by changing ALS providers, wide fluctuations in response times and reduced performance during each transition to a new provider. Since assuming responsibility for ALS transport, residents have seen a marked improvement with response times and overall quality of care. The District took a rather conservative approach to its staffing model and designed a very cost-effective model where it staffed 1½ ambulance with a total of 9 FTEs. Management evaluated its historical call load and pattern of calls against its current reserve personnel staffing to determine the initial staffing needs. Each of the 3 shifts was assigned 3 personnel who were all crossed-trained in fire suppression and Haz-Mat mitigation. This initial “concept of operation” proved to meet the expected call load and there were few incidents where reserve personnel couldn’t help staff (drive) the second ambulance.

As expected in any new system startup, there were a number of procedural and operational changes that were necessary. However, as a whole, there were no system failures or departmental issues that were not managed in a timely and professional manner. This can be attributed to the quality and character of the organization and a commitment to customer service and teamwork by all of the Department’s stakeholders (Fire Board, Staff, Volunteers, Career Staff, and Management Team).

During the past three full years of operation, the Department’s staffing patterns have changed and the number of available resources has been reduced (i.e., average number of firefighters per call). Moreover, as the collateral work scope expands for the career staff, they are typically not sitting at Station #2 waiting for a call.

This has caused unexpected consequences where there may not be enough resources available to quickly staff the second ambulance. Compounding these factors is the lack of predictable, qualified EMTs to ensure a baseline EMS response capability of two ambulances 24/7. Fire station locations and capabilities to accommodate 24/7 operations has also affected the overall performance of EMS delivery. The District has
taken a proactive position as recommended in the last Comprehensive Plan and remodeled Station #1 to accommodate 24/7 operations. This action will help reduce response times in District #1 and provide the necessary facilities to accommodate a staffed second ambulance and will help improve the District’s overall response capability.

Because the standards for performance have changed over the last several years for both public and private EMS providers, the District continues to take appropriate measures to reduce response times and to provide quality care for its residents and visitors.

**Fire Suppression Capabilities**

The Louisville Fire Department’s strategy in responding to structure fires is simple – get there fast and extinguish the fire while it’s small. It’s important for the public to know that when firefighters arrive before flashover, they find a fire that requires little water or extinguishment effort. However once flashover occurs, ordinary fire suppression techniques have little impact on life and property loss in the vicinity of the fire.

After flashover, the smoke and heat generated reduce the chances of safe evacuation in the remainder of the building. This also presents a much greater danger to the firefighters. Unless the building is equipped with sprinklers, firefighters must take hose lines inside to extinguish the fire. The LFD utilizes an aggressive attack strategy to push the heat, smoke and steam away from potential survivors; and if this is not possible, defensive operations are deployed to contain the fire from spreading to other structures.

What’s important to note is that the success of fire suppression operations is dependent on early intervention by response crews. Currently, the Department delivers one engine company on the initial alarm most of the time. This initial response typically puts 3-6 firefighters at the fire; however, quick response times are dependent on the location of the fire in relationship to the fire station and availability of firefighters.

The Planning Team conducted a review of the current staffing and deployment of Department resources and compared it to the last Comprehensive Plan findings and recommendations. The team also reviewed the critical task requirements outlined in national standards and the Department’s current capabilities.

The current response profile places approximately 5-8 personnel on the scene of a typical first response assignment including career EMS personnel. This includes the Fire Chief and Deputy Chief (when available). Based on the two-in/two-out OSHA
provisions and the methods used to establish a water supply and initial attack, the Department can realistically provide approximately 200-240 gpm in the first 8-10 minutes of attack. This correlates to the water necessary to extinguish a fire in a single-family dwelling or small commercial or industrial occupancy. (This task analysis is based on having a crew of 5 personnel on duty at either Station #1 or Station #2 at all times).

Fires that exceed this fire flow or have a longer response time by the Fire Department will require additional resources. On the positive side, because the Department is staffed predominantly with volunteers, the incident can expect a significantly larger number of resources on protracted incidents or multiple alarms. This is particularly evident during evenings and weekends when more volunteers are typically available. *(Note: The OSHA “Two-in/Two-out” requirement is designed to ensure there are adequate resources outside the structure to effect a rescue of the interior crews. While this has been a recommended practice in the past, it is now a legal requirement.)*

While the current initial capability is considered relatively low, it has become increasingly more challenging to meet these minimum expectations based on current staffing patterns and availability of personnel. It’s important to note that this observation is a significant change since the last evaluation period in 2005 and will require a change in the Department’s staffing methodology if the District is to maintain a baseline fire suppression capability.

The team also looked at the overall fire flow capability of the Department in relationship to the potential demand. An analysis of the three “big box” stores in the District indicates a requirement for a water flow of approximately 8000 gpm. Because the buildings are sprinklered and well-maintained, the code allows for a 50% reduction in fire flow.

That said, the maximum fire flow the Department could expect is 4000 gpm. The Department still maintains a pumping capability of over 5000 gpm and has taken steps to ensure a minimum of 4000 gpm is available even if one pumper goes out of service. Fire apparatus and fire suppression observations will be covered in detail later in this document. In an effort to help reduce the effects of reduced staffing capabilities, the District should consider industry standard alternatives when baseline staffing cannot be met. Mutual aid and automatic aid are appropriate tools, providing the surrounding area agencies are willing to help.

**Transition Fires**

Transition fires in the LFPD are particularly challenging. Because fire continues to grow in size and intensity until it is overwhelmed by water, second and third engine company response times are critical in determining whether a fire can be successfully extinguished in its early stages. If the first engine company is unable to slow the fire’s growth, they will likely be caught in a transition fire. A transition fire occurs following flashover and leads to the fire becoming larger than the first company’s extinguishing potential.
Transition fires also present additional dangers to firefighters. The firefighters can become exhausted and more susceptible to injury. The building may collapse, leading to entrapment. Because of the potential for collapse, firefighter’s efforts may switch to defensive exterior attack.

Transition fires also tend to spread to exposures requiring additional resources. They are not a unique challenge to the LFPD; however, this department is more likely to face the effects of these fires more often. Without a predictable and reliable initial baseline suppression capability, defensive fires with higher property loss will become more prevalent.

**Pre-Fire Management**

The LSFPD has worked diligently to enhance its pre-fire programs through strict code compliance, installation of sprinklers, and a rigorous life safety program. The Department has also taken another proactive measure to enhance the minimum requirements outlined in the code. While this strategy has worked well for industrial and commercial occupancies, it does little to manage the high probability events in Louisville residential and multi-family occupancies.

**Hazardous Materials Capability**

Because significant portions of Louisville and Boulder County’s economies are associated with advanced technology, research, and chemical manufacturing, large quantities of hazardous materials (Haz-Mat) are transported through the District and the transportation corridors. Like any other community, these materials, if released, can threaten the lives and health of District residents. Because of this threat the LSFPD takes the appropriate measures to prevent and control Haz-Mat incidents.

The Department responded to 23 Haz-Mat incidents in 2004 and 141 in 2010 (Figure 14) and we anticipate those numbers to increase in the future. Growth in Haz-Mat incidents is consistent throughout the region and nationally.

Unfortunately, with a potential increase in Haz-Mat calls, there is usually a proportionate cost in legally disposing of hazardous waste as a result of illegal dumping. This is particularly the case when the Department has taken responsibility as the Designated Emergency Response Authority (DERA).
Response Capability

Federal law requires that each state develop hazardous material response systems, and in Colorado, the responsibility was delegated to local jurisdictions by statute. The statute requires local governing bodies to appoint a Designated Emergency Response Authority (DERA) for the purpose of responding to Haz-Mat incidents in their jurisdictions. In order to provide the community with the best low-cost options, the LFPD has implemented an interagency agreement with the Boulder County Haz-Mat Team.

The Louisville Fire Department primarily handles initial responses to hazardous material incidents with an initial engine and EMS company assignment. Firefighters are trained to the Haz-Mat Awareness or Operations level; however, they only maintain the most basic diagnostic instrumentation and Type C & D personal protective equipment (PPE). Should a confirmed Haz-Mat incident happen in the Louisville jurisdiction, the Incident Commander will request the Boulder County Haz-Mat Team for consultation and/or mitigation. Depending on the level of the incident the Louisville FD will implement one of the following Boulder County response modes.

- **Mode I** – The incident is within the capabilities of the first responding units, they can handle the containment and arrange for disposal themselves.
• **Mode II** – When the initial engine company cannot handle the incident, they activate the Boulder County Haz-Mat Team. In Mode II, Incident Command remains with the Louisville Fire Department.

• **Mode III** – If the incident is too large, the IC requests a full Haz-Mat team response and joint command is established.

• **Mode IV** – Requires state and/or federal assistance and command of the incident is turned over to the appropriate agencies.

While the Department supports the Boulder County Haz-Mat Team, it presently has no active members on the team. It would be beneficial for the District to have multiple members on the team; however, based on the current volunteer availability and the minimum staffing requirements for career personnel, it is not realistic or practical at this time.

**Hazardous Materials Release Prevention (Enforcement & Education)**

While this component is discussed in some detail in this chapter, it dovetails into the Department’s community fire defense programs. The first effort toward decreasing the number and severity of hazardous materials incidents involves public education. Through these efforts the District can increase the number of options such as household hazardous waste disposal programs, thereby decreasing unnecessary storage and illegal disposal of hazardous substances by citizens.

Another essential aspect of decreasing the number and severity of hazardous materials incidents is the enforcement of local, state, and federal laws concerning storage and transportation of hazardous materials. Currently, these programs are managed by the Life Safety and Fire Prevention Division.

To better manage these materials, it would be beneficial to have the LSFPD directly incorporate Haz-Mat information after each inspection into the proposed preplan database. This action will help firefighters better understand the hazards associated with each occupancy. Currently, Fire Department management is evaluating ways to integrate the inspection software with the preplan software.
Technical and Support Services Programs

Training

Today’s firefighters operate in complex, dangerous and dynamic environments. Firefighter training is the single most important factor in determining if the firefighters are prepared to meet the challenges of the environments in which they work. Proper training can mean the difference between success and failure during an emergency operation. The need for firefighter and officer training in Louisville is substantial. Firefighter safety and survival is the first and foremost reason for enhancing training in the Department. As the community ages and grows, firefighters are faced with new challenges and hazards, changing construction techniques, and new manufacturing processes requiring specialized knowledge in order for them to respond safely to emergency incidents.

The demand for increased efficiency also drives the need for enhanced training. As service demands increase, the Department attempts to do more with limited resources by looking at new technologies and procedures to make operations more effective.

Increased training requirements are also driven by the “Paradox of Firefighter Training”. The paradox is, as the fire department does a better job in preventing fires and other emergencies, the less proficient firefighters become, therefore basic skills must be practiced and refreshed. The LFPD is further challenged with the lack of in-district training facilities.

Current Training Program Delivery

The Department’s current training program is developed and delivered through a combination of in-house and external training. As part of the planning process, the Department re-examined its training needs and delivery system, which included the Fire Chief’s analysis of current capabilities. As outlined in the Department’s command structure, training is assigned to the Training Division. Each year the Training Division develops a training calendar, with approval of the training officer, to support the minimum training requirements, coordinate training activities, and facilitate the training curriculum.

Since the 2005 Comprehensive Plan evaluation, the training program has changed from a program primarily centered on meeting a specific hour requirement to a more performance-based training system. While each member must still successfully complete 48 hours each year, much of the annual training requirements now concentrate on performance and not just time in class.
Training is categorized into four training program areas (Table 9). Additionally, each member must also complete an approved Louisville Fire Department initial Firefighter 1 Academy, obtain a State of Colorado Emergency Medical Technician certification, and State of Colorado Firefighter 1 with Hazardous Materials Operations certification. It should be noted that all of the fire service certifications are IFSAC accredited. All of these certifications require both a written and practical examination.

In addition to these core training requirements, any member who drives a fire pumping apparatus must complete the State of Colorado “Driver/Operator” program. This program requires an estimated 100 hours to complete, with a written and practical factors component. The Training Division has started to transition all Driver/Operator Pumpers to an IFSAC approved certification, however, it has been slow to implement.

In 2005, the Department took a big step in firefighter development by conducting an Officer Development Academy. The training was required for anyone that will assume the OIC or officer status during a call. This program requires 64 hours to complete with a field component and is based on the National Fire Academy’s Officer Certification program. Unfortunately, the Department has not been able to maintain this program, which has affected the development of future and current leaders. It was attributed to too many training requirements and not enough instructors to maintain the multiple requirements. The Training Division has, however, developed a new “Officer Qualification Package”. The intent of this program was to provide a self-paced open enrollment program in an attempt to attract more candidates. To date, there have been no candidates enrolled. Improvement in the Department’s Officer Development Program and transitioning to an IFSAC approved Driver/Operator program are recommended.

Table 9 - Training Requirements

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<tr>
<th>Training Category</th>
<th>Hours Required per Year</th>
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<td>EMS</td>
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<td>Hazardous Materials</td>
<td>6</td>
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<tr>
<td>Fire</td>
<td>36</td>
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<tr>
<td>Driver/Operator</td>
<td>4</td>
</tr>
<tr>
<td>Officer Development</td>
<td>4</td>
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With an aggressive individual training program, the internal analysis indicated that the improvements made since the last evaluation has improved the quality of the training programs. The Training Division has implemented a multi-faceted approach to training in an attempt to reach as many firefighters and officers as practical. This includes, but is
not limited to: company-based day shift training, performance-based training, and student-centered and realistic training. With all of its improvements there is still room for refinement and further diversified training. The Planning Team recommends that a more active drill-based training program be added to the Department’s overall training program plan. This will allow members to exercise their skills and test the effectiveness of ongoing training.

- **Company-based** - Company training is usually centered on how to function as a team and what role and responsibilities each player has. These include fire ground functions integrating efforts from single engine companies to combined companies to achieve rescue and fire control. The key to company operations is a standard set of procedures that create teamwork.

- **Performance-based** - This is a practical approach to basic skills proficiency. Proficiency testing and certifications on standard skills are critical components of the performance-based program. Testing helps identify areas of further need. Good testing lends credibility to certification and allows the firefighter to demonstrate proficiency. The Planning Team believes that performance-based training is a critical component to the Department’s overall performance. This training approach will soon be required by the Colorado State Division of Fire Safety to maintain certifications.

- **Student-centered** - Most training professionals believe that a good training program is student-centered. It concentrates on developing teaching methods and a curriculum that is at their experience and ability level. This type of training also develops firefighters in meeting new challenges and developing new skills. It also provides synergistic training opportunities.

**Training Center Challenges**

The Department currently utilizes the Boulder Regional Fire Training Centers, located in the north end of the city of Boulder and in Longmont, as a small component of its training program. This is primarily due to the location of the training centers and the time it takes to relocate personnel. While the centers have proven to be a valuable training asset, it is still impractical to use them on a more frequent basis.

Boulder County residents approved funding to support construction of two training sites throughout the county to allow for better training opportunities for county firefighters. The concept was sound and supported by the District; however, the final site locations are still less than desirable for the Louisville Fire Department. Crews are required to travel 12 to 15 miles, which will continue to cause extensive out of service periods.
Most importantly, it degrades the baseline response capabilities of the District when they are used.

The LFPD has a very aggressive training program which relies heavily on the use of private, commercial, and industrial buildings as their training props. City surface streets are also used to conduct routine driver and engineer continuing education. This practice has become somewhat problematic for obvious reasons. Many property owners are reluctant to allow personnel to use their buildings due to liability and potential damage to their buildings. Moreover, using streets and parking lots with heavy apparatus has caused unnecessary damage.

These observations are not new and have been recognized by District policymakers and Management for several years. The Planning Team recognizes the financial challenge many smaller suburban departments have experienced in financing their own training structure and drill ground. However, the current practice of depleting most of the District’s available resources to utilize a training building is problematic. Department Administration and the Board of Directors should consider reprioritizing construction of an in-district facility and seek an alternative funding source, if necessary.

**Community Fire Defense Programs**

**Fire Codes**

Comprehensive community fire defense programs are provided through a systematic combination of fire prevention, fire suppression, and public education programs. Fire codes are a critical component of the LFPD community fire defense programs. Specifically, codes help prevent fires from starting and minimize the size and impacts of fire that cannot be prevented. They also protect the occupants of a building and the firefighters who assist them during an incident.

While codes are considered our first line of defense, they do not eliminate the risk. The design, construction and contents, as well as the use of the occupancy, have a fire safety consequence. Thus, the design and construction of a building can both contain or accelerate the fire. For example, placement of walls and exits affect the ability of people to exit the facility, while the contents can either slow or accelerate the flame spread. It’s not uncommon for a hazardous process in a manufacturing facility to increase the probability of a fire starting, or a small fire in a crowded theater can have a devastating impact on the occupants. Relative to other cities of similar size, LFPD fire codes are considered to meet industry standards. The current codes have minimized fire risk in some commercial, multi-family and industrial structures. With the use of comprehensive code application the District has realized good, but not exceptional, control over most predictable fire scenarios.

For example, the Fire Chief has taken some aggressive measures in an attempt to set a more stringent sprinkler standard than what is minimally required under the code. He
proposed that all occupancies except in “U” (Storage) be sprinklered at 5,000 sq. ft. and the 2009 ICC Code be adopted. While the LFPD provided the necessary analysis and justification to support this initiative, it was met with some resistance from building officials and City policymakers. Having said that, the District was able to implement a sprinkler requirement for Group A-1, A-3, A-4, B, and E occupancies at or above 5,000 sq.ft. The LFPD considers this a great first step in achieving a goal of “Best in Class” community protection policy. Additionally, residential structures outside the city limits that exceed 3,600 square feet require sprinklers.

While the District has placed a high priority on its code compliance and fire prevention program, it must be emphasized that it has limited statutory authority with a “Home Rule” city. The Planning Team continues to recommend that the District seek other opportunities to improve its community fire defense programs, including a more aggressive public education component.

**Economic Advantages of Fire Codes**

The LFPD continues to strongly believe that fire codes decrease both direct and indirect operating costs by reducing the occurrence of fire. With a strong code program the Department has been able to remain a predominantly volunteer response force. Additionally, codes which minimize the impacts of fire also allow resources to be assigned to other community critical programs including delivery of emergency medical services, public education, training, maintenance, and preplanning activities.

Currently the Department has realized an average of $75,000 annual loss against an assessed value of $405,000,000. *NOTE: While the District has enjoyed a significantly reduced annual fire loss, it is not an accurate indicator for projecting future fire loss. This data is provided for illustrative proposes only. Annual fire loss statistics are significantly influenced by residential occupancy fires where fire codes and annual inspections are not typically applicable to residential properties.)*

**Public Education Programs**

It’s certainly not practical to believe that fires and medical emergencies can be eliminated, but it has been proven in several proactive agencies that we can reduce the number of incidents and severity of fire and medical emergencies. The Department strongly believes that by educating the public we can avoid emergencies and improve the odds of citizens’ reacting appropriately during an emergency.

Department programs have been traditionally directed towards fire prevention and taking every opportunity to market the Department’s mission and values. The Department is also active in conducting fire prevention activities during Fire Prevention Week and providing other life safety and public awareness activities throughout the year, including Citizen CPR classes to enhance the community’s awareness and survivability from cardiac arrest.
While these programs continue to have a positive impact on its defense programs, the Department has been slow to implement its goal of providing public education to include an “All-Risk Public Education Program”. Program implementation currently resides with the LS&FPD and the Tactical Operations Division normally deliver the field programs. While the basic program elements are being met and managed better than in 2005, it is not considered a mainstream Department program. Again, while recent organizational changes have helped improve oversight and programs are delivered on schedule, the program still has limited resources to adequately manage it.

The Planning Team recognizes that although the Department has limited financial resources, it has done a satisfactory job of improving the quality of its public education program. It is not likely that this program will have a significant impact in the community if the necessary resources and funding are not a priority. The Department does have a detailed SOG that outlines its current programs and how they are to be managed using existing personnel.

**Current Program Shortfalls**

Compared to other small suburban fire departments of Louisville’s size, public education is considered a higher priority. Unfortunately, program implementation is entirely dependent on key operations personnel for coordination and content development.

Of particular concern to the Planning Team is that the entire program becomes vulnerable when volunteer or career staff members move or are unavailable. Therefore, while this program is considered a critical component of the Department’s fire defense programs, it cannot be supported on a consistent or reliable basis.

Further, the Department would like to expand its current programs to include several new all-risk public education topics including, but not limited to: Appropriate Use of 911, Accident Prevention, Haz-Mat Awareness, Neighborhood Safety programs, Juvenile Firesetter programs, Formalized Elementary School programs, Disaster Preparedness, and Citizen Academies. Most importantly, the Department has a goal to be proactive in the delivery of its programs and market them directly to the community. As stated above, realization of this goal is limited by the lack of a dedicated resource.

**Disaster Preparedness**

Generally, emergencies within the LFPD are considered routine and there is typically no community-wide impact or need for extraordinary resources to bring the condition back to normal. It is the scale of an emergency that defines a disaster.
By definition, when the scope of an incident exceeds the Department’s resources, it becomes a disaster. There are three types of general disasters that the District can be faced with: natural, technological and civil. Natural disasters include, but are not limited to: wildland fires, floods and tornadoes. Technological disasters include chemical & biological releases, fire and radioactivity material incidents. Civil disasters include civil unrest, terrorist attacks, and incidents where no unrest is present but conditions lead to large numbers of people being injured.

In the city of Louisville, the police chief is responsible for coordination of the City Disaster Management Plan, along with the District Management Team. For areas outside of the city and within District boundaries, the Boulder County Sheriff’s Department has program responsibility and is in charge of the Office of Emergency Management (OEM). Under the joint funding structure, funds from all levels of government are funneled through the Boulder County OEM unless the Federal Emergency Management Agency (FEMA) provides them directly. State statutes require each county to maintain an Emergency Management and Preparedness Office and only the county OEM can ask for disaster assistance from the federal government.

While disasters in the District are considered a very low probability, they do have a high potential for catastrophic losses. Because the risk at any given time is relatively low, agencies like the LFD cannot realistically staff to meet the expected resource requirements. It can take days, even weeks, to amass the resources necessary to combat and recover from such an event. It's not uncommon or unrealistic, to take several days just to deliver basic assistance to the most severely injured. Based on these facts, it would be wise to have a plan to assist the LFD for up to 48-72 hours.

Planning

Because disasters are not routine, and come in different types and sizes, an effective all-risk plan of action is important to maintain. The LFPD prepares and maintains an emergency plan and the Fire Department will have an active role in both the deployment and maintenance of the plan. Due to the relative infrequency of disasters, it is difficult to remain proficient. It requires coordination of several agencies. Therefore, it’s essential that the Department takes every opportunity to develop a working knowledge of both the District and county system and capabilities before the disaster strikes. The Department must also participate in all city and county run disaster drills. The LFPD has, however, done a good job of developing an SOG to identify the function and assignments necessary to help manage a larger scale incident. All staff members including Administration, Operations, Prevention and Fleet have pre-assigned assignments.
Administration

Currently the Department has 2.5 personnel assigned to functions associated with organizational management. The Fire Chief has overall operational responsibility and is accountable for Department policy and overall direction of the Department. The Business Administrator is responsible for management of the Department’s HR functions, payroll, budgeting, and accounting. The Receptionist currently directs phone calls to appropriate team members and assists with clerical and support functions.

The Administration Division functions well, however there are opportunities to realign some daily functions to support the organization’s business requirements. The current receptionist position will transition to more of an administrative assistant to the Fire Chief in support of procedure development, records management, and coordination of Department performance activities. This transition will be implemented as funds become available, with a graded approach. The Planning Team believes that based on the current and projected work load analysis, the Division is currently staffed at an acceptable level.

Staffing and Fire Station Analysis

Staffing

As outlined in Section IV of this Plan, the Louisville Fire Protection District provides its Tactical Operations programs by a predominantly volunteer force that is supplemented by a small group of career firefighter-paramedics. This is a significant change since the last assessment and has proven to be very cost-effective.

The Department has enjoyed a long and proud tradition of providing quality emergency services and it maintains the highest standard of training and performance of any suburban fire department in the Denver metro area. This philosophy has not changed since becoming a combination department, in fact, the District can now demonstrate that it can provide a response for every call for service.

The staffing analysis chapter is designed to evaluate the current LFPD staffing model against national response time criteria and the probability of meeting generally accepted performance standards on a consistent basis. We also evaluated changes since the 2005 evaluation and outlined what improvements should be made, highlighting any new vulnerability.
The Louisville Volunteer/Reserve Program

Experience Levels

By all accounts, the volunteer/reserve staff is among the most professional and dedicated the fire service has to offer. In many respects they are the backbone of the emergency services program. However, the Department is still significantly challenged to meet its staffing requirements despite the dedication and sacrifice of its members and staff. As outlined in the last Comprehensive Plan, there continues to be a considerable amount of personnel turnover. There are several reasons that contribute to this, however, it is primarily due to family & time commitments, job issues, loss of interest, and members being hired by career fire departments. Again, Department Management and policymakers understands the challenges of maintaining a predominantly volunteer force and have made a significant investment in time and resources to train, recruit and retain its volunteer programs.

The constant turnover of volunteers/reserves requires not only an aggressive recruitment program but the necessary infrastructure to maintain a reliable and consistent staffing model. Although the Department has been very successful, it has resulted in a large number of relatively inexperienced firefighters. The Department spends a disproportionate amount of its time with basic or entry level training and it has limited time to dedicate to multi-company training, officer training or advanced strategies & tactics.

Even though the average experience level in the Louisville Fire Department is 3.7 years (2011 Data), the vast majority of firefighters (73%) have less than 5 years total experience (Figure 15). This situation is even more apparent when comparing 2011 data with that from 2004.

Recent efforts at recruitment have been successful but we do not know if similar gains will be shown in retention. In spite of the challenges listed above, the Department continues make improvements in its Tactical Operations programs.
The Louisville Fire Department is fortunate to have a very talented volunteer/reserve staff that currently provides an effective and economic service to the community. The current system has several advantages including, but not limited to: reduced operating costs realized by not paying salaries; a stronger sense of community because the members are protecting their families and neighbors; and, many times the Department can assemble a larger firefighter force than many comparably sized career departments. While this statement is still true, the Department has experienced a decrease in the amount of in-district volunteers in the past 5 years.

On average, in 2005 there were 10 firefighters responding to their respective station on each emergency call compared to 4.6 firefighters in 2010 (Figure 16). This breaks down to an average of 3.5 firefighters on the first vehicle out of the station and 1.1 firefighters on standby or who respond with a second apparatus.

The response varies with the type of call and the time of day. For example, if the call was received as a structure fire, the Department averaged 15.6 firefighters responding to the station in 2004; in 2010 this number was 14.3, of which 10.0 were volunteer firefighters.

The District has done a good job of transitioning to an in-station staffing model (duty crew program) in an effort to minimize the impacts of a reduced number of personnel responding to pager call-outs. Overall, the number of on-duty personnel has improved,
but there continues to be no real baseline staffing (minimum staffing) established for the Department.

**Figure 16 - Average Number of Volunteer Firefighters per Call**

As observed during the last Comprehensive Plan assessment, the pager call-out system has also proven to be a challenge for the Department when predicting availability of members. While this system provides members with the opportunity to respond to as many calls as they would like, there is no practical way for Management to predict resource availability or what skills mix will be responding.

The pager call-out system has been in existence for several decades in the American fire service. However, it has become a less than desirable resource management system as the District has grown in population and demand for service.

Additionally, and perhaps more importantly, the personal demands on the volunteer/reserve staff have changed significantly over the past several years. Members are typically traveling farther to work, working longer hours, and have much less time available to respond to calls on an as-needed basis.

Given the current labor market, it is becoming increasingly more difficult to find people with schedules flexible enough to support weekday responses between 0700-1600.
Typically, the majority of emergency calls are Monday through Friday (Figure 17, 88%, 2010 Data), between 0800-1700 (Figure 18, 46%, 2010 Data).

**Figure 17 - Percentage of Calls per Day of the Week**

![Figure 17](image1.png)

**Figure 18 - Call Distribution by Hour (2010 Data)**

![Figure 18](image2.png)
Duty Crew Program

Like most of the remaining suburban volunteer departments in Colorado, the Louisville Fire Department has fully implemented the “duty crew” concept as a new method for staffing and managing its skills mix. Note: this is a significant accomplishment and a model for other departments to follow. The Management Team credits its members, Operations Focus Group (OFG) and officers for the success of this program.

The basic strategy of the program is to have a minimum crew on duty (at the station) to respond to calls with the remaining members on call and to respond (if available) to augment the minimum response force. This program has proven to be a significant improvement to the Department response profile and continues to have an added benefit of allowing volunteers to schedule their time, as opposed to responding when available. While this program has improved response times over the past 5 years, the Department continues to struggle filling every duty crew position with a minimum of four qualified responders.

As with the pager call-out system, the duty crew program is vulnerable to two primary system failures. First, is staffing limitations. The current system does not guarantee that resources will sign up; and second, the length of the duty crew shift has been modified to accommodate the members’ time availability.

Based on feedback from available daytime volunteer/reserve firefighters, it has been difficult to expand the shift work period to 10 hours even though it’s for a justifiable reason. The District still has many periods from 4 p.m. to 7 p.m. where it must rely entirely upon the pager call-out system and call back of off-duty chief officers. Of particular importance, run data shows that approximately 33% of Department calls occur from 1 p.m. to 7 p.m. (2010 Data).

Secondly, is the skills mix. While it is certainly a program goal to have responders available in each station, the Department must also have the necessary training and experience to provide a safe and effective service.

For example, it’s not uncommon to have an alarm with a crew on duty, however the response is delayed due to not having a certified driver/operator. While this is a more infrequent occurrence than in the past due cross-training of the career staff, it is indicative of a program vulnerability.
Implications of Analysis

Before, analyzing the Department's staffing needs, the Planning Team had to answer two basic questions. What are the expected service performance requirements? What level of risk is the community willing to take?

Based on guidance from the District Board, it was determined that the citizens of the District should receive response times and available staffing to meet industry standards for a suburban fire department (see Section VII, Executive Summary #2, Performance Goals & Standards for Cover). They also indicated that the District is committed to doing what is necessary to ensure a consistent quality service level to the community.

The District took a rather innovative and proactive approach to involve the community when answering these questions. They conducted a District-wide Citizen Survey of 6,000 residents to help policymakers better understand customer expectations. This initiative has proven to be a model for other departments to follow and it demonstrates a commitment to keeping the customers involved in the planning process. The staffing analysis identified the following areas of concern:

- Turnout and travel time continue to significantly impact response times
- Volunteer availability continues to impact response times and capabilities
- Most firefighters have limited experience
- Response times are longer when duty crews are not staffed

Understanding these realities, the Planning Team has evaluated alternative staffing models for consideration and has recommended operational changes to improve the existing response profile.

The Current Combination Staffing Model

In general, the combination staffing model concept allows a jurisdiction to maintain a minimum level of staffing on a consistent basis while having the necessary resources for larger incidents and simultaneous calls. From a practical perspective, the LFPD combination model combines the best of what a career and volunteer firefighter has to offer. While that doesn’t suggest that the current staffing needs or requirements are optimal, it does help the District meet the growing demand for services at reduced cost.

There are however, several different types of combination models currently in use throughout the country. One model uses predominantly career firefighters augmented by volunteers. Typically, the volunteers are considered reserve firefighters and receive a minimum hourly wage or stipend to support the career program. The other model
uses career staff to augment the volunteer program, as is the case with the LFPD. In these departments, career personnel are utilized for two primary reasons. First, they ensure a timely and minimal response where volunteer coverage may be lacking or unavailable. Second, career personnel can perform non-emergent functions that take away the volunteers’ time for training and emergency services. There are a few other variations of these models; however, they are based on shared resource models.

As recommended in the 2005 comprehensive planning document, the Department has successfully transitioned to a combination type department. The career staff is assigned primarily to the Operations Division and is responsible for providing ALS transport services. They also serve as firefighters and apparatus engineers when necessary and are considered part of the initial engine company assignment. This combination staffing model has helped to improve the Department’s initial response objectives and ensures that a responder arrives on every call. However, it has not proven to be a permanent solution to the staffing vulnerabilities or the Department’s baseline capabilities.

As mentioned throughout this document, we don’t believe that these vulnerabilities are due to poor program execution, lack of vision, or the lack of dedicated personnel. In fact, the command staff has done a remarkable job of increasing the amount of duty crews filled. The Planning Team believes there are several new factors that impact the current staffing shortages, including but not limited to: less in-district reserves, fewer “pager” responders and the fact that there are career personnel on duty to handle what they consider “routine calls”.

This new reality has had some unintended consequences or gaps in its response model. For example: the Department has experienced less firefighters per call and an increase in the number of “no shows” or no engine responses. In fact, a safety concern was recently issued to the LFPD Occupational Safety and Health Committee about the lack of suppression support for fire alarms and sprinkler activations.

To the extent financially feasible, the Department must rethink its current staffing model and design a system that ensures more coverage or establishes a minimum baseline capability. Without a significant change in its staffing profile, Fire Administration and policymakers will most likely have no other choice than to consider increasing the career staff to ensure that an engine can respond on every call. Regardless of how the LFPD chooses to resolve its current staffing vulnerability, corrective actions should be done in the near term.
Fire Stations

There are typically three approaches to determine fire station locations. One is from a purely political approach, the second is using national standards, and third is using local data and experience. While each of these components impacts the LFPD decision on station locations, we will focus our analysis based national standards, local data and experience.

There are two questions that must be addressed in the Louisville Fire Defense Plan. Are the stations adequately distributed in the community to achieve the response time goals? Are the total amounts of resources available able to be drawn together in a timely fashion so they can concentrate their ability to control a severe emergency?

Theoretically, fire stations should be distributed so that they protect an equal share of area, population and workload. However, that seldom occurs, including Louisville. Generally, fire stations are placed in locations that provide them with a percentage of the coverage that is linked more to the road network. In Louisville’s case it has been primarily based on available land and funding availability. Ultimately, it is a matter of trying to balance out response time, available land and risks, that makes locating fire stations sometimes problematic. Once again, this concept is very technical in some respects. The Planning Team did refer to information from the Commission on Fire Accreditation International that provides the methodology of this concept. Finally, the team evaluated progress against recommendations made in the 2005 Comprehensive Plan and the extent these improvements have made, if any.

In the past 5 years, the LFPD has been very active in evaluating a number of options for placing future fire stations, including those outlined in the 2005 Comprehensive Plan. Probably the most significant of those alternatives was the feasibility of sharing a station with the North Metro Fire Rescue District. In the past 18 months, North Metro built a new station that is on the border of 96th St. & Paradise Dr. The station is so close to the border that they must drive into the LFPD to enter their station. So it stands to reason that it presented a new opportunity and potential solution to the vulnerability identified in the District #3 response area.

Louisville Fire Department Management met with representatives of North Metro and proposed a number of options. They included but were not limited to: jointly sharing a facility; sharing a common response district where we support each other's needs; and, enter into an automatic aid agreement in which North Metro would be automatically dispatched to some of the Louisville District #3 response area.

While the LFD team believes that these proposals would have reduced the cost of building and maintaining a new station, North Metro chose to not support these proposals. Unfortunately, the need for a station in the south Louisville area still exists, therefore, the LFPD Board of Directors has decided to accept the 3-station concept recommended during the last evaluations. Because of the proposed new ConocoPhillips
development scheduled to open in 2014, coupled with the existing high-risk hazards, it is clear that a new station is necessary in District #3.

In addition to the in-house station analysis, the LFPD has taken the unusual step of seeking public comment on fire station locations and response time expectations by conducting a citizen survey. We believe this process is a model, because it helps ensure that the taxpayers’ expectations are in line with District government. (See Appendix F for survey results.)

The team also reviewed the fire station response models currently available for the existing two stations and proposed Fire Station #3. To the extent practical, automatic aid will be part of the evaluation process.

**Current Location of Stations**

The Planning Team evaluated ISO station location requirements during the fire station analysis process. In 2007, ISO rated the Louisville Fire Protection District and individual properties based on travel distance from a fire station. ISO distance thresholds are 1.5 and 2.5 driving miles for engine companies and ladder companies respectively, and 5 driving miles maximum from a fire station to receive any credit for fire protection.

As indicated in Figure 19, the response areas for engine company responses from Station #1 and Station #2 cover the majority of the city of Louisville, although there are some significant exceptions. These include: areas east of W. Dahlia St. on Dillon Road, Avista Hospital, Centennial Peaks Hospital, ConocoPhillips campus, Monarch K-8, Monarch High School, and the Colorado Technology Center.

With longer distances allowed for ladder companies, the response areas cover a much greater area of the District (Figure 20). Following the ISO evaluation, the LFPD was marginally able to maintain its 4 rating for areas within the city of Louisville and 9 rating for District property primarily north of Baseline Rd.

As important as the location of stations is, the normal distribution of emergency calls is equally important. As evident in Figure 21, many of the calls still cluster around Station #1 and Station #2. The calls in the south and southeast areas of the District are highly apparent. These calls occur outside the ISO recommended response areas for engine companies utilizing the current locations for Station #1 and Station #2.
Figure 19 - Engine Response Areas St 1 & St 2
Figure 20 - Aerial Response Areas St 1 and St 2
Station Location Analysis

Utilizing several mapping programs, an analysis of the current station locations along with several proposed stations was undertaken. The basic findings of these studies are consistent with the 2005 review and many of the conclusions remain the same.

- The two Louisville fire stations currently provide a response to the concentrated residential population and the old town hazards within the stated response time goal for volunteer-based operations.

- An additional fire station will be required to provide the desired response time coverage to the industrial and business areas in southeast Louisville within the near term. The timeline for Station #3 is necessitated by a proposed 2.5 million sq. ft. research and training campus on the south side and the addition of 5,000-10,000 employees and visitors.
• The Planning Team believes that it would still be prudent to talk to North Metro Fire Rescue about a joint station venture, despite the obvious barriers. *(Note: the Planning Team understands that the LFPD has very little control over this recommendation and all past efforts have been unproductive to this end.)*

• Over the next 5 to 10 years, the projected increase in call volume and the expected geographic distribution on the south side may require either the relocation of existing resources or necessitate a career engine/EMS company.

**This is the most important decision point in the fire station planning process.** The basic question to be answered is, when and where should new stations be constructed? With the current station locations, there is an approximate 50/50 split for calls between District #1 and District #2 using 2011 data. However, many of the current District #2 calls are located in the area which would be served by a proposed third station. By breaking down the calls into three districts, there would be a major drop in the number of District #2 calls (Figure 22). Average response times to the proposed District 3 are 1 to 1.5 minutes slower than to the rest of the District, with an increase in the response time 90th percentile by 2 to 2.5 minutes (Figure 23).

**Figure 22 - Call Distribution by District (2011 Data)**
Fire Station Locations

Since the original fire station location analysis, the Management Team was able to eliminate a number of the potential site locations due to financial, political or potential zoning issues. Understanding these new realities, the location of Fire Station #3 will most likely be limited to land owned by the District.

NOTE: It’s vitally important to note that while the station analysis provides valuable information for determining station locations, it does not consider volunteer staffing or the location where the volunteers live. Therefore, the analysis is considered a tool for helping determine station locations. Based on future staffing projections, it is not likely the Department will have a staffing profile beyond a 3-person career Engine/EMS Company and a Volunteer Engine Company on a first alarm. Moreover, any additional resources will have to come from “pager call-out” personnel; therefore it’s critically important that a staffing plan must accompany the development of Fire Station #3.

For informational purposes, all of the potential sites in South Louisville were provided to illustrate a risk/benefit of each location. As with the last station analysis, the area in which there is the greatest lack of current coverage and the potential for the greatest amount of growth is in District #3.

Four sites were initially evaluated for placement of Fire Station #3. Figure 24 indicates the increase in coverage with an engine company from a station located at So. 88th & Campus Dr. along with engine companies from Station #1 and Station #2. A second site is just east of So. 88th Street on W. Dillon Road. As outlined in the 2005 station analysis, Xcel has moved from that site and is currently seeking a buyer. This property is very
desirable, however, both county and city governments prefer it to return to agricultural or open space. The response area from a station at this site is indicated in Figure 25. The third proposed site is at So. 96th Street and Dillon Road (just north of North Metro Fire Rescue Station #67). While it is not desirable to build a station in close proximity to Station #67, property has recently become available in this area. Unfortunately, these properties are very expensive and currently are not financially feasible. The response area for a station at this location is shown in Figure 26. The fourth possible site for a third station is in the Colorado Tech Center in the area of S. 104th Street. No specific property has been identified in this area but a possible response area is shown in Figure 27.

Figure 24 – So. 88th St. & Campus Dr.
Figure 25 – So. 88th St. & Dillon Rd.
Figure 26 – So. 96th St. & Dillon Rd.
Figure 27 – So. 104th St.
Summary of Response Coverage

Overall, these maps indicate that the current Via Appia station and Main Street station provide a high coverage percentage in the central areas of the city, however, the LFD still cannot adequately reach the southeast quadrant or District #3 (CTC, Avista Hospital, Monarch schools and the ConocoPhillips areas). This remains a vulnerability for the LFPD and it is expected to be significantly compounded when the ConocoPhillips campus is completed.

The question that needs to be answered in the near term is, when and where should Station #3 be constructed? When a station is needed is based upon the principles already described in this report. However, these principles need to be implemented within the context of a budget and are subject to conditions that may change in the future. The Planning Team and FD Administration concurred that a fire station location should be based upon the following criteria:

- To reach areas with population and property at risk
- To reach areas where there is a workload (call volume) that becomes statistically significant
- The station should provide the most cost-effective distribution
- The station should contribute to the overall concentration of resources (Assessing volunteer resource availability)
- Be readily accessible to traffic pattern and circulation elements

Fire Station Summary

As recommended in the last Comprehensive Plan, policymakers adopted the 3-station model in an effort to meet or exceed NFPA 1710 and ISO response standards. They have recently completed remodeling Fire Station #1 and now have two stations that can accommodate 24/7 operations.

While this is a significant accomplishment, the Planning Team recommends that construction of Fire Station #3 be expedited due to the projected impacts of the new ConocoPhillips campus. Due to the size, complexity and projected increase in the District’s daytime population, it necessitates a fire station in South Louisville in the near term. Most importantly, the South Louisville area continues to be an area with the greatest number of high hazard occupancies.
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V. PROGRAMS & PRACTICES
Review of Programs and Practices

This section reviews the services, activities and responses provided by the Fire Department to the LFPD customers. These are the specific activities designed, organized, and operated in compliance with the Department’s mission, goals and objectives. This chapter does not resemble a management audit. Specific areas for improvement are not discussed in this chapter per se. The findings however were used to develop recommendations for future comprehensive planning considerations.

The intent of this section is to identify the various types of services and activities that are currently being provided by the Department and that may require modification as the District grows and evolves. The Planning Team organized the current services to determine the various levels of adequacy, deficiency and effectiveness. Methods and specific results of programs are not listed in this document; however, future policy and direction will be formed based on this information. Technical terms are defined in the included glossary.

Goal Statement

General Plan, Policy 1, states the following goal statement:

“Public health and safety through (1) the provision of high quality fire and emergency response services that respond to community needs and issues; (2) education programs that raise community awareness about public safety issues; and (3) preventative programs that involve residents in reducing fire hazards and addressing other threats to public health and safety.”

The applicability of all the Fire Department’s listed programs is discussed in the context of the goal statement above, which is reinforced through the Louisville Fire Department’s program activity that has been approved in the budget. This was further clarified by reviewing the Department’s mission, goals, and objectives (see Section IV). The Louisville Fire Department has already committed to these goals in the implementation of programs, activities and discretionary tasks being performed.

This raises two questions in the process of comprehensive planning:

Should these activities and programs be continued at the existing level?

Should they be enhanced where appropriate to deal with future demands upon the Department?

We evaluated these questions through the use of the Fire and Emergency Services Self-Assessment criteria and the “Center for Public Safety Excellence” accreditation process. The results of this review follow. Please note that statements in *italics* are “*standard criteria*” statements used in the LFPD review.
Assessment Criteria and Department Results

General Administration and Management

“The administrative and support services component of the organization should be adequate, effective, and efficient to provide the organization with all appropriate support functions such as research, planning, purchasing, coordination, control, and feedback.”

Currently, the Department has 2.5 persons available to provide for administrative and management activities. The current workload of these positions is reflected in the types of reports generated by the Department such as the status of its compliance with District policies and procedures and its participation in District-wide administrative processes. There are no indications of a backlog in this area, but there are indications that continued growth in program activity would result in increased workload. Examples of this include: (1) expanded recordkeeping including EMS trip reports and additional career staffing; (2) additional compliance with state-mandated activities and quality assurance activities within EMS program, future billing activities, and maintaining training records for additional resources; and, (3) further use of technology, especially in the area of management information systems (needed to keep pace with both an increased workload and documentation to support program activity). The Department should anticipate that the amount of effort devoted to administrative duties will increase slightly at every budget cycle. This is due in part to the demands placed on local government by state and federal mandates.

Examples of this in the past include mandates from FLSA and OSHA involving mandatory training and fire prevention requirements. If these trend lines continue, we anticipate that an additional administrative support person will be required within the next 2 to 5 years. It is important to note that FD management has worked to streamline and automate many of the old work processes. This has resulted in greater efficiency and less redundancy.

However, if the quality assurance and documentation requirements increase as much as it has over the last 10 years, a full-time EMS Coordinator/Supervisor is likely to be required within the next 5 years. This is discussed later in the report, but it is included here because the EMS Coordinator/Officer is often multi-tasked, also performing administrative duties.

Life Safety & Fire Prevention Division

“An adequate, effective and efficient program should be directed toward fire prevention, life safety, and risk reduction of hazards. Enforcement of contemporary fire and building codes is one of the most cost-effective ways of controlling a fire problem. This area
involves installation of equipment for the detection, reporting, and containment & control of fires and other emergencies. The provision of occupant safety, through features such as, exiting and the provisions for first aid and firefighting equipment are all contained in fire and building codes. This process also involves conducting plan checks and inspections to assure compliance with codes, regulations, and ordinances.”

The Louisville Fire Department Life Safety & Fire Prevention Division (LSFPD) consists of 1.0 personnel. This includes a Fire Marshal supplemented with career line personnel. The Division has established goals and objectives that are consistent with the Department's mission statement and overall goals. They currently are:

- LSFPD and engine company personnel shall inspect all businesses at least annually, unless otherwise required by law or directed by the Chief.
- LSFPD will maintain an effective weed abatement program that routinely notifies property owners each year of their responsibility to abate their weeds, enforces compliance, and responds to complaints in a timely manner.
- LSFPD will continue to maintain an effective program of insuring Fire Department access during emergencies to locked facilities utilizing the “Knox Box” key entry system.
- LSFPD will respond to customer requests within 24 hours or less.
- LSFPD will maintain its current standard of initial plan check turnaround time of 10 days or less, 95% of the time.
- LSFPD will, in coordination with the Fire Department’s Training Division, implement an ongoing training program in support of the engine company inspection program.
- LSFPD will coordinate a public education/outreach program with the Fire Department public education unit. The program will target the business community and emphasize a fire-safe business environment predicated on state and local code requirements.
- The LSFPD is responsible for the implementation of the Hazardous Materials/Chemical Control Program. They have established goals and objectives that are aligned with the District and Fire Department's mission.

The workload of the LSFPD has changed significantly since the last assessment. The amount of new construction and tenant finishes has been reduced by nearly two-thirds.
in the past few years, primarily due to the recession. Most of the current workload is driven by the number of occupancies that require inspection and the amount of work created by a few new construction projects.

The current staffing levels are capable of keeping up with the current load, but would be considered marginal if the number of occupancies increase. While the pattern of growth in the District will increase the total number of occupancies, decisions should be made to balance out the distribution of inspections between target and routine hazards. What will continue to be a pressure on Fire Prevention is the newly planned technology and training campus scheduled to be built by 2014. This will have a significant impact on plans review and field reviews for the next 3 years.

That said, the LFPD should consider having a staff augmentation during that period to offset the expected workload and to avoid overstaffing when the project is complete. Based upon the current slowdown in growth, current staffing can adequately handle the workload, however, it should be expected that 2 full-time positions will be needed within the next several years to accommodate the sheer quantity of inspections. The criteria for that decision will be the number of required inspections and the amount of personnel hours available to achieve them.

**Fire Investigation**

“There should be an adequate, effective and efficient program directed toward identification of the origins and causes of fires, explosions and other emergency situations that endanger life or property.”

The LFPD has fire investigation ability at two levels. Fire officers or fire companies are given the responsibility to perform an initial "cause and origin" investigation to determine if the event was a result of a deliberate act or a function of an otherwise accidental ignition. If it is determined that arson or another criminal act has occurred, provisions are made to bring in more technical expertise. Law enforcement personnel and LFD investigators are available to assist on accidental fires and are primary on all suspicious fires.

**Wildland Suppression Approach and Analysis**

Based on the historical responses of the LFD, most of the wildland fires experienced within the response area are limited in size (between 1/4 and 5 acres). This experience has not changed since the last assessment. However, for advanced planning, a fire of approximately 5 acres is used to simulate past and expected future conditions. It should be noted that this is a conservative estimate for fires where the fire department does not receive early notice, such as those occurring at night or in areas protected from sight by vegetation or terrain, based on the success rate at previous fires and the availability of county (mutual aid) resources to initiate the attack organization. Although wildland
mitigation activities are considered a minor program responsibility, the Planning Team felt it necessary to evaluate the impacts of all fire scenarios on the District.

Because wildland fires are very unpredictable, some assumptions must be made regarding the determination of minimum staffing. For this evaluation the assumptions include:

- The allocation of resources will vary with each incident and variances can change the effectiveness of even the smallest subset of a response team.
- The initial attack is limited to one operational period (shift). However, the containment phase and mop-up may extend to multiple periods.
- The incident does not require a written incident action plan or specific procedures.

In addition to the generic factors described in the background section above, there are additional factors affecting wildland fires in the LFPD. The LFPD is responsible for protecting 17 square miles of property with generally low-density ground cover fuels. Most importantly, the fuel types are significantly influenced by an arid climate and minimal annual rainfall. Much of the fuels in the District are considered a significant amount of flashy or light fuels. Utilizing the NWCG “Aid to Determining Fuel Models for Estimating Fire Behavior” the District has four fuel models identified within its boundaries.

Note: Flashy fuels can and do develop into some of the fastest burning fires and are considered as challenging and more dangerous to mitigate than a larger slow moving forest fire. In fact, the NWCG and NFPA have reported that range fires have killed far more firefighters than forest fires. That said, the Planning Team will include the fire behavior of a range fire when determining the baseline wildland resource requirements.

A general expectation is that the Fire Department will engage in offensive fire suppression versus allowing the fire to burn while only protecting structures and known environmental hazards. Relative to suppression of wildland fires, it is generally understood that it is neither practical nor economically feasible to staff or equip the Louisville Fire Department to manage a large-scale wildland incident, however based on the consequence of an un-mitigated initial incident, staffing must be sufficient to meet the challenge. The ultimate success of these suppression efforts is heavily dependent on a rapid response (Blitz Attack) and intervention, trained resources, reliable equipment and mutual aid. This basic strategy has not changed over the past few years and is not expected to change significantly in the foreseeable future. Therefore, the
assumptions that Fire Administration has made to manage wildland incidents is both prudent and logical.

There are a number of documents that contain recommendations for staffing and personnel deployment for wildland fires, including NFPA 295, National Wildfire Coordinating Group documents and lessons learned from past Boulder County wildland fires. Table 10 is considered the minimum initial attack deployment.

**Table 10 - LFD Initial Attack Organization (5-Acre Wildland Fire)**

<table>
<thead>
<tr>
<th>Task Required</th>
<th>Personnel Required to Perform</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incident Command/Aid</td>
<td>2</td>
</tr>
<tr>
<td>Squad/Crew Boss</td>
<td>½</td>
</tr>
<tr>
<td>Support (Equipment, Supplies, Logistics, etc.)</td>
<td>1</td>
</tr>
<tr>
<td>Engine Suppression</td>
<td>6</td>
</tr>
<tr>
<td>Hand Crews (4 Hand Crews)</td>
<td>12</td>
</tr>
<tr>
<td><strong>Total Personnel</strong></td>
<td><strong>21</strong></td>
</tr>
</tbody>
</table>

This baseline staffing is considered by the Planning Team as a best case staffing model, however it is not practical given the volunteer/reserve staffing patterns. Predictions for the next 2 to 5 years of weather patterns by the National Weather Service indicate that the current trend of dry and drought conditions will likely continue, raising the potential for large wildland fires [NWS, 2009]. Although not considered part of the planning assessment, an examination of an extended attack incident should be determined to measure extended capacity.

While the impact of wildland suppression has not changed significantly since the last assessment, the Planning Team does see a missed opportunity to control or minimize the effects of wildland incidents.

The Planning Team believes that a more aggressive “prescribed burning program should be coordinated with the city and county. We believe that it is a valuable mitigation tool for the District.

**Wildland Training and Qualifications**

The LFD currently encourages interested Tactical Operations personnel to meet NFPA 295 and to be trained to Wildland Firefighter Level I or II, as defined by National Wildfire Coordinating Group (NWCG) PMS 310-1 [NWCG, 2000].
Because the Department does not require complete NWCG compliance, the Louisville Fire Department has encouraged members to certify, however continuing education is sporadic. The Planning Team recognizes the relative infrequency of this activity and recommends that annual refresher training be provided. The Team also recommends that the current practice of supporting individual training and certification be expanded to the extent possible. At the very least, a minimum of 50% of the response staff should be Red Card certified. Moreover, as recommended in the 2005 assessment, the Department should consider assigning a resource to help coordinate training activities with the county teams and to help facilitate advance level training.

The Planning Team also recommends that the command staff become part of the County IMT when openings become available.

Wildland/Rural Equipment and Apparatus

The Department does maintain a very minimal amount of wildland PPE equipment and two support apparatus. Two Type 6 and one Type 1 apparatus are available to mitigate District wildland and rural incidents. The LFPD has taken the necessary steps and purchased a second unit capable of wildland firefighting. This action has improved the Department’s operational capabilities and ensures there is always at least one unit in service. While the apparatus have some desirable wildland features it is somewhat limited in its 4x4 capabilities. This was primarily due to the need for the apparatus to be multifunctional. In spite of those minor shortcomings, the Department maintains a minimum level of wildland apparatus capability; however, 2731 should be replaced within the next year.

Fire Suppression

“There should be a fire suppression program, designed to control and/or extinguish fires for the purpose of protecting people from injury, death or property loss.”

The overview of the Department’s suppression functional areas was provided in Section III of this document. Fire suppression is one of the most visible services provided by a fire department, but is not the program that takes up most of the productivity time. In fact, if a department is experiencing a high rate of fires, high fire loss, and severe losses of life & property, the overall system is not functioning correctly. Fire Suppression is a service that is provided to react when everything else has failed to prevent the event from occurring.
LFPD General Plan Policy states a “Standard of Service” goal as follows –

Continue to provide and maintain fire services that are adequate in manpower, equipment, and resources to respond to localized emergencies and calls for service within the District. As with the last assessment, the Department’s current levels of service should be improved to meet current demands and, as the District continues to grow, with an average emergency response time for fire services of less than 6 minutes. However, most importantly, the unit of productive measure shall be a response level of 8 minutes, 90% of the time. This is the industry standard that is recommended for departments with similar needs as Louisville.

The Department’s Tactical Operations Division has established goals and objectives consistent with the Comprehensive Plan, national standards and the Department’s mission. These goals consist of the following statements:

- Ensure there is an adequate, effective and efficient fire suppression response force designed to control and/or extinguish fires for the purpose of protecting people from injury, death and/or property loss.
- Arrive on scene in 8 minutes or less 90% of the time.
- Confine fires to the building of origin 90% of the time.
- Confine fires to the area of involvement upon arrival 90% of the time.
- Maintain current pre-fire plans for designated target hazards.

The decision to add additional staff and stations to a fire department is both a technical and a pragmatic question. The need must be clearly established and the finances must be available. Section IV of this document stated that there are hazards, risks and values that are clearly present in the LFPD, but they are not clearly documented or categorized. There is evidence of areas within the existing District that cannot be reached within the stated goals.

Maps displayed in Section IV demonstrate that an additional fire station will be required to provide adequate coverage as the District moves towards its build-out period. That time appears to be now. Based on the proposed increase in population, area and traffic circulation & construction development, it is projected from data in this Comprehensive Plan that a minimum of 3 fire stations will be required by the year 2012 or 2013. Also, the analysis has concluded that Station #3 will need to be built as soon as financially practical.
While the District has done a remarkable job of accomplishing the recommendations outlined in the 2005 assessment, there are still some significant operational needs to ensure a baseline level of service can be met. Based upon the current staffing limitations, the District should consider putting a full-time engine company on when the proposed energy and research campus is completed in 2013. Based on customer and resident feedback, it is desirable to have a service level that meets industry standards and be available on a 24/7 bases. Please note that while we recommended that an engine company be staffed, it in no way suggest that the current reserve and volunteer program be minimized. In fact, FD Management has made it clear that the Department will remain a predominantly volunteer organization supplemented by career staff.

The Planning Team agrees that this model remains a cost-effective model for the taxpayer, however, a minimum baseline capability is necessary to ensure coverage and public safety. Until it becomes financial feasible, policymakers should continue to modify its staffing model and staff the second ambulance.

Based on the current service demands, medical emergencies continue to be about 65% of the workload, therefore it would be more practical and cost-effective to build upon the success of the EMS program and hire personnel capable of staffing a second ambulance who are also fire suppression qualified. This will be further elaborated on in the next section. Most importantly, this option will allow the District to maintain a minimum of 4 people on duty and have the flexibility of moving personnel to support the suppression as necessary.

**Emergency Medical Services**

“EMS has become a major element of the Louisville Fire Department over the last 20 years. Throughout the state, fire districts have a statutory responsibility to be the first responders to medical emergencies. The primary reason for this is the placement of fire companies through their locations and staffing configuration. EMS, in order to be delivered promptly, has become an integrated activity of fire district activity. Care, however, should be exercised so as not to create a priority or resource allocation conflict between the two program activities.”

The purpose of the EMS portion of the Comprehensive Plan document is to define the delivery of pre-hospital medical care service for the LFPPD and other provider agencies vested with the responsibility and authority to deliver such services to the citizens of Louisville and the District. The
Planning Team’s assessment of the Louisville Fire Department’s EMS services is based upon information gathered from multi-dimensional sources. A comprehensive analysis of an EMS system requires much more than simply quantifiable measures. Historical perspectives and qualitative influences can significantly influence the performance of an EMS system.

**Mission Statement Alignment**

The purpose of the Emergency Medical Services component of the Department is the provision of efficient and timely pre-hospital care of the sick and injured. Medical oversight of quality of care issues and collaborative system design are essential for clinical excellence in pre-hospital care. The Department has established the following goals and objectives for this program:

- Provide pre-hospital care at a level consistent with the regional and national EMS standards.
- Maintain EMT certification for 100% of the fire suppression personnel.
- Continue to provide an enhanced level of basic EMT skills, consistent with state EMS regulations and requirements.
- Develop a quality assurance program that will track patient treatment and patient outcome. Develop a continuous quality improvement plan.

The Department’s EMS program is not a separate division within the Fire Department. The Fire Chief and Operations/EMS Chief (who concurrently is responsible for numerous other fire training and safety mandates) manage EMS services. It is operated as a concurrent function of existing volunteer staff. Records and reports kept on this activity illustrate the following:

- The Department is able to provide for basic life support within 10 minutes 90% of the time.
- The Department is now able to provide for Advanced Life Support within 8.25 minutes 90% of the time. This is a significant improvement in measurable performance since the 2005 assessment. The Department expects to lower its overall EMS response time when both ALS units are staffed full-time.

**Role and Authority**

The Louisville Fire Department provides a combination of basic life support with enhanced EMT and EMT-IV skills and an ALS transport service. Medical control is the responsibility of the EMS Chief with oversight from the Fire Chief. The EMT program
Louisville Fire Rescue currently uses standing protocols that are authorized by both the state and Boulder County.

A policy and procedures manual, located at each fire station, contains EMS protocols approved by the Department’s physician advisor, however, there is currently no identified formalized EMS planning and research function in place. Moreover, there is no medical director actively involved in the planning process or evaluation activities as it relates to overall EMS program. The Department has taken steps to strengthen its QA programs by contracting third party PCR reviews and meeting with the physician advisor on a scheduled frequency; however, it is recognized that improvements need to be made.

Louisville Fire Department’s management practices encourage discretionary decision making and there are liaisons within the Department to coordinate program activities with the physician advisor and the Avista Hospital EMS program manager. While there is currently only limited pre-hospital training and education provided by the host hospital, it must be emphasized that there is a good working relationship with the staff of Avista Hospital. Both organizations are committed to quality care and support each other to this end. The team would recommend that a more formal system of communication be established or a change to a system that can better support continuing education and transport EMS.

**Legal Services**

The LFPD attorney is the Fire Department’s legal officer. Release of patient information or medical history typically require a subpoena. The LFPD attorney will be present when personnel are required to submit depositions and is available to defend employees in job-related civil cases. The District currently does provide malpractice insurance for personnel associated with the delivery of EMS.

There is not a routine review of EMS policy by the legal officer; however the District only uses state/county approved EMS protocols. Legal does not normally attend Fire Department meetings unless requested by FD Administration. There is no regular tracking or translating of legislation and court decisions specific to Department employees for EMS policy development and for making decisions. Effective May 1, 2005 the Fire Chief implemented a legal review for all contractual agreements between EMS and other public or private entities.

**Fiscal Management**

The LFPD currently charges for emergency medical services as outlined in the Department-approved fees resolution established in 2007. The Fire Department
maintains a modest inventory of property, equipment & supplies; and the EMS Division maintains an adequate amount of stock for replacing expendable EMS items. Usually a 60-day stock is maintained in-house. Tactical Operations EMT personnel are not solely dedicated to EMS. They function in dual roles of public education and fire suppression. EMS is provided 24 hours a day, 7 days a week.

**Safety and Health**

Louisville Fire Department has a very detailed written procedural program outlining the availability and use of EMS safety equipment. Established procedures exist for dealing with violent and potentially dangerous situations to which EMT/Paramedics are summoned. Procedures have been written and established for disposal of potentially infectious waste materials and for involvement in hazardous material incidents. A detailed written policy and procedures are currently in place regarding infection control and potential exposure to a communicable disease. Additionally, all firefighters are required to attend annual bloodborne pathogen training.

EMT/Paramedic involvement in crime scenes is covered by EMT/Paramedic guidelines. A Critical Incident Stress Debriefing (CISD) program exists to incorporate the availability of employee assistance programs and a crisis intervention team. All personnel are offered Hepatitis-B vaccinations. TB testing is initially done but no annual follow-up tests are given unless medically warranted.

**Command Operations**

EMS is an integral part of Louisville’s Incident Command/Management System (NIMS). There are specific job assignments included in the ICS. The Louisville Fire Department utilizes the Boulder County Incident Management Plan to manage both multi-casualty and mass casualty incidents. There is a designated EMS command officer for these emergencies and the EMS component of ICS includes cross communication with other agencies.

**Training**

The Department training officer is responsible for the Fire Department’s EMS training under the guidance of the State of Colorado EMS regulations and the Department’s physician advisor. Annual EMS training in accordance with Colorado Division of Public Health and Environment regulations is mandated for all Louisville firefighters. EMS training specialists are provided monthly by Avista Hospital, guest lecturers or other qualified individuals. All Louisville Fire Department personnel, regardless of rank, are required to have EMT certification by the end of their probationary period. Medical training, other than CPR, is provided for civilian employees, however it’s not mandatory for employment. The Louisville Fire Department currently has two firefighter paramedics per shift on duty 24/7. Most notably, the EMS Division is a certified “training group” by
the State of Colorado Health Department. As a notable achievement, the LFD is also the only north suburban fire department that conducts a basic EMT course annually.

**EMS Quality Assurance**

Louisville has a documented Quality Assurance (QA) program in place regarding Fire Department EMS. As stated above, the EMS Division continues to implement programs, training and assessments to ensure competences are maintained. In-house SOGs clearly outline the program elements and actions taken for unsatisfactory performance. The team does recommend more interaction with the physician advisor and assessment from third party assessors.

**Medical Control**

The Department’s physician advisor maintains medical control of the Department’s EMS program. This person maintains specific requirements under state or local guidelines and oversees compliance with specific State of Colorado EMS policies and procedures.

**Support Services**

The Boulder Regional Communications Center dispatches all fire department and EMS calls. Dispatchers are responsible for other functions as well. Currently, dispatchers are trained in CPR or emergency medical dispatch. Fire Department EMTs provide BLS care until the arrival of an ambulance with paramedic-level personnel.

**Cost Recovery for EMS**

Presently, the Louisville Fire Department operates primarily by a tax-supported General Fund system. When the Department implemented its transport paramedic program, the Board of Directors approved a revenue collection program to help offset its operating costs. Cost recovery sources are Medicaid or Medicare, private insurance, fees for service, and an ambulance subscription program.

Projected growth estimates a 2020 population of between 23,000 and 24,000 residents. Two distinct issues that stand out within this population growth is the aging population and associated assisted-living occupancies. Over the next 10 years, Louisville’s population over 60 years of age is expected to increase considerably, representing a significant percent of the District’s residents. Typically, these older households generally have fewer resources to spend on services. Secondly, the District has experienced significant growth of citizens who use the EMS system for routine healthcare. While the system was not designed to provide basic in-home EMS services, we are nevertheless impacted by a growing demand for in-home care. Examples include, but are not limited to: treatment for minor nausea, small cuts & bruises, prescription consultation, oxygen system maintenance, lift assists, and general medical consultation.
The projected residential and commercial construction in the city of Louisville, combined with the extensive transportation projects, will have a direct impact on EMS response times. The existing fire stations may encounter longer response times. Shifting population demographics may affect EMS demands proportionally. EMS experience in Louisville indicates call rates could increase conservatively by as much as 10 to 20 percent over a 10-year period.

Alternative EMS profiles for fire departments throughout Colorado have identified and developed many diverse approaches to the delivery of EMS. Three program operational profiles including the existing delivery system in use in Louisville are:

- Placement of fire-medics on engine companies. Transportation of patients would be provided by private ambulance.
- Utilization of a dedicated unit composed of firefighter-paramedics. This would be a fire station based squad or ambulance located centrally in Louisville and would respond to both EMS and fire calls.
- First response by engine companies with EMT-enhanced skills would supplement the incident requirements.

All of these EMS delivery systems were again evaluated during this review period and the Planning Team has concluded that the fire-based EMS currently in place is the most beneficial for the Department and, most importantly, for the public. Billing rates are typically lower than the private providers while at the same time these resources are used to support other Department services. The LFPD Board of Directors should, however, consider rate changes every 4 to 5 years or as necessary to maintain a quality of the service. Moreover, the District should evaluate the rates between in-district and out-of-district customers. Out-of-district patients billing should consistent with the greater metro area.

**Medical Accountability**

Medical accountability is set at the state and federal levels by legislation, regulations, and treatment protocols that provide medical control. In pre-hospital care, there is a distinct difference between medical control and operational control. Medical control is the responsibility of the physician advisor of the Department and should be absolute with regard to clinical issues such as treatment protocols and quality monitoring of patient care.

Operational control is the responsibility of the Fire Department. Examples of operational control involve staffing, scheduling, vehicles, equipment dispatching, and quality monitoring of operational issues. The Fire Department has the greatest financial responsibility and legal liability and must work collaboratively with the community on system design and quality of care issues. Inherent with these responsibilities is a liaison
between the Louisville Fire Department and the medical community to conduct patient care quality assurance studies that evaluate the effectiveness of policies, medical treatments and paramedic performance. The Louisville Fire Department must demonstrate medical accountability to the systems standards. This is done by evaluating the performance of providers, providing quality continuing education programs, monitoring protocol compliance, and from patient input. To the extent it is financially feasible, the LFPD should strengthen its entire QA/QI program to include an Operations level resource to manage the current programs and statutory EMS requirements. The Department should take the necessary actions to ensure oversight and daily direction to the EMS staff, including field supervision, training, performance and interaction with the physician advisor.

**Continuity of Care**

Continuity of care for purposes of this document is defined as the transition of care from pre-hospital BLS to the ALS team and finally to the hospital medical staff. This continuity of care must exist regardless of what system is chosen and its goal must be quality patient care.

**Teamwork**

The patient care team must work in harmony to provide a well-coordinated approach toward quality medical care. Good communication is imperative and can have dire results when not achieved. Continuous training focuses on well-organized team performance. This is enhanced by a stable and experienced workforce.

**Coordination**

EMS involves a diverse set of individuals, agencies, organizations, and institutions. There is no single organizational umbrella that employs and directs every person who must serve the immediate needs of an emergency patient throughout the sequence of emergency care and transportation. Cooperation in EMS is fragile and requires constant attention. When it is a planned endeavor and pursued on a regular basis, coordination can become a method of controlling events rather than being controlled by them.

**Program Evaluation**

Evaluation means the examination of a specific function to determine whether that function is producing the desired results. Desired results, or goals, will have been stated in the initial stages of the paramedic planning process. Data will be necessary to measure performance. When the data (in the form of system outcomes) is measured against the goals, an opportunity occurs to evaluate the program and its performance.
Patient outcomes are the measurement of performance against the goal of reducing unnecessary death and disability through improved emergency care and transportation. Currently, the Planning Team believes that the existing system meets the expected performance commensurate with a suburban area of 24,000-25,000 residents.

**Cost-Containment Opportunities**

The Management Team and the Board of Directors recognizes the challenge every community has funding a quality EMS service. The LFPD team believes that the communities surrounding Louisville have the same challenges with the same mandate and legal requirement to provide EMS. That said, the team would recommend that consideration be given to negotiating an interagency agreement to share the cost of maintaining a quality system (to the extent practical). Each entity should retain local control; however, there could be opportunities to reduce common infrastructure costs. While there has been little support from surrounding agencies to establish formalized partnerships, the LFD management teams should continue to seek opportunities wherever practical.

**Public Education and EMS**

The Louisville Fire Department should assume a proactive role in providing community education outreach programs. Programs such as First Aid, blood pressure screenings, CPR, and school safety programs can all contribute to the success of an EMS program. For example, early CPR (by bystanders) is an important link in the “chain of survival.” Without this intervention, chances of survival are diminished and the EMS system will have poor performance results.

Essential elements in this outreach program must include teaching the difference between non-emergent situations and emergent or “911” calls. Recognition must be given to the fact that the emergency medical services system is a rapidly changing system. The combination of state and federal EMS legislation, coupled with local needs, requires that any plan be monitored and updated frequently.

The LFPD has taken some proactive actions by providing a bi-monthly CPR course for the public and blood pressure screenings at selected public events. While this has proven to be a beneficial and a great first step, public education programs are not funded or staffed to meet the objective identified in this document.

**Training and Education**

“Training and Education” is defined as the specific programs, resources, and capabilities of the personnel within a fire service agency which exist to support the operational programs defined by its own policies.
Training and education resource programs express the philosophy of the organization they serve and are central to its mission. Learning resources should include the following:

- A library and other collections of material that support teaching and learning
- Instructional methodologies and technologies
- Support services
- Distribution and maintenance systems for equipment and materials
- Instructional information systems (such as computers and software)
- Telecommunications, other audiovisual media, and the facilities to utilize such equipment & services

Central to the success of the training and educational processes is a learning resource, organizational structure, and a technically proficient support staff (i.e., training officers). The training staff should provide services that encourage and stimulate competency, innovation and increased effectiveness. The agency or system must provide the learning resources necessary to support quality training. The adequacy of a system's successes should be judged in terms of its goals, objectives, and programs supporting the organization in achieving its mission. The system should also include the following elements:

- Comply with all federal, state and local mandated training requirements
- Include training sessions specific to new apparatus and equipment
- Implement a recordkeeping system that identifies individual participation and compliance with mandated training requirements
- Develop Standard Operating Procedures specific to Louisville Fire Department capabilities and a program plan
- Ensure operational readiness through quarterly performance reviews

The Louisville Fire Department has a training group that prepares a master calendar of training and ensures that records are maintained. As identified during the last assessment, the Department does not have an adequate training facility to accomplish basic fireground operational procedures.

One of the consequences associated with low outbreaks of fire in a community is the loss of practice and likewise, the ability to fight them when they do occur. This is not
because firefighters do not have the training. It is because of a phenomenon called “skills degradation.” This is a reduction in the ability to perform skills that are not frequently practiced.

Without an adequate reinforcement of periodic drills of basic skills, especially in the area of interior attack, skills often deteriorate over time. Therefore, departments need training facilities to maintain their skills. Currently, there are no formal training facilities within the immediate vicinity. The closest training tower is in north Boulder or Longmont, however they are considered state of the art. Based on all of the information to date, the Department is unlikely to have either the space or financial resources to build a complete training facility in the near term, unless there is an increase in the current mill levy or a capital bond project is approved. While every fire department has a need, it was felt that the best and only short-term option is to continue to use the county facilities in spite of the impacts to operations. As outlined in Section IV, these facilities are a great benefit to the departments that have resources to cover while in training. However, due to the current LFPD staffing structure, it becomes a question of how much risk is acceptable to support out-of-district training.

Training Staff

The Planning Team believes that the Louisville Fire Department is one of the more diverse and progressive departments in the Front Range area. The Department provides a full range of services including, but not limited to: Fire Suppression, Emergency Medical & Rescue Services, and Haz-Mat Operations.

Over the past several years the Department has been very fortunate to have both qualified and dedicated training officers to meet the needs of our organization. They have spent countless hours preparing, instructing and delivering continuing education programs, officer development programs, and new member orientations.

As the Department’s training needs have increased over the years (including state & federal mandates), Department officers have been both creative and forward-thinking to meet the Department’s training requirements. The Department has and continues to use internal resources to the fullest extent possible. The Department and its members are to be commended for their dedication and resourcefulness in meeting this challenge.

Regardless of whether a department is career or volunteer, the challenge of maintaining a well-trained staff is becoming more difficult each year. We are increasingly impacted by changing standards which require additional continuing education hours, instructional preparation hours, field instruction and documentation. While the Department meets the
basic intent of industry standards, these requirements significantly stretch our training resources. Training resources are further stretched by the realities of today’s volunteer workforce and performance-based staffing. For example, our volunteer staff is expected to make 20% of the calls or staff fifty 12-hour shifts annually, attend approximately 52 hours of continuing education, achieve a minimum of 3 state certifications, and attend advanced level training when necessary.

Another compounding factor is the retention rate for volunteer firefighters. The current national average retention of a volunteer firefighter is approximately 3 years. According to the National Fire Academy, factors affecting the retention of volunteers relate much more to the mobility of the workforce than local impact factors. Additionally, more volunteers indicate that it’s too difficult to meet the significant time commitments of mandated training.

Unfortunately, the LFD statistics are in line with the national average. The Department has recognized this challenge for several years and the leadership has implemented a full-time training officer starting July 2005. Still, the training officer is responsible for other collateral responsibilities which limits the time required to adequately support training needs. Again, the Planning Team understands the need to be flexible; however, the need for a full-time dedicated training officer should be seen as a high priority.

At least for the foreseeable future, the LFD will be a predominantly volunteer department. In an effort to help sustain a predominately volunteer organization, the Planning Team believes it’s critically important to provide the necessary infrastructure to meet the needs of our volunteer staff. With a reorganization of responsibilities and the addition of a training officer dedicated to just training (or some version of this), the Department will be better prepared to adjust to a changing workforce, provide consistent and measurable training and, perhaps most importantly, ensure the community has an effective response force.

Public Education, Awareness and Outreach

The Department has a relatively active public education program. The position has been a collateral career function for some time. There have been goals established for the program, with an emphasis on fire and life safety. The Planning Team agrees with the Department’s management staff that public education is one of the three critical fire defense programs. The current system is predominantly volunteer-
based and dependent on the goodwill and dedication of the volunteer members. Consideration should be given to funding a part time position to maintain the program in a manner consistent with the Department’s goals. The program should also be managed by the Fire Marshal’s Office.

**Hazardous Materials**

“There should be a hazardous materials response program designed to protect the community from the hazards associated with fires and uncontrolled releases of hazardous and toxic materials.”

Hazardous material emergencies, spills, releases, or accidents have become a major function of fire service agency activity. Hazardous materials response is a complex undertaking, and considerable knowledge & resources are required to cope with these types of emergencies. Such incidents may require the integration or coordination of several agencies. The local fire agency has generally become the lead agency, or Designated Emergency Response Authority (DERA), during the “unstabilized” emergency portion of such an incident.

Louisville has two different levels of dealing with hazardous materials. The first has been identified in the LSFPD section. This section deals with hazardous materials inspections only. The Fire Department has also trained all fire suppression personnel to meet the state-mandated level of “Operations” as a minimum. If the event escalates to a level that requires a Haz-Mat Specialist or a Technician’s expertise, Louisville utilizes the mutual aid system and the Boulder County Haz-Mat Team.

There are only two firefighters within the Louisville organization certified to use encapsulated suits or to function at the level of a Haz-Mat team member with the exception of the Fire Chief. It is not realistic (with the current staffing structure, funding, and call load) to have this capability in-house. However, it is considered a critical mission requirement to have the service available. The current resources available come from the county team within a 60 to 120-minute time frame.

**Heavy or Specialized Rescue**

“There should be an adequate, effective, and efficient program established to rescue trapped or endangered persons from any specific cause that exists in the Louisville Fire Department’s area of responsibility. A specialized rescue could include a structural collapse, vehicle accidents, fast water or dive rescue, cave-in, trench rescue, or hazardous material plumes.”

The Department currently trains and staffs a rescue team designed to respond to static or surface water situations, auto extrication, and minor building collapse. The Department, in response to a specific incident in the past, voluntarily adopted this. The District does have periodic flooding that can result in risk to life, but the number of
incidents is low. There are limited resources budgeted for this program. Current discussion is underway regarding the impact of new qualifications and certifications that are required if a LFPD specific unit is to become recognized and conform to “typing” in the mutual aid system. Typing is a term that is applied to all resources that are placed in the mutual aid system. All resources that are identified as meeting minimum requirements are given a number or letter that tells all other users what its capabilities are.

The best example of this is the typing of engine companies. A Type I pumper is considerably different than a Type IV pumper. In the field of water rescue, the process of creating types is under the jurisdiction of the State Office of Emergency Services. Louisville’s existing team may or may not meet the new criteria. The cost impact of this is unknown at this time. When it has been established, it will contain both physical assets and personnel costs. The Department does, however, maintain minor heavy rescue equipment and the capability of managing most initial heavy rescue incidents expected in Louisville. Personnel are trained annually and they must demonstrate proficiency with all equipment.

The Team would recommend for consideration that the Department train its personnel at the Awareness level for high angle, low angle and confined space emergencies. Based on the District’s current hazard inventory, these would be desirable skills. Most importantly, mutual aid agreements must be maintained with Rocky Mountain Fire Authority and North Metro Fire District to ensure tech rescue capabilities are available with the LFPD District.

**Disaster Management**

“There should be a disaster management program designed to protect the community from both man-made and natural catastrophes.” The State of Colorado, under the provisions of state statutes, places specific obligations upon a Designated Response Authority to prepare for disasters. The LFPD has an adopted the City of Louisville’s Disaster Plan and supporting documentation for its effective implementation. (Currently, the City of Louisville is responsible for implementation of the disaster management plan.) The Planning Team recognizes the importance of a comprehensive disaster plan and recommends the District work closely and support the City in implementation of all components of the program.

**Physical Resources**

“Physical Resources” are defined as the fire stations, training facilities, fire apparatus, and other capital expenditures and outlays that make up the property assets of an agency. Special attention is required to obtain and maintain appropriate physical
resources. Apparatus resources should be designed and purchased to meet the Louisville Fire Department’s goals and objectives. The inspection, testing, preventative maintenance, replacement schedule, and emergency repair of all apparatus should be well-established and meet the needs for service and reliability of emergency apparatus.

Fire Stations

The Louisville Fire Protection District has two fire stations in service today. Station #2 serves as District headquarters and is well-maintained, however, is very heavily used. With regular maintenance and update as necessary, the station is very serviceable for the next 20 years. Station #1 has undergone a complete renovation as recommended in the 2005 needs assessment. It can now accommodate 24/7 operations and all of the critical electrical and HVAC systems have been upgraded. Moreover, all of the asbestos has been replaced and no longer poses a life safety risk to firefighters. The anticipated service life of this station is about 30 years.

The Department no longer has a funding mechanism for capital improvement projects after completing the Station #1 renovation project; however, the Board and staff should be applauded for having the discipline to save and pay for the renovation out of reserve funds. That said, the District has owned land in South Louisville for over 20 years with a goal on building a third station as the District’s population and risks grow.

In Section IV of the 2005 Fire Department Overview, the assessment indicated that additional stations may be required in the So. 88th St. area sometime in the future, however, it is now considered a necessity. The response area maps produced in this Comprehensive Plan indicate that a third station is currently needed in order to provide service equity and achieve the response time goal for all portions of the District utilizing a predominantly volunteer staffing model. The decision to construct Station #3 has only be limited by the District’s financial limitations and changing operational priorities. District Management has done a good job of seeking alternative funding by state and federal grant submittals, as well as requesting major corporate support and impact fees from the City of Louisville. Unfortunately to date, none of these have been successful. For the purpose of this Comprehensive Plan, the following two goals are proposed as part of setting the criteria:

- The District will, when fiscally capable, construct and staff Fire Station #3. Time and distance studies reveal a significant deficiency in achieving the Department response goal in South Louisville, which will be compounded when the new ConocoPhillips campus opens in 2014. It is plausible that without a station in South Louisville, the community and property owners may experience a slower than expected response and a higher risk than other areas of the District.

- All permanent fire stations will be of sufficient size and flexibility to meet current and anticipated operational needs for the life span of this Plan.
Fleet Maintenance and Replacement

The Louisville Fire Department vehicles are maintained by the District’s Fleet Maintenance Department. There is a comprehensive maintenance program in place, and most importantly, it now has a documentation and recordkeeping system that meets NFPA (National Fire Protection Association) standards.

The District provides specific training and certification of the mechanic assigned to work on Fire Department vehicles. There is replacement cycle and the Comprehensive Plan serves as the document for formalizing the timeline and replacement criteria. All engines are given annual pump tests and the Department will, if fiscally capable, maintain a District-approved vehicle replacement cycle through the budget process. Typically, the guidelines listed below state that fire engines are to be used for a maximum of 13 years as a frontline apparatus and 5 years as a reserve. Rescue apparatus has a life expectancy of 5-6 years and command cars should be replaced every 5 years.

- Fire Suppression Years of Service (ISO & NFPA Guidelines)
- Command Vehicles Years of Service & Mileage
- Staff and Support Mileage
- Utility Physical Condition

Table 11 - Current Apparatus List

<table>
<thead>
<tr>
<th>Apparatus</th>
<th>Year Purchased</th>
<th>Year to be Replaced</th>
</tr>
</thead>
<tbody>
<tr>
<td>2701</td>
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<td>2021</td>
</tr>
<tr>
<td>2703</td>
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<td>2012</td>
</tr>
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<td>2716</td>
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<td>2020</td>
</tr>
<tr>
<td>2717</td>
<td>2001</td>
<td>2017</td>
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<td>2013</td>
</tr>
<tr>
<td>Ranger</td>
<td>1999</td>
<td>2013</td>
</tr>
</tbody>
</table>
Immediate Need

The District continues to update the fleet in a fiscally responsible manner. They have taken a path less traveled by choosing to “retrofit” apparatus. This has proven to not only save the taxpayers’ money, it ensures apparatus meet the necessary operational and safety requirements. However, 2703 is at the end of its life cycle and in need of replacement within the next two years. The apparatus is underpowered and extremely heavy for the brake package available at this time. This apparatus has a unique design to accommodate the rural, non-hydranted areas of the District and is considered a critical piece of equipment to manage District hazards. The Planning Team believes that replacing this apparatus should be considered a high priority.

Personnel and Staffing Issues

“The category of human resources is defined as all aspects of personnel administration except those regarding training and competency. The heart of any organization is in its people and this category is designed to appraise the importance and results of the human resources program. It is recognized that the completion of this human resources chapter may involve members from other governing entities or other elements of the community.”

Section IV defined the Department’s existing staff resources. The District's Administration personnel are responsible for development of human resources policies and procedures and the Fire Department is tasked to follow through to ensure compliance and consistency. The current staffing level of the Department is set by District policy and reflected in the budget. Current Tactical Operations staffing levels are capable of providing initial attack for a fire between 200 gpm and 240 gpm and are capable of handling routine basic and advanced EMS calls.

This Comprehensive Plan projects that additional personnel will be added with the addition of each new station; but further anticipates that staffing and distribution between line and staff will increase over the next 10 years to respond to growth issues and, perhaps more importantly, to address staffing turnover. Moreover, the Planning Team recommends that 3 personnel be hired to staff the second ambulance and help shore up staffing shortages. The Management Team recommends that a minimum staff of 3 line supervisors be part of the career staffing makeup. While it should be noted that the Department has done a remarkable job of providing a cost-effective service to its customers, the District should establish a minimum baseline staffing capability and actively work to ensure 24/7 response coverage.

Volunteer Programs

The most important considerations for future staffing enhancements are the cost and benefits of each improvement. The Fire Department should, if fiscally capable, maintain and staff its fire stations to comply with the adopted standards of response coverage. It
should also, if fiscally capable, maintain adequate staff personnel to ensure quality control over program activity, workload management and firefighter safety. That said, maintaining the volunteer program is essential to the overall Department staffing plan and will continue for the foreseeable future. As defined throughout this document, turnout, arrival time, and a baseline staffing capability are critical to the overall service delivery goals of the District. While the “pager call-out” program has served the community well over the years, its success is based on having in-district volunteers available. During the last 5 years, the Department has experienced a significant reduction in the availability of in-district volunteers. Roughly 50% of its membership is out-of-district members who are not available to staff apparatus from pager call-outs. As a result, there has been an uptick in the amount of calls where no members respond.

The Department continues to do a good job of handling high priority calls, including structure fires, however, the Planning Team remains concerned when a duty crew is not fully staffed or doesn’t have the appropriate skills mix. Again, the members and staff have done an admirable job of adjusting its staffing models and there are significantly more shifts being covered than 5 years ago, but staffing every call remains a challenge. Fortunately, the District is well aware of the impacts to occupants from flashover and cardiac arrest and have fully embraced the “duty crews” staffing concept. For managing initial alarms and routine EMS incidents, this model has proven to be more beneficial than responding from home and the responding to the call. While it is critically important to maintain the pager call-out program for greater alarms and support, duty crews remain the preferred volunteer staffing model.

**Internal Support**

These are the activities relating to internal support including communications and dispatch services.

“The public and the Department should have an adequate, effective and efficient emergency communications system. The system is reliable and is able to meet the demands of major operations, including command and control within fire/rescue services during emergency operations and meeting the needs of other public safety agencies requiring distribution of information.”

The Boulder Regional Communications Center (BRCC) provides the Louisville Fire Department’s communication and dispatch services. Earlier in this report it was indicated that this service is an element in the determination of response time in that it controls the time it takes to process an alarm. Alarm time is not currently being
evaluated or measured for BRCC. Currently, the regional system is adequate; however, implementing the CAD system’s hardware and software should help reduce response times and improve the District statistical analysis capabilities. It should also be noted that the LFPDs ISO rating was negatively impacted because the BRCC does not meet much of the NFPA criteria. While this is a concern, it is outside of the LFPDs operational control. The current dispatch services are free.

**Management Information Systems**

The Department’s records and reporting system is considered significantly more formalized since the last review period. Some systems are not automated; however, management is working to complete its transition to a fully automated system by 2013. The Department is keeping the minimum appropriate records to respond to questions relative to fire prevention, training, maintenance and emergency operations. The HR reports that are aggregated on a regular basis (e.g., monthly or annually), are still somewhat labor intensive to a degree.

In the process of conducting this review, several key issues could not be addressed due to lack of a fully automated system that would allow the rapid collection or compilation of HR data. It is noted however, that the District has made significant improvements in automating its payroll and retirement checks, budgeting system and code inspections. Training records still lag automation. The Planning Team recommends that the Department conduct a “technology refreshing” schedule to ensure all IT systems are up-to-date. Standardization of the various HR and business-related software programs are recommended. Additionally, maintaining multiple software subcontracts and IT support could be an area of cost savings and efficiency.

**External Relationships**

“A fire service agency should have well-developed and functioning external agency agreements. The system is synergistic and is taking advantage of all operational and cost-effective benefits that may be derived from external agency agreements.”

The Louisville Fire Department is minimally involved with automatic aid and mutual aid. Since the 2005 assessment the District has made significant improvements in formalizing its mutual aid agreements with other departments. Most notably, the Department has become part of the Denver Metro Mutual Aid Agreement and signed agreements with all of the departments that surround the LFPD. The experience of the last 10 years has been that mutual aid is a very valuable asset to every community and that active participation in major events is becoming a more frequent experience. Currently, Louisville does not have sufficient reserve personnel to respond to every mutual aid request. When this
occurs, a recall of off-duty personnel is required to maintain standards of response coverage in the community.

Automatic Aid

Automatic aid should be a part of the Louisville Fire Department’s overall response strategy at this time. These agreements are effective and efficient ways of providing coverage. The one disadvantage is that they are dependent upon external decision making processes. Excellent relationships exist between the City of Lafayette, North Metro and Rocky Mountain Fire Authority that provide a solid foundation to consider other options and alternatives for automatic aid. The Team recommends, however, that the District consider formalizing all of the verbal agreements to more formal auto aid agreements for at least the target hazards.

Evaluation and Performance Measurement

“For purposes of organizing and managing a fire department, goals and objectives that can be measured should always be established. Performance measurement is best described as a systematic attempt to quantify and compare a department’s activities. The purpose of the analysis is to determine if the activity is effective (doing what it is supposed to do) or efficient (doing the job as inexpensively as possible).”

There are three ways of measuring service levels:

- Comparisons between communities
- Setting a specified service level that can be measured over time
- Setting a standard against which performance is measured

Each technique has its limitations. Intercommunity comparisons require that all factors for comparison remain the same and setting specific service levels without considering growth factors may be misleading. Measurements against standards are only useful if the standard is realistic. One of the tools to set standards is to have a set of goals and objectives. The LFD has occasionally used the goals and objectives process; however, while goals and objectives are incorporated into various functional areas, they must be evaluated and measured on a periodic basis, if they are to contribute to efficiency and effectiveness.

Since goals and objectives are key areas for the Fire Department, we anticipated finding performance measures related to each of these areas. During the Planning Team deliberations, a review was conducted of several different levels of goal setting. These included goals for the comprehensive planning
process and program goals. Fire Department performance indicators are usually grouped into three types -- inputs, outputs or efficiency indicators.

Input indication refers to the level of effort applied to a service unit. In this report we have calculated expenditures per capita, staffing per 1,000 population, and others. Inputs do not constitute performance information since they do not provide any information regarding what was achieved as a result of the input. Example: The speedometer tells you how fast you're going, but does not give you an indication of your direction. Input measures also do not inform you about how efficient your operations are or the quality of service provided.

An intermediate indicator does not lead to an end by itself either. Achieving the goal of arriving at a scene of a fire within a specified time frame does not necessarily mean there will not be loss or injury. Intermediate indicators, for instance, could include the numbers of dollars lost or the average property loss for all structural fires. These would indicate the level of expected damage from an average fire call.

An efficiency indicator measures outcomes. An example of this would be keeping records on the percentage of fires that are confined to the room of origin after arrival of the fire company to the scene. Efficiency indicators compare inputs versus outcomes. These are very difficult to develop for fire service scenarios, but they form the basis of a cost versus benefit analysis. Generally, the management of a fire department is better represented by the use of intermediate and output performance indicators, rather than input or efficiency indicators. When performance indicators are used in areas of community risk reduction, training and education, fire prevention, fire suppression, hazardous materials and emergency services, they begin to represent a community's quality of life. That said, the Department has established some achievable baseline performance measures including goals to measure the Department’s progress. To the extent financially practical, the District should establish a minimum staffing baseline to help ensure, or at the very least, reduce the current staffing vulnerabilities.

**Means of Evaluation of the Comprehensive Plan**

A comprehensive plan is a document that requires periodic review to determine when to implement various components identified in the future forecast of the department. The review cycle has two elements, the annual budget cycle and a 5-year update. *(This document represents the 5-year update).* All financial considerations contained within the budget are subject to the proposed adoption process utilized to develop the budget cycle. When multiple-year budgeting is utilized, the same consideration is given.
The 5-year update review cycle is for a different purpose. It is an internal review aimed at evaluating the validity of planning assumptions and accuracy of trends and patterns. The five-year review process should focus upon population and area projections, as well as workload increases and the ability to meet adopted performance standards.

This report, once adopted, should be updated in 2016 unless most of the recommendations were not funded, implemented, or superseded by another document with a similar charge. The responsibility for conducting such a review should be tasked to the chief fire official. A written report should be required that provides amendments to planning details, updates, and replaces or eliminates policy for the department.
VI. POLICY DIRECTION & RECOMMENDATIONS
Policy Direction

Trends and Patterns

Trends and patterns in all areas of fire district governmental services are subject to wide changes in direction. For example, economic factors can cause funding of services to become very difficult. A breakthrough in technology can cause significant changes in work practices. New tools and techniques can change efficiency and effectiveness of both individuals and groups. Therefore, making predictions from trends is at best, inaccurate over time. The "further out" a projection, the lower its accuracy. Nonetheless, the best way to ensure a future outcome is to plan for its eventual implementation. This requires establishing some form of vision of the future; therefore, this Comprehensive Plan has a 10-year time frame. Moreover, the speed of technological change is creating some difficulty in the decision-making processes of an organization. In a recent newspaper article it was pointed out that with growth comes consequences. While the economic recession has significantly slowed growth in most areas, Colorado's ten largest municipal areas are still struggling with how to maintain the level of service provided five years ago.

Fire protection is also a quality of life issue. Communities with high fire loss and extremely high response needs are often the ones that have not invested in a total systems approach to fire protection. They may have lacked mitigation through prevention, staffing to control incipient fire, or training for both the fire force and the community. It is also appropriate to note that fire protection is in competition with other infrastructure issues in the community. Schools, highways, water systems, garbage disposal and law enforcement are generally in a similar mode of competition of fewer tax revenues. Balancing out risk with resources requires constant assessment of the policy direction of the fire department. Trends and patterns can be used to define a direction and to some degree, a sense of incremental change that can be projected short-term.

In the context of this document, the trends and patterns have also been evaluated against the performance and professional standards used currently by the Fire Department. Section IV and Section V provide detailed information relating to these activities. The information in these chapters present basic findings used to form the foundation of recommendations in this section.

General Issues

After a review of the District, Department operations, current programs, and contemporary standards that guide the delivery of fire protection services, the Planning
Team has identified six main issues to be addressed by this organization over the next 5 to 10 years. They are:

- Emergency Medical Service
- Fire Station Distribution and Concentration
- Staffing
- Level of Service & Response Times
- Management Information Systems
- Periodic Assessment of Performance

As noted in Section IV, the current level of effort for providing fire protection is about $115 per person. As was the case in 2005, if this funding level continues at the current rate, implementation of many of these new recommendations will be based upon available funds and it could take at least 15 years to see only partial implementation. Any incremental improvement will be based on the Board of Directors’ ability to make specific planning decisions in a timely manner and to determine what the necessary funding should be to meet the needs of the District.

The Louisville Fire Department - Ten Years From Now

If a person drove down the streets of Louisville in 1980 and had a perfect memory of what they saw and then came back in the year 2010, they would have one impression. This is no longer a small rural town, it has grown into a diverse community with significant infrastructure and support service needs. If one projected those same phenomena from the current year 2010 to the year 2020, a person would probably have a similar experience. The similarities are important, but not nearly as important as the differences. From a fire protection planning perspective, the fire problem in a community is a fairly slow changing phenomenon. The general plan will determine a great deal with respect to what is allowed to be built within the District; and, the aging population will bring with it increased service demands on the Fire Department. These were projected in Section IV. The most important thing to consider in this planning process is not that things may change, but rather that they will change one day at a time. Often problems are created before anyone recognizes them as problems. Based upon some of the existing changes going on in the community, we can anticipate that there will be a continuation of
increased traffic on streets and the construction of a wide range of buildings for a wide variety of occupancies.

There will be an anticipated change in type and distribution of housing stock, with some considerations given to increasing both the purchase ability and the availability for local workforces. There is likely going to be a change in the makeup of the age distribution in the community. It is unlikely that there will be major shifts in the types and sizes of business and industry currently in the District (with the exception of the ConocoPhillips campus). New processes will be created and new products stored in old occupancies. It is likely that the number of occupancies that will require fire inspections and pre-fire planning will increase. New neighborhoods will become older neighborhoods. All of these things may happen, but when they do, they will not happen at the same time. The Fire Department must monitor and respond to these changes in the community or there will be service level deficiencies.

The fire service of the future is not easy to predict. If one looks at the fire service of 1980 and compares it to the fire service of 2010, he or she would find that the fire profession has changed very little. There are still traditional fire stations and the basic firefighting and staffing configurations. Slight improvements would include the means of fire extinguishment from automatic fire sprinklers and the number and type of built-in fire protection devices. What has changed the most is that fire departments have become “all-risk” agencies – given more and more multi-tasked assignments.

This has been basically for emergency medical services and to a certain extent hazardous materials. Also, the majority of the fire service has a strong disaster management focus. Another change has been an increasing demand upon firefighters to meet training and education standards since there has been more regulation of the types of training and education required and a general increase in accountability and productivity of fire agencies. Therefore, if these trends continue, the public will have a much higher level of expectation of the Louisville Fire Department. With the increased emphasis upon emergency medical services, hazardous materials, and even environmental issues, the fire service of the future may have need to re-evaluate hiring practices to emphasize different skills and abilities. Fire agencies will also likely be impacted by legislative and regulatory changes in the field of health care. Moreover, fire equipment may evolve into different configurations to take into consideration both higher road activity and the need to meet a different mission assignment.
Specific Policy Considerations

Background and support documentation for these considerations are contained in the previous three sections. This section identifies specific needs in these major areas that need to be considered in determining ultimate outcomes. These issues are not listed in order of priority in this chapter. Priorities have to be developed into formal action plans as the implementation of specific items reach maturation. Funding, time frames, strategies and decisions will vary according to facts that come into existence over the time frame of the Plan. In the Executive Summary, these recommendations are listed in a framework that identifies who is responsible, and approximately when they should become a priority. The Fire Chief and appropriate District officials should consider and adopt actions to deal with the following decisions.

Deployment Plan Findings and Recommendations

Finding #1 - Fire Station Distribution and Concentration

As in the 2005 assessment, this planning document has identified that current station coverage has deficiencies and projected growth will intensify the problem. This will be further compounded when the ConocoPhillips campus is built in South Louisville. Scenarios indicate that to achieve the response time goal of reaching 90% of the calls for service within 8 minutes, an additional fire station will be required in the near term. Additionally, based on the analysis outlined in this document, the District should take a graded approach to building a training facility.

The District should be commended for being proactive and seeking alternative methods, including a joint station concept with North Metro Fire. However, based on two years of ongoing discussions, it is unlikely that this proposal will go beyond the discussion phase. That said, the District should move forward to construct a station independently. Past fire boards have identified the need for Station #3 for over 20 years and it should be considered one of the highest District capital project priorities.

Supporting Information

The current station analysis seems to verify the recommendations and assumptions made in the 2005 Comprehensive Plan. The need for a total of three fire stations within 7 to 10 years is valid, which means the station should be operational within 1 to 4 years. This does take into consideration using automatic aid companies to help cover the existing area, to the extent possible. (Currently, North Metro Fire Rescue has determined that it is not in their best interest to formalize an auto-aid agreement to support response deficiencies in South Louisville.)
With regard to specific apparatus and staffing, the Department may evolve into a different mix of types and sizes of apparatus than it has presently. Flexibility will be required in making those operational decisions, as the delivery of services becomes more diverse.

The process used in this report to evaluate future fire station locations was primarily based on response time standards and risk assessments. Based upon a review of the background principles, proposed land use, existing distribution, and concentration of occupancies, it was determined that the two existing fire stations will not serve the needs of this community, based upon the growth assumptions, hazards, and projections in Section IV of this report.

The decision to build fire stations should ultimately be based upon criteria of response time thresholds, service gaps, or increased demand. In order for a policymaking body to make a valid decision regarding such a major capital outlay project, each fire station location or relocation should be accompanied by a specific analysis of its contribution to the district’s overall fire defenses. The goal of this evaluation is to provide for construction and deployment of stations to minimize areas with minimum service. Several alternatives are provided in Section V for consideration in responding to future fire station needs.

The current construction costs for a new fire station vary from $2 million - $2.2 million dollars, excluding apparatus and equipment. Most importantly, the District Board of Directors has determined that the 3-station model is preferred to meet the intent of NFPA 1710.

**Recommendation #1 - Fire Station in South Louisville**

The current fire stations are somewhat distributed equitably for initial attack purposes and the major population concentrations of the District. Unfortunately, high-risk areas and growth in South Louisville highlight the need for an additional station in the So. 88th St./Dillon Rd. area. The Planning Team recommends the District take the necessary steps to build this new facility in the near term. That said, based on the comprehensive planning analysis and the current volunteer staffing profile, it might be realistic to fund this project providing current revenues remain stable.

The District should be commended for aggressively seeking alternatives to offset the cost of building a new station. Unfortunately, requests for support from major developers, inclusion in any City of Louisville impact fee assessments, a joint fire station venture with North Metro Fire, and federal grants have all failed to materialize. It is clear that the District will have the sole burden of funding a fire station in South Louisville.
Recommendation #2 - Consider Using Reserve Funds

The District is in a unique position whereby it is not currently overly burdened by high employee costs and most of its capital projects are paid for. Based on current reserves and an aggressive savings plan, the District should earmark funds every year to build Station #3.

**OR**

Recommendation #3 - Consider Alternative Funding

Consideration should be given annually to the feasibility of a general obligation bond or mill levy increase to meet the District’s longer-term capital asset and operational needs.

Finding #2 – Staffing and Deployment

The current staffing level has transitioned from a completely volunteer program to a combination staffing model supplemented a minimum of 2 firefighter/paramedics. The skills mix and staffing levels remain somewhat unpredictable and there are limits to the availability of volunteers, particular during the daytime shifts. Staffing patterns are unpredictable and the system is dependent on the goodwill of the volunteer staff. While there has been a significant improvement in the overall hours covered, the initial attack force should be expected to handle at least a single room and contents fire as a minimum baseline capability. There are four primary corrective actions to support these recommendations:

- The District should continue with the combination type staffing model, however, 3 additional personnel should be hired to staff the second ambulance and help ensure there are 4 personnel responding to a simple room & contents fire (assuming a paramedic unit is not on a transport).

- Modify the existing staffing model to help reduce the amount of time when no stations are staffed. The Management Team should also consider using an e-scheduling system to better predict and manage its resources.

- Modify command staff hours (career and volunteer) to help ensure there is officer coverage on weekends.

- The District should start planning to staff a career engine company within the next 2 - 3 years if the current staffing model cannot meet 24/7 operational needs.
Supporting Information

The issue of staffing levels is among the most controversial factors within Louisville Fire Department. The “Critical Task Analysis,” (see Appendix D) indicates that the following staffing level be considered when developing its one-year staffing plans.

Currently, the existing SOGs outline the necessary resources and apparatus required to manage most of the fire and EMS events in the District. With few exceptions, the volunteer program has very successfully met the community’s needs when it comes to delivery of services. However, with the advent of performance standards, the expectation level of the community has changed. It is no longer acceptable for a department to assume that just because it is predominantly volunteer, an excessively long response time or no response is acceptable.

While even the most sophisticated and well-funded fire departments are challenged to meet the NFPA 1720/1710 standards, it is nevertheless a new fire service standard that departments must work to. Again, the District has done a good job of improving its capabilities over the past 6 years; however, significant gaps in service remain. For example, the last ISO evaluation showed a reduction in fire suppression capabilities and readiness. Any further degradation will most likely result in a reduction in its current insurance classification.

The Department continues to be challenged by significant turnover. This problem is not unique to Louisville, however it is nevertheless impacted by lack of experience and significant recurring training costs to train new firefighters. Currently the make-up of Louisville firefighters is consistent with the demographics of the community.

Louisville is considered a “white collar” community, with a predominantly professional workforce. As with the workforce, the volunteer force is impacted by transfers and changes in work assignments. Also, as outlined in Section IV, personnel demands on volunteer members sometimes conflict with the need for staffing coverage, as well as training and continuing education. That said, keeping a trained, competent volunteer force is a significant challenge.

Strengthening of a Combination Staffing Model

In today’s suburban fire service, the use of a combination staffing concept is becoming more desirable to ensure adequate staffing for initial fire attack and to provide EMS. As outlined in sections IV and V, mounting a successful initial attack largely depends on quick response times and applying water before the fire reaches flashover.

Having a minimum number of trained firefighters on duty at all times improves the Department’s ability to minimize damage to the involved structure, and most importantly, improves firefighter safety. Currently, if there is no volunteer staffing during the daytime, it has a direct effect on the Department’s ability to maintain the OSHA and

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NFPA, two-in/two-out rule. Essentially, the first-in crew is limited to an entry of only two (if EMS is available), or is confined to defensive operations until an engine arrives. (This is considered a significant liability for the District.)

By having one additional career staff to assist in the fire suppression component, entry crews will have a better chance of performing interior operations with the initial complement of personnel. It will also help to ensure that an engine can respond with two personnel when there is no volunteer staffing. It should also be noted that the initial gpm delivery should be expected to increase as well. While the combination concept improves the Department service levels, it's not a solution for every conceivable emergency.

One critical operational limitation is that the career responders may transport a patient at the same time a structure fire is received. Albeit a lower probability event, it must be clear to the public and the Board of Directors that having four career personnel on duty is not a solution to every initial response requirement. However, it does provide the most significant improvement to service delivery at a reduced cost. The District should also formalize automatic aid agreements with surrounding area departments to help ensure initial resource requirements are available for major target occupancies in the service area.

**District Challenges and Issues**

There continues to be several management issues that must be explored in addition to complementing the volunteer program with career personnel. Obviously, the Department must continue to minimize potential conflicts between the career and volunteer staff. Many members of combination departments that started as volunteer may feel threatened by the prospect of additional career firefighters taking over their responsibilities.

The Assessment and Management Team still believes that it’s beneficial that the career firefighters only augment the volunteer firefighting staff. The District must, however, not lose sight of its first obligation to protect the citizens it serves. The Board of Directors must always ensure, through the Fire Chief, that the community is provided a consistent and predictable response level.

For the most part, the District has enjoyed a cooperative, productive relationship with its volunteers. For this to continue, the combination staffing model should include a management commitment to minimize the threat to the volunteer firefighters. Another potential conflict is the chain of command. Career and volunteer firefighters could develop different knowledge and experience levels between various ranks.

Conflict can also occur when a member on one group has to take orders from someone he or she believes has less training or experience. This conflict is especially prevalent in departments with different minimum training standards for career and volunteer
personnel. To avoid this potential conflict, the District has done a good job of defining roles & responsibilities and communicating with both volunteer and career personnel. Minimum training levels for volunteer personnel continue to be equivalent to the basic training levels for career firefighters.

Inadequate or misguided department policies can also increase conflict. Sometimes when volunteers are relegated to only support functions with limited possibility for upward mobility, they become frustrated by the perception of having an inferior status. Again, the District has done a good job of integrating the team by ensuring both career and volunteer firefighters continue to have a vital part of the fireground operation and the direction of the Department.

To the extent possible, the Planning Team recommends that management develop its organizational structure and response policies so that they are equitable. Most importantly, the Management Team must communicate that fair treatment is not always equal treatment when dealing with different work groups. Expectations, performance and deliverables can be different depending on the rank, employment status, and time availability. In any case, high standards for both career and volunteer members are necessary, and the standard.

**Other Compounding Factors**

Based on the policy direction of the LFPD Board of Directors and the Planning Team's analysis, it is recommended that the Department’s future staffing profile include a baseline capability for fire suppression. Again, this recommendation was based on the fact that there continues to be significant staffing shortages that have resulted in over 200 calls in 2010 where there was no engine company response.

While a post incident analysis was conducted on the necessity of engine company response, it doesn’t dismiss the fact that there continues to be significant vulnerabilities in the level of service and overall capabilities of the District. The command staff, Operations Focus Group, and member staff should be commended for filling some of these gaps and changing the staffing schedule to cover more shifts. Moreover, the Department has increased the size of its volunteer membership in an attempt to ensure 24/7 coverage, however, the current staffing rational is not consistent with the Department SOGs. In spite of a 100% increase in personnel from 2005, gaps in staffing still remain.

**Recommendation #4 - Fully Implement In-House Paramedic Transport Program Staffing Plan**

The Planning Team recommends the District hire 3 personnel to complete the current paramedic force. They should be cross-trained to provide and support the Department core services including, but not limited to: ALS transports, firefighting, facilities and apparatus maintenance, fire prevention, and public education. We believe that fully
staffing both ambulances has several advantages. At a minimum, it provides an
additional resource to support initial fire suppression during low staffing periods and will
provide the necessary minimum personnel to staff the District #1 ambulance. The
current staffing model has served the District well, however it is both impractical and
ineffective with two operational stations.

Recommendation #5 - Re-engineer Existing Staffing Schedule

The existing staff schedule should be modified to help ensure adequate minimum
staffing and enhance the Department’s 24/7 baseline capability goals. While the LFD
team has done a remarkable job of improving its staffing levels, there continue to be
some shortfalls. As outlined in the 2005 Comprehensive Plan, the District can always
hire additional personnel to ensure that an engine company is on duty 24/7; but the
Planning Team believes future changes to the existing system could minimize the need
to implement that option for the short term.

The LFD should consider changing its fire suppression staffing schedule to ensure 24/7
coverage. For example, increase the daytime shift, require weekend shifts, and
minimize overlaps on like qualifications. If the current staffing is unwilling or unable to
meet these minimum District needs, the District should consider other options to the
extent financially feasible, including a general operating mill levy override initiative.

Recommendation #5a - Other Staffing Options; Consider Supplementing Career
Staff

As a contingency, the District should consider using a strategy of staff augmentation
when necessary. The utilization of part-time employees or subcontracted labor has
proven to be a cost-effective alternative before hiring full-time employees. While these
options must be balance against other District needs, it is a viable option during staffing
shortages. The Board of Directors should annually review its ability to meet the
minimum staffing requirements to adequately protect the District and its residents.

Recommendation #5b - Consider Additional Volunteer Staffing

The Department has done a great job of increasing its staff in an attempt to ensure that
at least one engine is available. The current staff is at 75, however staffing gaps are still
negatively impacting the District’s baseline capability goals. Should the re-engineering
efforts meet the stated objectives, the Planning Team would recommend that an
additional 20 volunteers be authorized.

Recommendation #5c - Evaluate Consolidation Options

While not considered a preferred option or priority, the District can and should consider
alternatives to its current service plan. Consolidation of smaller departments into larger
well-established career departments is not new. The reasons for choosing to go this
way are many - lack of funding to sustain a viable response force, lack of available volunteers, and cost-effectiveness, to name a few.

Louisville is somewhat unique as it does have adequate community support for funding, it can recruit reserves, and it’s very cost-effective compared to all surrounding area departments. In a recent survey, District residents were asked if it was important to maintain a Louisville specific fire department. The results showed an overwhelming preference (79% strongly agree) for keeping local control and maintaining the Louisville Fire Department. The most practical option before any consolidation efforts should be auto-aid or simply requesting more funding to support its mission requirements (see Recommendation #12) and maintain its strong commitment to cost-containment through volunteerism.

**Recommendation #6 - Improve Skills Mix and Consider Career Command Staff Positions**

Unfortunately, as outlined in the previous sections, the Department does have times when a station is staffed with “duty crews” and the skills mix does not meet a desirable configuration. In an effort to minimize those impacts, it would be prudent to implement the following operational concepts and plans:

- The District should also train additional driver/operators to help reduce the occurrence of delayed or no response. At a minimum, there should be 28 certified D/Os on the roster.
- Restructure the current staffing procedure to spread out available D/O resources over more shifts.
- Stagger the career Chief Officers’ and the career Training Officer’s work schedules to support weekends or implement a 24/7 Battalion Chief concept.

Either one of these options should have an immediate and positive impact on the current staffing shortages, particularly on weekends. Most importantly, the BC concept will allow for a 24/7 command presence. The Planning Team believes that having a 24/7 commander will eliminate the impacts caused by having new or untrained firefighters performing critical command functions. Most importantly, firefighters will be allowed time to improve their overall firefighting skills before being expected to make fireground decisions. Any of these options could be realized at either no cost or reasonable additional costs.

**Recommendation #7 - Establish a Baseline Staffing and Capabilities Standard**

As outlined in Appendix D (NFPA 1710), the fire service has established the minimum staffing requirements to effectively and safely manage a 1,700 sq. ft. residential fire. In
short, it recommends 14 firefighters and officers to perform all the necessary critical
tasks. These 10 critical tasks are effectively the baseline capabilities for a given fire. In
order for any department to meet these standards, it must also design a minimum
baseline capability or performance policy.

Currently, the LFD has a minimum staff of 3 career firefighter/medics along with an
average of 4.66 volunteer firefighters and chief officers per call (2010 Data). Assuming
the average staffing or availability per call is 7.66, the question then becomes, what
should be the baseline capability?

Based on the current staffing performance, trends, call load, NFPA response standards
and the District’s risk & hazard assessment, it is easy to justify that a minimum daily
staffing of 10 responders is required to manage the District’s emergency services
needs. This is a net increase of 3 firefighters per day, assuming the average turnout for
structure fires will continue to be 17 personnel. The Planning Team and FD
management understand these recommendations will require a graded financial
approach; however, the District Management Team should start the planning process
with both short-term and long-term targets.

Finding #3 - Volunteer Staffing Programs and Patterns

The LFD has made some significant improvements in its volunteer staffing program
that have had an overall positive impact on delivery of its emergency service
program. The “duty crew” staffing concept for response to all initial fire
emergencies, including EMS incidents, has proven to be beneficial. The findings in this
section highlight the need to continue seeking new innovations to improve its operations
and to the extent possible, improve its pager call-out program. Complete
implementation of interim corrective actions including, but not limited to, staggered start
times and extending weekend duty crews. (See Finding #2 for supporting data.)

Supporting Information

The most important considerations for future staffing enhancements are the cost and
benefit of each improvement. The Fire Department should, if fiscally capable, maintain
and staff fire stations that are located to comply with the adopted standards of response
coverage. While the Fire Department should, if fiscally capable, maintain adequate staff
personnel to assure quality control over program activity and workload management.
That said, maintaining the volunteer program is not only essential to the overall
Department staffing plan, it is the most financially feasible. As defined throughout this
document, turnout and arrival time are critical to the overall service delivery goals. We
know that the “pager call-out” program has served the community well over the years;
however, it still has limited value for staffing initial routine alarms. It does work well for
specific calls that are reported as “structure fires”. Unfortunately, it has not worked well
over the past 6 years to manage the majority of incidents the LFD responds to.
This is not unique to the LFD, nearly all of the remaining predominantly volunteer fire departments along the Colorado Front Range rely on the duty crew concept. It has proven to have a positive impact on the survivability of patients in cardiac arrest or fire prone to flashover. Therefore, it is critical to have the support systems to better facilitate the duty crew program. While it is critically important to maintain the pager call-out program for greater alarms and support, duty crews remain the preferred volunteer staffing model for the delivery of initial services.


Revise the duty crew program as necessary to meet the minimum staffing requirements. For example:

- Change length of duty crew shift period;
- Add a requirement for all members to shift on the weekends;
- Stagger start times, with some incentives to cover hard to fill times periods;
- Implement an e-scheduling system so volunteers can access the shift calendar and officers can see the staffing strength;
- Implement a phone paging system for notification of calls. Currently, members do not like or don’t want the provided voice pagers.

**Finding #4 - Emergency Medical Service/Operations Officer**

As recommended in the 2005 findings, the District Leadership Team should be recognized for accomplishing nearly all of the EMS recommendations. Within a two-year time span, the District initiated a campaign to increase its general property mill levy, obtain state licensing to operate an ALS service, purchased all of the state-mandated EMS supplies & equipment, hired nine fire medics, initiated an EMS cost recovery program, obtained a physician advisor, and implemented some basic components of a QA program. As a result of these proactive measures, District residents and visitors are no longer at risk of losing quality emergency medical services. Most importantly, the District has reduced its ALS response time by nearly 5 minutes, which has directly improved the quality of life and survivability of its customers.

The current level of service provided by the Fire Department is Advanced Life Support with enhanced EMT skills. Its service levels meet national standards or expectations of a modern suburban community. Formal agreements with surrounding area agencies ensure backup ambulances are always available to respond during high call volume or equipment breakdowns.
That said, the Department’s EMS program does lack the maturity of many well-established fire-based EMS programs. While understandable, due to being a new system, the District should work to develop the necessary infrastructure, support, oversight, and supervision to ensure service quality and performance.

**Supporting Information**

After conducting an in-depth review of the LFPD’s EMS system, it is evident that a basic improvement plan in its operating philosophy must be strongly considered. The 2005 LFPD Comprehensive Plan recommended the Department establish emergency medical service goals and objectives. (This document will serve as that vehicle.) The Team also believes that implementing a process for measuring system outcomes and system performance measures will greatly improve the emergency medical system in Louisville. This is typically done by statistical and trend evaluations, and a well-documented quality assurance program with strong supervision and oversight.

The Department has made some attempts to implement each of these programs, however, the current staff tries to perform these functions as a collateral function in addition to their regular duties. For example, the Fire Chief assigned the Training Chief to assume some of the daily supervision and implement the QA provisions outlined in their SOGs. As a result of these actions, there has been some marginal improvement in these program areas, however, the Training Division has suffered by not having a full-time resource dedicated to this activity.

Moreover, supervision of the EMS program requires a consistent and predictable level of field observations and real-time feedback and supervision. Currently, career chief officers provide this function and are effective to the extent possible. They are typically available during the normal 40-hour work week, which means field supervision is only available less than 25% of the time. If we exclude time needed to run other Department functions and responsibilities, chief officer supervision is less than 5% of any work day. The Planning Team would recommend that a full-time dedicated Operations/EMS Chief be hired to manage the Department’s daily EMS needs, provide a consistent QA program and to the extent financially capable, work to AAA accreditation; or seek some type of staffing plan to have direct supervision of the EMS programs. The Planning Team also believes the Department should seek AAA accreditation. It will ensure that all of the necessary EMS program elements are implemented and verified through a third party evaluation.

Emergency medical calls account for approximately 64% (2000-2010 averages) of the call load for the LFD. In addition, the District Overview demonstrates that the population/demographic changes are most likely going to increase the need for EMS in the 5 to 10 year time frame, so the need to ensure a quick response time to all areas of the District remains a high priority.
Numerous studies, starting with the Seattle CPR study in the 1980’s, have indicated that survivability of cardiac arrest patients can be affected by the speed in which ALS personnel arrive on the scene. It is a generally accepted standard for performance that an ALS unit should be on scene within 8 minutes and BLS (First Responder with AED) within 4 minutes (See NFPA 1710). With this understanding, the placement of fire stations plays a critical role in the Department’s ability to provide medical intervention and have a realistic chance of saving lives. To that end, as highlighted in Finding #1, a fire station located in South Louisville should be a District priority.

While the response times, treatment and procedures of ALS companies are vital, another vital link is the intervention by witnesses to cardiac arrests. The speed in which First Aid, CPR, and other actions are taken is a determining factor of overall outcomes. As the Department expands its role, it should develop a more visible, proactive outreach program geared towards educating the public about emergency medical services (particularly defibrillation). The use of AEDs at public venues and athletic events has proven to be a significant and somewhat cost-effective way to provide quick CPR support. Fire stations can never be close enough, or responders fast enough, to administer defibrillation. To the extent possible, the District should seek grants or other funding options to support an AED community-wide program.

The District should also, at least annually, review its operating cost against the approved cost recovery fee structure. It a well know fact that fees will not cover the cost of operating a transport EMS program. Transport fees should at least cover 50% of the ongoing operating costs. When and if operating costs exceed 50% of its cost recovery revenues, the District should request either an increase in fees or a general mill levy increase. The District can obviously choose any options at its disposal, however, there should a funding delta (or action trigger) established to ensure a sustainable EMS program.

Documentation of training and performance is also very important in the EMS field. The Department needs a performance tracking system for enhanced and EMT-B/IV level skills. The development of competency-based curriculum testing for all EMS personnel, on an annual basis, should be a Fire Department standard. This should be in place as quickly as possible. It will require an additional Operations/EMS resource.

Another factor to be considered is a requirement for in-service training with all ALS personnel. In addition to the monthly continuing education requirements, paramedics should have regular feedback sessions with the physician advisor and skills training at Avista Hospital or another agency. This will help ensure their skill levels are maintained and evaluated by a third party. The goal statement for this program is to provide a level of service consistent with similar communities of this size. The Department must continue its development of plans to maintain the Louisville Fire Department’s role in the county-wide Emergency Medical Services Plan.
Finally, as outlined in the staffing section and the EMS analysis, slower ALS response times in South Louisville negatively impact the Louisville EMS system. Again, it’s pretty easy to understand why the service level and response times would be consistent with regional and national standards. The LFD is relatively new to ALS and it will take time and money to close the gaps.

Nevertheless, the District should take a graded approach to solving these challenges. From the Team’s perspective, the first step in this process is to build Station #3 with the understanding that it will take some time to staff it. Once the capital assets are in place it makes it much earlier in the future to resolve the response time challenges in South Louisville. The Team would also recommend the District maintain a strong working relationship with surrounding EMS agencies through the IGA/MOU formalized process.

**Recommendation #9 - Daily Supervision**

The District should have, as a minimum, a supervisor on each shift and preferable in each station. Personnel need to have the necessary supervisory support, to ensure safety, productivity and accountability. The team lead concept has outlived its useful life and it doesn’t fulfill the supervisory function.

**Recommendation #10 - EMS Quality Assurance & Physician Advisor**

This is a follow-on from the 2005 assessment findings; however, there have been some improvements in the QA program. The current system utilizes a third party evaluation of significant or challenging patients. The EMS Chief also reviews each PRC and provides some feedback. The QA program should include all of the elements outlined in the CAAS accreditation including a strong documentation program. As a second component of this recommendation, the program should also include at least semiannually, a skills evaluation and feedback program. The Department should be affiliated with an active pre-hospital EMS system that can provide the necessary guidance and oversight. While the Department has done a good job of implementing all of the traditional program requirements and it has formalized SOGs and protocols, it should enhance the Physician Advisor Program.

**Recommendation #11 - Defibrillation and Public Education Program**

While not a high priority, the EMS program could benefit from an expanded public access “defibrillation program”. The District continues to have a good community CPR program as well as a dedicated ALS ambulance. The District should consider placing defibrillators at all public venues. Along with a strong community CPR program, it could have a meaningful impact on patient survivability.
Recommendation #12 - Dedicated EMS Chief/Battalion Chiefs

The LFD has done a great job of implementing an ALS program, however it does lack the necessary oversight, supervision and daily management. These duties are currently a collateral responsibility under training. It is recommended that an Operations Chief/EMS Officer be hired (or a similar position) to manage these diverse programs.

Finding #5 - Fire Training Facilities / Training Officer

This finding is essentially a carryover from a 2005 finding in that the District has no dedicated training facility. While the county training system was to provide three strategically located regional centers, their final locations have had no real practical use for the Louisville Fire Department. Most, if not all, firefighting skills training is relegated to simulation, using existing buildings within the District and the occasional acquired structure.

The Training Division must use the county training buildings for all “burn” training; however it significantly impacts in District staffing and, more importantly, negatively impacts overall protection of the District. To the extent possible, the District did make improvements to their existing learning resource center at Station #1 and included a couple of training props in the remodel project. From the Planning Team’s perspective, it must have a dedicated facility to accommodate their volunteer programs and to minimize the vulnerabilities caused when training out of district.

From a training perspective, the Planning Team continues to recommend all required certifications be transitioned to IFSAC. While all new driver/operators (D/Os) are trained and certified under the State of Colorado, the Department has been slow to fully implement this program. Finally, the District has had an expanded role in county-wide wildland deployments, so it has necessitated a new baseline training level for all responding employees and members. The Planning Team recommends competency levels should meet S-130/190 to the extent possible.

Supporting Information

As recommended in 2005, this observation proposes the development of plans and specifications for a local fire training facility scaled to the district’s needs. This might include, but is not limited to, a modular/metal type training building such as that used by North Washington, Ft. Lupton or Sterling fire departments.

A training facility would aid in the development and maintenance of firefighting, rescue and other skills over the time frame of the Comprehensive Plan. Moreover, the Planning Team recommends that it may be wise to research a teaming initiative with other departments to the extent possible. Due to District-wide vulnerabilities when equipment,
apparatus and personnel are out of district, it is considered a high priority. The Planning Team understands and appreciates the significant cost associated with such a project, however it has been in the discussion phase for several years. If nothing else, it should be moved to the planning phase.

The Department currently uses IFSAC certifications for Firefighter, Officer and Haz-Mat and has made some progress in transitioning new engineers to the state-approved certification. As outlined in the last assessment, the Planning Team still recommends the District require third party certifications. This is the standard of care for most departments in the Front Range and the old LFD training program cannot be validated. Transitioning to the state program ensures that all driver/operators have met the generally accepted industry standards and the training is accredited by a third party.

For many years, the LFD has not considered wildland fire to be a significant threat; however, that has changed over the past several years. The Planning Team recommends that at the very least, a “wildland team” be implemented and trained to the S130/190 training requirements. The Planning Team believes that the Department must be equipped and trained to meet every fire threat the District might have.

**Recommendations: #13 - Training Center**

The Department has more than doubled its career and volunteer staff over the past six years, which has resulted in more training hours, wear & tear of District buildings, wear of surface streets, and more time out of service due to travel to a county training building. This recommendation is no longer considered a luxury, but a necessity to maintain a trained force.

**Recommendation #14 - Training & Certifications**

The Training Division and FD personnel have made some significant improvements in its training programs. From all indications, it is compliant with all state and federal mandates. That said, we continue to recommend a transition to certifications that are accredited (specifically Driver/Operator). The Department should also initiate a wildland team and train its responders to the basic S190/130 certification.

**Recommendation #15 – Multi-Company Drills**

In addition to the current training program, the Training Division should include drills and simulation in its program. While the JPR and continuing education programs are solid, it should be integrated with drills.
Finding #6 - Fire Code Enforcement and Prevention Programs

The fire prevention and life safety activities of this Department are comprehensive and effective in obtaining code compliance. The Department has done a commendable job of implementing nearly all of the 2005 recommendations, so most of the 2011 recommendations are considered fine-tuning. The workload of this division is primarily impacted by maintenance efforts after occupancy is granted. The Department is now utilizing new technology for records management and manually enters code violations in the field. The Prevention Division has a well-documented program plan that defines or describes the program elements.

Supporting Information

One of the most effective means of controlling the growth of the community fire problem is the Life Safety & Fire Prevention Division (LSFPD). The Planning Team believes that the current staff are exceptional inspectors and have managed the community’s fire defense programs well. Many commercial and industrial structures are sprinklered and inspected on an annual basis. That said, the Team would recommend several areas of improvement from a business management perspective. Perhaps most importantly, the District’s community fire defense programs would benefit greatly from an analysis of emerging trends or recurring hazards in the District. Currently, there is no real effort dedicated to this function. Systems are available and widely used throughout the Denver metro area. They have proven to help identify and target problematic areas throughout the District. This information also allows the Fire Marshal to concentrate on prevention efforts in those areas.

The Department’s preplanning efforts have been a bright spot in the inspection and mitigation programs. Career line personnel along with the Fire Prevention Division support field activities and develop the entire preplan. In an effort to accelerate the field walkdown activity, the District developed a new computer program to manage the information and it is utilized by Fire Prevention personnel to help obtain field facility information.

The LSFPD has a Fire Prevention Program plan that documents and describes the program elements and a means to implement them. The Department has also developed a “Contractors’ Checklist” to ensure that developers and contractors have a guide on what is expected in the LFPD. This has proven to be a very successful tool in ensuring contractors are given standardized instructions of basic code expectations.

Finally, the Planning Team recommends that all Fire Prevention personnel be active in the local chapters of Fire Marshal Associations or the Society of Fire Protection Engineers. It is critical for all personnel to be current with new technologies, code development and emerging trends.
Public Education

The Fire Department has a relatively effective Public Education Program considering there is no one person dedicated to manage the program. It is mostly volunteer-based and entirely dependent on their goodwill for implementation.

Supporting Information

The Department’s Public Education Program is virtually unchanged from the 2005 assessment. Most of the routine requests for public education classes are being met and the Department works hard to contact every 2nd and 3rd grade class in the District.

One notable item since the last evaluation is the development of a “Kids’ Academy”. The program is designed to reach 7 to 12 year olds with an overriding goal of teaching all-risk safety. It is basically comprised of 4 half days of interactive lessons and games to enforce positive safety behaviors. The program has been a remarkable success for everyone involved.

When we look at the role of public education in the fire service, it is changing from a “fire only” basis to more “all-risk” as departments and communities change. With the Department integrating emergency medical information into its publications and audio-visual presentations, its public education program can contribute greatly to the survivability of potential users of the EMS program. The public education program can be used more effectively if it focuses upon targeted audiences. The Department should also conduct a baseline community awareness survey once every five years to determine the depth of public awareness on pertinent issues in order to target activities and programs more accurately.

That said, the Planning Team recommends the Department work towards enhancing its programs to the extent possible with existing staff. The Department should also include an annual “senior safety” component to its education programs. The LFPD has one of the oldest populations in Boulder County so it stands to reason that programs focusing on seniors will be beneficial.

Recommendation #15 - Strengthen Public Education Programs

The Department and community could benefit from an improved public education program. To the extent financially practical, the program could benefit if it included a senior component with some additional corporate elements.

Recommendation #16 - Implement the Residential Sprinkler Component of the 2009 ICC Code

The Department has done a remarkable job of enhancing the 2009 ICC Code, however it should push to implement the residential code. This is not within the LFPD span of
authority, however, it should do what it can to educate and lobby the City for final implementation.

**Finding #7 – Program/Performance Measure Reviews**

The Louisville Fire Department has the desire to set goals and evaluate their completion. The Chief, command staff and District Board clearly understand the importance of producing goals and objectives that can be evaluated. The Comprehensive Plan will be the primary vehicle for evaluating programs and internal operational objectives will be measured through best management practices programs including self-assessments.

**Supporting Information**

Accountability and responsibility are increasingly part of the assessment of services in government. This recommendation is to raise the visibility of the process by recommending a review of all programs, and specific goals & objectives for each program element as it relates to the elements of the Comprehensive Plan. Also, internal self-assessments are an important part of the Department 360-degree functional review. These assessments and SWOT analyses are great tools to ensure internal feedback against the comprehensive planning process.

To the extent necessary, the Fire Department should consider a retreat with the staff and officers to facilitate the exchange of information between programs. This should include a review of the District’s baseline and benchmark performance measures for fire protection services. The goal of this recommendation is to make an assessment of the changes the Department experiences over time.

**Recommendation #17 - Assessment of Performance and Accountability to Taxpayers**

The LFPD is a very transparent organization and provides the necessary access to all District business. The LFPD should, however, review its overall performance and expectations for service by the taxpayer. The LFPD District Board should also review the Department’s performance against its approved “Service Plan” and “Comprehensive Plan” and ensure that the Department is performing as expected.

**Finding #8 - ISO Grading**

The Fire Department underwent a re-evaluation by the Insurance Service Office (ISO) in 2009. As in past evaluations, the District was able to maintain its Class 4 rating by a very narrow margin. While many in the fire service believe that this
rating system is archaic and not relevant today, it does still impact insurance rates for residential and commercial properties.

If for no other reason than keeping a low insurance rate, the District should seek to improve its rating or, at the very least, maintain its current rating. This objective is no small undertaking. It’s reasonable to assume that the District will need to take a graded approach and evaluate other options, including a more aggressive auto-aid policy. That said, implementing the recommendations in this Comprehensive Plan will go far to ensuring compliance to the ISO fire suppression section. Again, the Planning Team understands that this will be a significant undertaking that may take a number of years to implement. Moreover, it will take a significant increase in funding to meet these objectives. (Reference Section IV).

On a more positive note, the District has done a great job meeting all of the 2005 apparatus and GPM recommendation. Adding an additional Type 1 engine has improved the likelihood that the District will always have the required fire flows when apparatus is undergoing maintenance or repairs.

**Supporting Information**

The ISO only grades cities in this population range about every 10 years. The next grading may be the only time in the 10-year cycle of this Plan that there is a chance to impact the “class” of the District. The Department should institute an internal team to prepare for the next ISO visit to ensure it gets maximum benefit from its policies, practices and resources used for fire protection. This will help the Department obtain the maximum benefit from actions its taken since the last grading. As outlined in the ISO rating of the Louisville Fire Protection District, Fire Department Operations received a slight improvement. However most importantly, over the last two evaluations, the FD Operations score has decreased. This was primarily due to a transition in how volunteers volunteer their time.

Staffing strategies have been redesigned to better accommodate volunteer schedules, because over the past decade volunteers are no longer available to respond from home. This is also compounded by the lack of affordable housing available in the LFPD. The District’s overall ISO performance and capabilities have eroded over time and it is not likely that it will significantly change without a change its staffing strategies.

It should be noted that 2 of the 3 rating areas are not entirely within the control of fire department management or the District. Improvements or failures in the ISO water supply and communications sections are primarily influenced by the city’s water supply and maintenance program and Boulder County Communications Center performance and records. At the end of the day, it will ultimately be up to the District Board of Directors and Management Team to determine the priority of the ISO recommendations.
Recommendation #18 - Review ISO

The LFPD should take the necessary internal actions to evaluate its compliance to ISO and determine the benefits of Center for Public Safety Excellence Accreditation. The District Board and Management Team shall also determine what funding will be required to meet the minimum requirements to maintain a Class 4. If the District moves forward with accreditation, the funding requirements shall also be estimated to achieve compliance.

Finding #9 – Essential Assets (Apparatus Replacement Schedule)

Again, the District has done a great job of implementing the apparatus assets recommendations outlined in the 2005 Comprehensive Plan. The Department has added an additional engine, a Type 6 brush truck and purchased two ambulances to support the community based ALS/EMS program. These actions have had a direct effect on maintaining the Department minimum fire flow demands and ensuring that the District’s fire suppression capability is not compromised when an apparatus is out of service. As successful as the District has been, it must not become complacent with its apparatus replacement plan or considering specialized pieces of equipment to better serve and protect the District.

Supporting Information

While the vast majority of each year’s budget goes to personnel and operational program costs, the purchase price of a fire vehicle often creates “sticker shock” to the agency making the acquisition. As the District continues to implement its replacement cycle of fire apparatus, it has become more of a planning issue to balance apparatus against other future capital needs.

The District has done a good job of minimizing the risk of impacting its current ISO gpm requirements with the addition of a new engine. The District can now sustain a fire flow of 4000 gpm. That said, the Planning Team strongly recommends the District not only evaluate its apparatus and equipment needs based on gpm, but also the needs of the District.

For example, the city of Louisville has one of the largest open space areas of any city of its size, and the Department has limited access to much of those areas. Most, if not all, of the existing bridges in the open space cannot support the weight of even the smallest brush truck. The topography of much of those areas is so steep that conventional brush trucks are not accessible or would not be safe to operate in.

Most importantly, the City no longer supports mowing fire breaks between residential areas and vegetation in many areas is overgrown and the fuel load is not managed. Managing this new threat requires the District to add at least one 6x6 ATV concept
vehicles to its fleet. The addition of this apparatus will allow firefighters to access areas not currently accessible, mitigate fires in their incipient phase, improve firefighter safety, and better protect residences that back to open space.

The LFPD has also been proactive by adding a donated Zodiac inflatable boat to its inventory. The boat is currently at Station #2 and is deflated for storage proposes. Unfortunately, it’s not easily accessible for emergency deployments. The Planning Team recommends that it have a dedicated towing trailer with a small gas motor.

It should be noted that the FD Management Team now considers wildland fires to be a significant threat to the community; therefore, the Planning Team recommends that a select number of 20 firefighters be trained to this capability. The Team believes that the Department must be equipped and trained to meet every fire threat the District might have and it should have some more specialized firefighters to meet this unique need.

**Table 12 - Fleet Replacement Schedule**

<table>
<thead>
<tr>
<th>Station #1</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Apparatus</strong></td>
<td><strong>Year Purchased</strong></td>
</tr>
<tr>
<td>Engine 2701</td>
<td>2008</td>
</tr>
<tr>
<td>Ladder 2716</td>
<td>1993/2010</td>
</tr>
<tr>
<td>Medic 2721</td>
<td>2007</td>
</tr>
<tr>
<td>Brush 2731</td>
<td>1991</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Station #2</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Apparatus</strong></td>
<td><strong>Year Purchased</strong></td>
</tr>
<tr>
<td>Engine 2703</td>
<td>1995</td>
</tr>
<tr>
<td>Ladder 2717</td>
<td>2001</td>
</tr>
<tr>
<td>Medic 2722</td>
<td>2007</td>
</tr>
<tr>
<td>Brush 2732</td>
<td>2006</td>
</tr>
</tbody>
</table>
Finding #10 – Essential Resources (Apparatus Maintenance Programs)

The Planning Team’s review of the current apparatus maintenance and replacement schedule indicates a well-managed and documented system. Also, all repairs are documented in the Department-approved database.

Supporting Information

As the fleet has increased over the years, the Department has made a big commitment by having its own fleet management tech on staff. The District has also invested in a “repair order” system that is designed to capture needed repairs, track repair progress, and document how the repairs were fixed and closed out.

The Department also has a PMO and PMI system that is designed to prevent or minimize apparatus and equipment downtime and to help ensure operability. For a department of this size, it is unusual to have systems and procedures that are compliant to the NFPA 1500 recommendations for maintenance.

That said, they are in their infancy and require some oversight and management to ensure they are done to procedure. Current staff has been slow to institutionalize these industry practices. It has also become evident that the District is need of its own fleet services building. There is no shortage of operational and safety concerns that have arisen because there is not dedicated space.
For example, responders have to routinely work around maintenance parts and equipment, exposed fuels & liquids, and unsecured tools. Moreover, both stations have been damaged due to maintenance on cabs or ladders, not to mention the damage of trucks from single person backing. These are all precursors to injury or continued damage. While some may see it as a minor inconvenience or the price of doing business, the Planning Team believes that it is a significant safety concern that should be a District priority.

The District should also make a conscious effort to review the apparatus replacement schedule every budget cycle. The condition of apparatus does change from year-to-year and it’s necessary to have some flexibility in the replacement cycle.

**Recommendation #18 - Fleet Services Facility**

Performing truck maintenance in a fire station is considered a safety issue. The fleet mechanic should have a dedicated area to perform maintenance. Most importantly, firefighters should have an area that is free of tripping hazards, exposure to chemicals, and chronic industrial noise caused by vehicle maintenance. It should not be considered a luxury, but a necessity for firefighter safety and protection of District facilities.

**Finding #11 - Information & Technology**

The Department’s current information management systems have been improved as recommended in the 2005 Comp Plan recommendations, including implementation of a NIFRS compliant reporting system. Most importantly, these improvements have had a direct effect on personnel productivity and standardization of FD Operations. The Fire Department does not, however, have a comprehensive management information system that can be utilized to perform HR functions.

**Supporting Information**

The Department is no longer a small department and it requires that the Administrative Division have a system to help manage its personnel needs. This is to ensure accuracy in management information and to maintain compliance with the applicable state and federal employment laws. This includes, but is not limited to: call timecards, payroll, inventories, training and personnel tracking, etc.

The Department is also lacking voice and telecommunications in both stations. The current system reduces the effectiveness of career and volunteer staff because there is no communications link between stations. Each work station should have direct video conferencing to support the multiple shift turnovers. The Team strongly recommends that this technology be funded to improve productivity of all staff and improve customer communications.
Consideration should also be given to integrating the AVL system in the primary responding units. The Boulder County Communications Center will soon be installing a new CAD system with AVL capabilities. If the District chooses to move forward with this recommendation, it could ensure that the closest unit is always dispatched and the current LFD mapping system is integrated into the county system. This will also allow BCC and commanders to see the location of responding units.

Lastly, the Department is lacking a technology replacement plan that is typical of most governmental and corporate entities. The Department currently runs most systems to failure, which has caused some loss of productivity. It is vitally important for the District to maintain a 24/7 operational capability, thus, the recommendation to develop a technology replacement plan and integrate it into the budget plan.

Recommendation #19 - Technology Upgrades

The LFPD should continue to upgrade its operational and support systems to include, but is not limited to: HR management software, automatic vehicle locations (AVL), voice communications between stations, and implementing a “technology refresh” program every 3 to 4 years.

Finding #12 – External Relationships (Auto-Aid or Box Alarm Assignment)

The Department has implemented all of the recommendations for establishing formal mutual aid agreements with surrounding area departments. However, there are areas in the District that could benefit from auto-aid or box alarm assignments.

Supporting Information

The Department currently enjoys good working relationships with the surrounding area departments and they routinely call on each other for support when needed. However, the Department should also consider utilizing automatic aid or box alarm assignments for target hazards including, but not limited to: “big box” stores, hospitals and the tech center. The Planning Team is also sensitive to the concerns of surrounding agencies when auto-aid is abused. There have been many cases where auto-aid has been used to cover routine alarms for agencies that are unwilling or unable to cover them themselves.

In some of the latest auto-aid discussions, one agency has refused to help cover new developed areas in South Louisville. This agency refused to sign a formal agreement because they don’t believe their taxpayers should be responsible for protecting new development in an adjoining district. Their position is that it is up to the LFPD and the
City of Louisville to protect their new development and it should have been considered when approving the new projects. The LFPD Management Team and Board of Directors certainly understand these concerns and are currently evaluating tangible options (contained within this Comprehensive Plan). To the extent possible, the Planning Team recommends that the District make modifications to these past proposals to help minimize the impact on surrounding agencies.

For example, the LFPD can implement a limited auto-aid agreement whereby they only request a box alarm for specific targeted addresses. By prioritizing protection in the South District, it will minimize the need for auto aid; however, there is no single department that can handle every conceivable emergency. The question the District will need to answer in the near future is whether to build and staff a station in South Louisville to address these higher risk areas and accommodate the demands of existing and new development.

**Recommendation #20 - Evaluate Auto-Aid Policy**

The District should reevaluate the need for auto-aid in South Louisville and specific target hazards. Until the District can meet its response time and staffing goals, it should consider an auto-aid option, to the extent that their neighbors are available.

**Finding #13 – Financial Resources**

The Louisville Fire Department Management Team, with the support of the Board of Directors, implemented a strategy in 2006 to increasing the current funding level by increasing the fire protection mill levy. This allowed the District to implement an ALS transport program, remodel Station #1 and replace some older equipment.

Like most departments in Colorado, the current funding will not support the longer term needs of the District. The Management Team believes that present funding will sustain the organizational and community protection needs for another 3 to 5 years. This is assuming there is no improvement in service levels in South Louisville or support & training structures constructed. This also assumes that the current staffing profile won’t change.

The question of funding capital projects and improving the community’s fire defense programs is always a tough decision for any elected official. At the end of the day, funding must be balanced against the needs of the department and the support of the taxpayers.
Supporting Information

As outlined in Chapter VIII (Summary and Cost Estimates) it is evident to the Planning Team that the existing authorized funding levels will not meet the Department’s future service level requirements. While it is nothing short of amazing that the Board of Directors and the FD Management Team has been able to provide a quality service with only one tax increase in 35 years, it is not realistic to believe that the current funding level can sustain the needs of the community for more that 3 to 5 years.

With the addition of 40 new volunteer positions, increases in EMS staffing and an ops chief, much of the current funding will be committed to maintain these important operational needs. The Planning Team understands that it may not be practical or financially feasible to implement all of the comprehensive planning recommendations at one time, therefore a graded approach is reasonable.

Simply said, the District will have to prioritize its program needs and evaluate when and if these recommendations will require an additional funding increase. It should be noted that the District needs to be progressive today to protect tomorrow. The District can no longer wait until operational funding is depleted, exhaust its reserves, or defer capital projects and expect to adequately protect its customers.

Expectations from District customers are much different than they were 30 years ago as highlighted in the 2009 Community Survey. This survey showed that customers expect a service level that is consistent with national response standards and the District should be responsive to their needs. It is not inherently negative or signify a system failure if the District asks the taxpayers for a funding increase to achieve these stated performance goals. It is the opinion of the Planning Team that many of the 2011 Comprehensive Plan recommendations directly impact the customers’ quality of life.

Recommendation #21 - Funding Determinations

It is recommended that the LFPD Board of Directors determine the phasing of its capital and operational improvements. While currently not practical to fund all of its capital construction needs, to the extent financially practical, the District should prioritize “mission critical” programs and capital projects. That said, the District should consider requesting a general mill levy increase no later than 2016 to maintain its operational capabilities and consideration should be given annually to a bond initiative to support all of it capital needs.

Finding #14 - Preplanning

The Fire Department has done a remarkable job of developing a comprehensive pre-fire planning program. It shows a commitment to both firefighter safety and community life safety. All target hazards have a higher priority for completion and
are reviewed on regular basis.

Most notably, the Department has automated the preplan system and its now available on every apparatus computer. Moreover, preplans are updated on every computer within 24 hours of an update. As far as the District has come in its preplan development, the Strategy and Tactics sections are only in the beginning stage with few exceptions. The Management Team estimates that at the current rate of completion, it would take 2 to 3 years to complete the inventory.

That said, the District should consider contracting completion of some plans to the extent that funding is available. This will allow completion within two years. Again, this was an enormous amount of effort that required a team effort to complete within three years.

**Recommendation #22 - Strategies and Tactics**

The LFD should complete the Strategies and Tactics section of its preplans.
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VII. PERFORMANCE GOALS AND STANDARDS OF COVER
The Louisville Fire Department Comprehensive Plan contains seven goals under which the fire protection and emergency services operate. These goals reflect the Department’s desire to maintain its current level of service in light of the increasing demands for service and need to reduce response times. Each goal has a specific associated objective. Most of the objectives are quantified in order to provide performance measures for existing and future service. These measures use comparable data to establish benchmarks for comparison with 5-year averages, previous years and other jurisdictions.

Comparative data helps establish reasonable community expectations, assess the efficiency and effectiveness of the Department’s services, and identify practices that lead to superior service. These objectives were developed after reviewing Louisville’s past experience against data from other cities and districts with similar characteristics. The Department used comparisons from peer cities and districts. Peer departments are those that have similar demographics and have exchanged data for a variety of purposes. Comparable districts and cities are considered those with populations between 20,000 - 50,000 in 2011.

**Goal One – Minimize Death and Injuries Due to Fire**

The most tragic consequences of uncontrolled fires are human casualties. Therefore, the Department and its firefighters make every effort to keep deaths and injuries at the lowest level possible.

**Objective 1** - Limit the community to one fatality fire per 25,000 population on a 20-year average

Over the past 20 years, Louisville has experienced two fatal fires with a total of five fatalities in the past 35 years. It is important to understand that a single fire can produce multiple fatalities, thereby dramatically changing the annual fatality rate for a given period. Therefore, this goal is considered a stretch goal.

**Objective 2** - Limit fireground injuries to firefighters to two per year

Over the past 6 years, Louisville has not had a firefighter injury at a fire. Because injuries are closely tied to the number and severity of fires encountered in a given year, reducing the number and severity of fire will help ensure the injury rate stays low. Because the Department has had a very low fire rate in the last 5 years, the injury and accident rate is below the national norms.
Objective 3 - Provide fire response within 8 minutes to 90% of calls

A 5-minute response objective is outlined in national standards, this objective represents one of the most difficult challenges the District has. While the Department’s turnout response times have improved with implementation of the duty crew concept, response times exceed what the Planning Team believes are needed for a modern suburban community.

Currently, the Department can respond within 10 minutes to 90% of the calls. From a practical and financial perspective, it’s simply not realistic within the foreseeable future that the Department could meet the national standard. However, the Planning Team believes that it is realistic to reduce the current response time to initial alarms, and therefore have a substantial positive impact on service levels and District quality of life. Further, the District would significantly benefit from a 24/7 engine company. That said, the Department’s stretch performance goal is to respond to fires within 8 minutes 90% of the time.

Goal Two – Minimize Direct and Indirect Losses Due to Fire

Direct fire losses include damage to buildings and their contents. Indirect losses include the cost of medical treatment resulting from fire-related injuries, the loss of personal income & business revenues, loss of property & sales taxes, opportunity cost of lost productivity, and other economic losses to a fire district. Often indirect costs dwarf the direct cost of fire. Because indirect losses are generally proportional to direct losses, the Department uses measures of direct losses as the performance standard for both direct and indirect losses.

Objective 4 - Limit fire starts to 50 per 25,000 population per year

Currently national performance measures are only available for departments that cover a population over 100,000. With 100,000 population, the goal is to limit fire starts to 400 per year. That said, the Planning Team believes that the District should limit fire starts to 10%, or 50 starts per 25,000 population. This is considered an aggressive goal, even with the District’s relatively low annual loss record.

Objective 5 - Limit direct fire loss to $0.30 per $1,000 actual value protected

The data to perform this calculation are relatively new to Colorado. As a result of the TABOR amendment, the county assessor now supplies the District with actual value information. Louisville’s average loss per $1,000 actual value protected is $0.18.
Goal Three – Minimize Death and Suffering for People Experiencing Sudden Illness, Accident or Injury

When people suffer from sudden severe illness, have an accident, or are injured in any way, the emergency medical services (EMS) system attempts to intercede before further injury or death results. A timely and appropriate EMS response reduces deaths, pain & suffering, hospital stays, and medical costs.

Objective 6 - Provide basic or advanced life support (BLS/ALS) and automatic external defibrillation (AED) within 7 minutes for 90% of calls requiring emergency medical assistance

Again, while the national standard is to provide BLS within 4 minutes and 8 minutes for ALS treatment of cardiac arrest, it is not always realistic for a small suburban department with 17 sq. miles of coverage area to meet this standard. However, the Planning Team strongly believes the ultimate goal is to improve the existing BLS/ALS response time to the extent financially practical. That said, the Department has a “stretch goal” of responding to BLS/ALS call within 7 minutes for 90% of calls requiring emergency medical assistance. Even though this objective does fall short of the national standard of 6 minute ALS response times, it does represent a realistic stretch goal. It should be understood that although it will take time to meet this objective, it is nevertheless a vital community quality of life goal. Because the community has a vested interest in “their” response times, the Department should continually evaluate alternatives to bring ALS services to the customer quicker. This objective is considered one the Department’s highest priorities that has a direct impact on the citizen’s survivability.

Goal Four – Minimize Death, Injuries and Property Loss Due to Natural and Technological Disasters

By definition, a disaster is a large scale event that exceeds the resources normally available to cope with the emergency. Planning, preparedness, and public education are key factors in minimizing a community’s risk.

Objective 7 - Support the City of Louisville and Boulder County disaster plans

Because disasters are not routine and come in different sizes, an effective all-risk plan of action is important to maintain. The LFPD will assist both the county and city to implement the plans and provide resources to support annual drills and training. To the
extent financially possible, the LFPD will support the disaster plans and their implementation.

**Goal Five – Provide Cost-Effective Fire Protection and Emergency Services**

The Louisville Fire Department believes in prudent, responsible use of public funds. The Department will continue to evaluate its services in order to establish the best cost benefit ratio possible. This is particularly important when demands for services grow faster than the available financial resources.

**Objective 8 - Seek the appropriate funding levels to maintain a high quality of life**

Evaluate the community’s expectation for services and seek the necessary funding to support that expectation. Louisville’s average cost per capita is currently $115 (2010 Data). The Management Team’s recommendation is to increase operating costs to $150 per capita no later than 2016.

**Goal Six – Maximize Citizen Satisfaction**

The Department is customer-focused and recognizes the importance of citizen satisfaction. Therefore, the Department will focus its efforts to maximize citizen satisfaction through the following objectives.

**Objective 9 - Maintain an 85% approval rating by citizens contacted in the city survey**

Citizen surveys provide valuable information about public expectations and experience. Currently, very little information existed about citizen expectations of Louisville fire and emergency services until 2009 when the District commissioned a community survey.

The District survey conducted in June 2009, indicated a satisfaction rating of “Good to Excellent” in fire suppression at 96% and 95% in ambulance services. The City of Louisville also had an independent city survey in 2004 that showed an 84% overall satisfaction rating of the Department, *this was the highest rated department in the survey.* The Planning Team strongly believes that by being able to deliver quality services in a timely manner, the Department will maintain a high satisfaction rating. That said, it is vitally important that service levels stay consistent with similar demographics. The Department has a goal of maintaining an 85% approval rating.
Goal Seven – Be a Model Customer Service Provider

The Louisville Fire Department has always taken extreme pride in providing quality service to the community. It is the Department’s goal to set high customer service standards and to always remember that each customer has expectations.

Objective 10 - It is the goal of the Louisville Fire Department to meet our customer’s expectation every time we provide services. While we may not be able to control the outcome, the Department will try to meet these internally established goals for service.

- We will provide the quickest service possible.
- We will provide an effective service, solving the customer problem, to the extent possible.
- We will provide a well-managed emergency services program.
- We will provide a skilled and trained response force.
- We will always care for the people we serve.
- We will provide our services safely, minimizing firefighter injuries.
- We will inspect all public structures annually to ensure the public’s safety.
- We will provide an active public education program.
SUMMARY

The Planning Team believes that the Louisville Fire Department is a well-structured and very focused fire service agency. It displays a great deal of professionalism in its activities and performance. The Department should be commended for its track record of achievement and commitment. The interview process revealed that Department members are knowledgeable and motivated.

This report has offered a number of recommendations that if adopted, will assist the Department in being prepared to keep pace with the changes in service demand and community expectations over time. These adjustments may not be dealt with all at once, but incremental adjustment over time can accumulate to significant improvements in the Department's ability to provide quality services to its citizens. It must be noted however, that the initial investment should be significantly weighted in the next 2 to 3 years.
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VIII. SUMMARY AND COSTS OF RECOMMENDATIONS
The LFPD Fire and Emergency Services Comprehensive Plan has seven (7) goals and twenty-two (22) recommendations to enhance the safety and well-being of the citizens of the Louisville Fire Protection District. Each of these goals and most of the recommendations has specific performance objectives associated with them. The Plan weighs safety and economic security against the cost to the taxpayer. The Department believes this Plan is both reasonable and cost-effective. It should be noted that there has only been one mill levy increase for emergency services in LFPD for nearly 36 years. The Board of Directors and fire service managers should be commended for their vision and commitment to keep operating costs down while maintaining an effective community fire defense program.

It is clear to the Planning Team that the existing assessed mill levy is sufficient for the next 3-5 years, providing the goal is to maintain the status quo. If however, the District chooses to move forward with some or all of these recommendations, it is not realistic to believe that it could be accomplished with the current funding available. Regardless whether any of these recommendations are implemented, it’s important for the District to not fall behind in its funding appropriations as in the past.

The District should develop a 10-year funding plan that serves as a tool to align its capital projects with available funding. Moreover, it will allow District policymakers to better predict the impacts on changing revenue streams and when to seek a mill levy ballot initiative. Fortunately, the LFPD has a great track record of controlling costs and the Management Team has placed a priority on eliminating any debt and paying cash for nearly all capital projects. This practice, while still desirable, is not sustainable in the long-term, even if very few of recommendations are implemented.

That said, the District is in a unique position to initiate some of its capital projects because of its conservative budgeting practices. Within the next 2 years, the District should have enough capital reserve to build a modest fire station in South Louisville. Again, this assumes that the current staffing profile remains the same, assessed values remain at least at current values, and no significant state tax limitation amendments are passed.

**Observation**

The Department recognizes that public safety is not inexpensive. However, despite the Department’s efforts, both the quantity and quality of its services are dependent on stable revenues to meet the growing demands of the District. Maintaining the status quo in South Louisville no longer serves the needs of District citizens; therefore, the time has come to acknowledge the need to resolve some of the outstanding operational and capital assets needs. The LFPD comprehensive planning process has proven to be a solid investment in maintaining and improving the community’s quality of life. The LFPD Management Team would like to acknowledge the Department’s professionalism and dedication in this planning process. Through their efforts, District residents, property owners and visitors will be assured a consistent, measurable, and cost-effective service.
### Table 13 - Implementation Schedule

<table>
<thead>
<tr>
<th>Plan Year</th>
<th>Capital Construction Projects</th>
<th>Staff Hiring</th>
</tr>
</thead>
</table>
| 2007/2008 | Conduct fire station location study  
Perform Fire Station #1 feasibility study  
(Phase 1) | Add 20 Volunteers  
Hire 9 full-time Paramedics |
|          | Cost $30,000                  | Cost $700,000 |
| 2009     | Renovate Station #1  
(Phase 2)  
Asbestos removal, site prep, design  
Secure land for Station #3 | Add 20 Volunteers |
|          | Cost $85,000                  | Cost $45,000  |
| 2010     | Renovate Station #1  
(Phase 3) - Construction | Add 15 Volunteers |
|          | Cost $1,500,000               | Cost $35,000  |
| 2011     | Build Station #3  
Secure optional land for Station #3  
Training building & Fleet Service Center  
(Phase 1) | Hire 3 EMT/Firefighters |
|          | Est. Cost $450,000 for land acquisition | Est. Cost $300,000 |
| 2012     | Build Station #3  
Site prep, design for Station #3  
(Phase 2) | Hire 3 full-time Battalion Chiefs  
Add 10 Volunteers |
|          | Est. Cost $500,000             | Est. Cost $335,000 |
| 2013     | Build Station #3  
Construction (Phase 3) | Add 10 Volunteers |
|          | Est. Cost $2,100,000           | Est. Cost $35,000 |
| 2014     | Build Training Center and Fleet Service Center  
Design (Phase 2) | Add 10 Volunteers |
|          | Est. Cost $200,000             | Est. Cost $35,000 |
| 2015     | Build Training/Fleet Service Center  
Construction (Phase 3) | Hire 12 full-time Firefighters  
for Station #3 |
|          | Est. Cost $1,400,000           | Est. Cost $1,000,000 |
IX. APPENDICES
Appendix A - Cascade of Events Associated with Emergency Operations
## Appendix B - Building Code: Occupancy Descriptions

<table>
<thead>
<tr>
<th>Group &amp; Division</th>
<th>Description of Occupancy</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-1</td>
<td>A building or portion of a building having an assembly room with an occupant load of 1,000 or more and a legitimate stage.</td>
</tr>
<tr>
<td>A-2</td>
<td>A building or portion of a building having an assembly room with an occupant load of less than 1,000 and a legitimate stage.</td>
</tr>
<tr>
<td>A-2.1</td>
<td>A building or portion of a building having an assembly room with an occupant load of 300 or more without a legitimate stage, including such buildings used for educational purposes and not classed as a Group E or Group B Occupancy.</td>
</tr>
<tr>
<td>A-3</td>
<td>A building or portion of a building having an assembly room with an occupant load of less than 300 without a legitimate stage, including such buildings used for educational purposes and not classed as a Group E or Group B Occupancy.</td>
</tr>
<tr>
<td>A-4</td>
<td>A building or structure, or a portion thereof, for office, professional or service-type transactions, including storage of records and accounts; eating and drinking establishments with an occupant load of less than 50.</td>
</tr>
<tr>
<td>B</td>
<td>A building or structure, or a portion thereof, for office, professional or service-type transactions, including storage of records and accounts; eating and drinking establishments with an occupant load of less than 50.</td>
</tr>
<tr>
<td>E-1</td>
<td>Any building used for educational purposes through the 12th grade by 50 persons for more than 12 hours per week or four hours in any one day.</td>
</tr>
<tr>
<td>E-2</td>
<td>Any building used for educational purposes through the 12th grade by less than 50 persons for more than 12 hours per week or four hours in any one day.</td>
</tr>
<tr>
<td>E-3</td>
<td>Any building or portion thereof used for day-care purposes for more than six persons.</td>
</tr>
<tr>
<td>F-1</td>
<td>Moderate-hazard factory and industrial occupancies include factory and industrial uses not classified as Group F, Division 2 Occupancies.</td>
</tr>
<tr>
<td>F-2</td>
<td>Low-hazard factory and industrial occupancies include facilities producing noncombustible or nonexplosive materials that during finishing, packing or processing do not involve a significant fire hazard.</td>
</tr>
<tr>
<td>H-1</td>
<td>Occupancies with a quantity of material in the building in excess of those listed in Table 3-D that present an explosion hazard as listed in Section 307.1.1.</td>
</tr>
<tr>
<td>H-2</td>
<td>Occupancies with a quantity of material in the building in excess of those listed in Table 3-D that present a moderate explosion hazard or a hazard from accelerated burning as listed in Section 307.1.1.</td>
</tr>
<tr>
<td>H-3</td>
<td>Occupancies with a quantity of material in the building in excess of those listed in Table 3-D that present a high fire or physical hazard as listed in Section 307.1.1.</td>
</tr>
<tr>
<td>H-4</td>
<td>Repair garages not classified as Group S, Division 3 Occupancies.</td>
</tr>
<tr>
<td>H-5</td>
<td>Aircraft repair hangers not classified as Group S, Division 5 Occupancies and heliports.</td>
</tr>
<tr>
<td>H-6</td>
<td>Semiconductor fabrication facilities and comparable research and development areas when the facilities in which hazardous production...</td>
</tr>
</tbody>
</table>
### Group & Division | Description of Occupancy
---|---
H-7 | Occupancies having quantities of material in excess of those listed in Table 3-E that are health hazards as listed in Section 307.1.1.
I-1.1 | Nurseries for the full-time care of children under the age of six (each accommodating more than five children), hospitals, sanitariums, nursing homes with nonambulatory patients and similar buildings (each accommodating more than five patients).
I-1.2 | Health-care centers for ambulatory patients receiving outpatient medical care which may render the patient incapable of unassisted self-preservation (each tenant space accommodating more than five such patients).
I-2 | Nursing homes for ambulatory patients, homes for children six years of age or over (each accommodating more than five persons).
I-3 | Mental hospitals, mental sanitariums, jails, prisons, reformatories and buildings where personal liberties of inmates are similarly restrained.
M | A building or structure, or a portion thereof, for the display and sale of merchandise, and involving stocks of goods, wares or merchandise, incidental to such purposes and accessible to the public.
R-1 | Hotels and apartment houses, congregate residences (each accommodating more than 10 persons).
R-3 | Dwellings, lodging houses, congregate residences (each accommodating 10 or fewer persons).
S-1 | Moderate hazard storage occupancies including buildings or portions of buildings used for storage of combustible materials not classified as Group S, Division 2 or Group H occupancies.
S-2 | Low-hazard storage occupancies including buildings or portions of buildings used for storage of noncombustible materials.
S-3 | Repair garages where work is limited to exchange of parts and maintenance not requiring open flame or welding, and parking garages not classified as Group S, Division 4 Occupancies.
S-4 | Open parking garages.
S-5 | Aircraft hangers and helistops.
U-1 | Private garages, carports, sheds and agricultural buildings.
U-2 | Fences over 6 feet high, tanks and towers.
Appendix C - Glossary of Technical Terms

This glossary defines terms used in Comprehensive Planning which may be unfamiliar to the reader, and/or which have special meaning within the context of fire protection Comprehensive planning.

ABILITY TEST: A test of maximum performance designed to reveal the level of the organization or individual's ability to carry out specific tasks or activities.

ACCEPTED RISK: The amount or level of risk that is allowed by policy. The question of whether a risk is acceptable must be gauged against a benchmark or standard that has been deemed adequate by a particular Authority Having Jurisdiction (see definition below under AHJ), at a specific point in time. The unprotected portion of what there is to burn, defined by the policies, and accepted by the community through approval of the objectives. Examples would vary according to the level of government involved, i.e. District, fire District, county, region through law, regulation or level of service.

ADEQUACY: The quality or state of being adequate; sufficient for a purpose; equal to; proportionate to; or fully sufficient for a specified or implied requirement.

ADVANCED LIFE SUPPORT (ALS): Special Services designed to provide definitive pre-hospital emergency medical care such as cardiopulmonary resuscitation, cardiac monitoring, cardiac defibrillation, advanced airway management, intravenous therapy, administration of specified drugs, and other specified techniques or procedures administered by authorized personnel under the direct supervision of a base hospital or utilizing approved standing orders.

ADVANCED LIFE SUPPORT UNIT (ALS Unit): Emergency vehicles, such as vans, engine companies, truck companies, squad companies, helicopters, and other emergency vehicles that are especially equipped and staffed by certified emergency medical technicians – paramedics to provide Advanced Life Support to the sick and injured at a medical emergency.

ADVISORY COMMITTEE: A body of community representatives that reviews and guides the work of the Planning Team. See also TASK FORCE.

AHJ: Acronym for Authority Having Jurisdiction.

ALARM PROCESSING TIME: The elapsed time from the receipt of an alarm by the dispatch center and the notification of specific fire companies that are to respond.

ALTERNATIVE: (n) One of two or more things, courses, or propositions to be chosen. (adj) Offering or expressing a choice.
ALTERNATIVE SYSTEM CONCEPT: One of two or more ideas for a fire protection system.
ANALYSIS: Examination of a complex, its elements, and their relations.

APPARATUS: Fire suppression equipment such as engine companies, aerial trucks, crash fire rescue, and command officer vehicles.

ARSON: The willful or malicious burning of property with criminal or fraudulent intent.

ASSUMPTION: A situation or condition which must be considered as existing if the organization is forced to operate in a specific manner and over which the organization does not exercise any control.

AUTOMATIC AID: A contract between two or more agencies agreeing to an exchange of emergency response units, such as Fire apparatus, paramedic units, etc., to a predetermined geographical area, regardless of political boundaries to deal with day to day emergencies.

BASIC LIFE SUPPORT (BLS): Minimum acceptable level of pre-hospital care; emergency First Aid and cardiopulmonary resuscitation (and may include EMT-IV) procedures to include recognition of respiratory and cardiac arrest and starting the proper application of cardiopulmonary resuscitation to maintain life support without invasive techniques until the victim receives advanced life support services in the field, or until the patient is transported to a medical facility.

BASELINE SYSTEM: The current system with modifications to the resource levels necessary to meet the organizations situation and objectives.

BENCHMARK: A benchmark is defined as a standard from which something can be judged. Searching for a “best practice” to use as a benchmark helps define superior performance of a product, or services; includes both public and private organizations, apparatus, equipment, fixed and mobile, facilities, methods, human resources and policies by the authority having jurisdiction.

BUDGET: A plan for the coordination of resources and expenditures.

CHARACTERISTIC: An attribute or feature.

CERTIFICATE: A special document issued to an individual by a recognized medical authority denoting competence in a named area of pre-hospital care.

CERTIFIED: Having in one’s procession a currently valid certificate or card issued by a recognized medical/Fire authority denoting personal competence in a named area of prehospital care or fire service delivery.
CERTIFICATION: Certification is a process whereby an individual is tested and evaluated in order to determine their mastery of a specific body of Adequacy – The quality or state of being adequate; sufficient for a purpose; equal to; proportionate to; or fully sufficient for a specified or implied requirement.

CERTIFIED TRAINING: Training that is sponsored or recognized by an organization that is capable of issuing certification to a person completing that training that meets the minimum specifications.

CHARACTERISTIC: An attribute or a feature of something.

CHIEF of DEPARTMENT: The person in the department who is charged with carrying out the policy established by the District governing body.

COMMUNITY/DISTRICT: A population area wherein there is a clear responsibility, and statutory basis, for fire protection.

COMMUNITY RISK ASSESSMENT: The evaluation of fire and other risks taking into account all pertinent facts that increase or decrease hazard in order to define standards of coverage (See OCCUPANCY RISK ASSESSMENT).

COMPETENCY-BASED CURRICULUM: A curriculum in which the specific objectives are defined for each of the separate skills taught in training and education programs with integrated didactic and practical instruction and upon which the successful completion of an examination demonstrates mastery of each skill tested.

COMPLEX: Something made up of or involving an often intricate combination of elements.

CONCEPT: Something conceived in the mind; an abstract or generic idea generalized from particular instances.

COST-BENEFIT: A term used to express the value of a benefit-producing system. Can be expressed as a ratio of cost (negative value) to benefit both in equivalent terms such as dollars, person-hours, etc.

CPR: Cardio Pulmonary Resuscitation.

CRITERION: A measure on which a judgment or decision may be based. Plural are criteria.

CURRENT: Occurring in or belonging to the present time.

CURRENT SYSTEM: The fire protection system in place at present.
DEPLOYMENT: The strategic assignment and placement of fire agency resources such as fire companies, fire stations and specific staffing levels for those companies.

DOCUMENT: (v) Write, record. (n) Book, paper.

DRIVER/OPERATOR: (DO) A state certified apparatus engineer

EDUCATION: a term often used as a synonym for training. In the context of this review it is used to describe training that has been given in a formal fashion and is acquired through or in cooperation with degree granting institutions.

EFFECTIVENESS: Marked by a quality of being influential or exerting positive influence; exerting authority over outcomes producing positive results.

EFFICIENCY: To produce desired results with a minimum expenditure of time, energy, money or materials. Marked by quality, characteristics or facility to serve the performance of a task in the best possible manner. The ratio of “effective” is based upon useful output in relation to the total output of the system.

EMERGENCY: A condition or situation in which an individual perceives a need for immediate medical attention or where the potential for such a need is perceived by emergency medical personnel or a public safety agency.

EMERGENCY MEDICAL SERVICES (EMS): Those services, resources and methodologies utilized in responding to medical emergencies.

EMERGENCY RESPONSE: Response to the scene of an incident that threatens lives or property that requires the use of emergency warning devices in accordance with Colorado state statute.

EMERGENCY MEDICAL SERVICE: Medical service required for the immediate diagnosis and treatment of medical conditions, which if not immediately diagnosed and treated, could lead to serious physical or mental disability or death.

EMERGENCY MEDICAL SERVICES SYSTEM (EMSS): A specially organized arrangement which provides for the personnel, facilities and equipment for the effective and coordinated delivery of services in an EMS area of medical care services under emergency conditions.

EMERGENCY MEDICAL TECHNICIAN – An individual trained in Basic Life Support according to the standards prescribed by Colorado State statute and who has a current and valid certificate in the State of Colorado.

EMERGENCY MEDICAL TECHNICIAN – PARAMEDIC (EMT-P): An individual who has received additional training in Advanced Cardiac Life Support according to the
standards prescribed by the Colorado State Statute and who has a current and valid certificate pursuant to the statute.

**EMPIRICAL**: Originating in or based on observation or experience.

**ENGINE COMPANY**: Fire apparatus that is equipped with fire hose, a water tank, and a pump. This is the basic equipment used for initial attack on fires.

**EVALUATION**: Analysis and comparison of actual performance versus prior plan and stated goals and objectives.

**EXPLORATORY METHODS**: A set of methods which is used to explore what is possible given present capabilities.

**FEES FOR SERVICE**: Funds paid directly to the provider by the patient for charges. These funds are derived from patient’s income and other personal assets.

**FIRE MANAGEMENT AREA (FMA)**: The elemental building block upon which planning is based. An area in which it is desired to define and manage the fire situation.

**FIRE PRE-PLAN**: A document or other information source developed by a fire agency to identify hazardous situations, building information, owner information, and a variety of other data.

**FIRE PREVENTION**: That part of fire protection activities exercised in advance of the outbreak of fire to prevent such outbreaks and to minimize loss when fire does occur.

**FIRE PROTECTION**: The act of shielding from loss or injury due to fire.

**FIRE PROTECTION ENVIRONMENT**: The conditions, circumstances, and influences, under which the fire protection system must operate. Includes population, land use, physical, structural and non-structural, financial and water supply environments.

**FIRE PROTECTION SYSTEM**: A regularly acting or interdependent group of items employed in fire protection. Includes public and private agencies, apparatus, equipment, facilities, procedures, and people.

**FIRE SITUATION**: The state or condition of the community with regard to fire protection. Includes fire related (what there is to burn) and fire system management situations.

**FIRE SUPPRESSION**: The total work of extinguishing a fire beginning with its discovery.

**FIRST RESPONDERS**: Personnel who have responsibility to initially respond to emergencies such as firefighters, police Highway Patrol officers, Life guards and ambulance attendants
FLASHOVER: Thermal radiation feedback from the ceiling and upper walls, which have been heated by the fire. This radiation feedback gradually heats the contents of the fire area. When all the combustibles in the space have become heated to their ignition temperature, simultaneous ignition occurs (NFPA Handbook, Fourteenth Edition).

FUNCTION: One of a group of related actions contributing to a larger action.

GENERAL OPERATING GUIDELINES: Written guidelines that suggest courses of action, usually provided in a manual format. Acronym for this term is GOG; Often considered being comparable with Standard Operating Procedures.

GOAL ACHIEVEMENT: The means of verifying through indicators, either quantitative or qualitative that the end result being desired is being accomplished. Goal measurement does not imply that the goal is totally resolved.

GOALS: The general end toward which effort is directed. In the context of fire protection, Comprehensive planning goals are fundamental, inclusive, nonspecific, qualitative, future-oriented, time independent.

IGA: Intergovernmental Agreement

IMPLEMENTATION PHASE: The period in which the Comprehensive Plan is carried out, updated, and modified.

INCIDENT COMMAND SYSTEM (ICS): A management system that is based on the NIMS. System of controlling resources at the scene of an emergency. The ICS defines roles, relationships and functions of the different individuals responding to an emergency situation.

IFSTA: Acronym for the International Fire Service Training Association.

ISFSI: Acronym for the International Society of Fire Service Instructors.

ISO: Insurance Services Office. An insurance grading organization, which establishes community rankings, based on the capability of the fire organization.

JURISDICTION: A population area wherein there is clearly defined responsibility, based on statutory authority, to provide fire and/or emergency medical services. Also called authority having jurisdiction or AHJ.

LEVEL OF SERVICE: The magnitude of the supply for a public demand. In terms of fire protection the magnitude may be expressed in many ways, such as percent of people protected, percent of buildings protected, area protected, monetary value of property protected, etc.
LFPD: Louisville Fire Protection District

MASTER PLAN: A documented program of action, which defines and controls subordinate activities by virtue of vested authority.

MASTER PLAN WORKING GROUP: A group of community representatives, led by a professional, which performs the pre-planning effort.

MAXIMUM: The greatest quantity or value attainable or attained.

MEASURABLE TERMS: A word or expression that has a precise meaning and that may be measured.

MEDICAL CONTROL: The medical direction and management of an emergency medical services system as set forth in Colorado State Statutes.

MEDICAL DIRECTOR: The physician appointed to provide medical control and to assure medical accountability in accordance with Colorado State Statutes.

MEDICAID OR MEDICARE: A reimbursement from the State or Federal government for eligible services charged to a covered patient.

MEASUREMENT: A quantity or quantitative expression indicating acceptability.

MINIMUM: The least quantity assignable, admissible, or possible.

MOU: Memorandum of Understanding

MUTUAL AID: Wherein fire departments agree to assist each other when an emergency occurs that exceeds the capabilities of any one agency. The Mutual Aid Plan is a County-wide effort that can result in any one agency receiving assistance from any or all of the other agencies in the County. An example would be a large traffic accident or hazardous material exposure to several people. An MCI is larger than the normal day-to-day incident, but smaller than a disaster.

NIST: National Institute of Standards and Technology

NFIRS: National Fire Incident Reporting System.


NFPA Standards: Publications adopted by the NFPA through the consensus process setting a level of standard for fire service related dimensions or equipment specification.
NORMATIVE METHODS: A set of methods, based on goal setting, which are used to determine what capability is needed to achieve some stated objective.

OBJECTIVES: The specific end toward which effort is directed. In the context of fire protection, comprehensive planning objectives are independent of the means by which they may be reached, attainable within the planning period, quantitative. Objectives must be achievable within a certain planning period and be able to be measured in some quantifiable way.

OCCUPANCY CATEGORY: The classifications of occupancies used in the building codes. The structural occupancy categories used in this Planning Guide are from the Uniform Building Code, and the non-structural occupancy categories are from the NFPA 901 Code.

OCCUPANCY RISK ASSESSMENT: An assessment of the potential severity of a specific structure in relation to the fire agency’s ability to handle the type and severity of emergencies within that structure. Occupancy risk assessment often includes classifying these risks into categories. See RISK CATEGORIES.

OFG: Operations Focus Group – LFD Process Improvement Team

OPERATIONAL CONTROL: A day to day supervision of personnel who are assigned different tasks and responsibility in a provider agency. Operational control includes but is not limited to, the areas of scheduling, workload allocations, risk distribution, disciplining, and the setting of priorities for personnel that are hired and work for the provider agencies.

OPTIMAL: Most desirable or satisfactory.

OPTIMUM: Greatest degree attained under implied or specified conditions.

OSHA 29 CFR 1910.120 (q) (3): The citation for the Federal Occupational Safety and Health Administration Program.

OUTPUTS: The specifically intended types of results that can be expected from the activities and inputs that are placed into service. An example of outputs might be comparing the number of fire inspections to the number of staffing hours used to complete them.

PLANNING RISK: That risk, within an FMA, which is selected as the risk, which drives the fire protection planning for that FMA. The planning risk is selected from the major, key, and typical risks, using the historical and statistical risks within the FMA.

PLANNING PHASE: The period in which the community is identified and the fire situation defined; the goals, objectives, selection characteristics and measurements
defined; alternative systems defined and analyzed; a preferred system selected; and a Comprehensive Plan prepared to acquire and maintain the system.

PLANNING PROPOSAL: A document produced during the Pre-planning Phase, which sets forth the need, outlines the approach, and presents a budget for doing fire protection Comprehensive planning.

PLANNING TEAM: A group of community representatives, led by a professional, which performs the planning effort.

PRE-PLANNING PHASE: The period in which the need for a Plan is identified, commitment to planning is made, and the planning effort is organized.

PRIMARY FUNCTION LEVEL: The first level of a function tree; a major system function (such as suppression, prevention, etc.)

PRIVATE SECTOR: That portion of a community that is not in the public sector; generally used as a synonym for citizens groups and private industry.

PRIVATE INSURANCE: A reimbursement from a private medical insurance company for eligible services charged to a covered patient.

PROVIDER AGENCIES: Local governmental entities and agencies that elect to provide a complete pre-hospital care system.

PROTECTIVE CLOTHING: Personal items of clothing and equipment issued to individual firefighters for protection against heat, flame, abrasion, puncture or other traumatic injury during combat operations. Includes, but is not limited to, coats, trousers, boots, gloves, helmets, personal alarm devices, fire shelters, and any other special equipment issued for evaluating exposure such as dosimeters, communicable disease shields, etc. Sometimes referred to by the acronym PPE.

PROJECTED: Extended into the future; forecasted based on present trends.

PUBLIC SECTOR: That which belongs to the public at large; generally used as a synonym for governmental agencies.

PUBLIC SAFETY ANSWERING POINT (PSAP): A single telephone answering point within a given geographical area. A term associated with the countywide 911 system.

PURPOSE: That which is expected to be achieved if the organization is successful in completing their mission. It can be expressed in either qualitative or quantitative terms, within the parameters to be able to objectively verify them. Those, which we hope to create, accomplish, or change with view towards influencing the solution to a problem.
QUALITY ASSURANCE: A process through which a desired level of care is defined, monitored, achieved and maintained by detecting and correcting factors which present the achievement of the established desired quality.

QUALITATIVE: Having to do with the basic nature or kind of a characteristic; such as capital cost, fire loss, etc.

QUANTITATIVE: Having to do with the property by which a characteristic can be measured; such as capital cost not to exceed ten million dollars reduction in fire loss, etc.

QUINT: This is a type of apparatus that combines the functions of an engine company and truck company. It usually carries less hose and less water than an engine. It usually has less ladder reach and amount of ladders than a truck company. The term QUINT is short for quintuplet. This is because the apparatus can do five jobs.

RANKING: The ordering of quantitative scores or qualitative ratings from the highest to the lowest.

RECEIVING HOSPITAL-PARAMEDIC: A hospital contracted with and certified by the Emergency Medical Services Agency that provides an agreed upon level of care to all patients served by EMT-paramedics and transported under medical care.

RELIABILITY: The degree to which a test or other examination is free from chance errors of measurement. The extent to which scores are stable, dependable, and similar upon repeated measurements, consistent scores in successive ratings even with different raters.

RESOURCE FACTOR: An attribute of a function. Specifically as used in Comprehensive planning, the level in a function tree at which the functions may be described in terms of quantities (such as fire flow, person-hours, etc.).

RISK: Possibility of loss, as in fire risk.

RISK: Exposure to a hazard based on the probability of an outcome when combined with a given situation with a specific vulnerability. The level of risk can be described as the probability of a specified loss over a given period of time. All structures, for example, are subject to destruction by fire; however, individual structures vary considerably as to the possibility of loss as a result of their construction, contents and built in protection.

SAFETY EQUIPMENT: Tools and equipment used by individual firefighters to perform firefighting, hazardous entry or rescue work upon which the individual must rely on for personal safety. This equipment is normally not assigned to the individual, but rather carried on the apparatus. Includes, but is not limited to, respiratory equipment,
hazardous materials entry suits, carabineers, lifelines, etc. Does not include nozzles, hoses, ladders, etc.

SELECTION CHARACTERISTICS: Qualitative features used to compare and select systems. Examples are cost, benefits, legislative, political, etc.

SELECTION MEASUREMENTS: Quantitative selection characteristics.

SENSITIVITY: In system analysis, the degree to which a quantity is sensitive to change in its component parts. For example, the sensitivity of total cost to change in estimated.

SERVICE LEVEL OBJECTIVES: Service level objectives are statements of performance unique to a given jurisdiction. These statements should be developed by the agency based upon several factors: nationally recognized standards and practices for fire and ancillary services. The service level objectives should be written based upon a community’s specific profile that includes both existing and future risk levels. The community risk profile should examine the makeup of occupancies; types of uses, what the probability/consequences are of anticipated incidents and the historical response trends and patterns.

STAFFING: The level of personnel assigned to perform the anticipated emergency tasks of a specific fire company for the risk identified in a given District or community; the number of personnel required to perform multiple emergency operations functions such as fire suppression versus EMS or hazardous materials operations.

STANDARDS OF RESPONSE COVERAGE: A written statement that combines service level objectives with staffing levels to define how and when fire agencies resources will respond to call for service.

STANDARD OPERATING PROCEDURES: A term used to describe written direction provided to personnel in a manual format. Similar to the General Operating Guideline, but may be more specific requiring specific actions.

STANDARDIZATION: A process by which a product or service is assessed against some fixed standard or performance or quality.

SYSTEM: A regularly interacting or interdependent group of items forming a unified whole; as a group of devices or artificial objects or an organization forming a network especially for distributing something or serving a common purpose.

SYSTEM CONCEPT: An idea for a fire protection system.

UNCERTAINTY: Lack of sureness; a lack of definite knowledge about an outcome or result.
TASK FORCE: A body of community representatives which reviews and guides the work of the Planning Team. See also ADVISORY COMMITTEE.

TOTAL RESPONSE TIME: It is the total elapsed time from the point of notification to a responding fire company and the arrival of that unit at the scene. Total Response Time equals notification, plus Alarm Processing/Dispatch time plus Turnout Time plus Travel Time.

TRUCK COMPANY: This is apparatus designed to carry ground ladders and aerial apparatus (ladder, snorkel, or boom) and equipment to assist in ventilation and salvage operations.

TURNOUT TIME: The time it takes a fire company to discontinue routine operations and begin to respond.

TURNOUT CLOTHING: A synonym for protective clothing, also called “bunker gear”; acronym PPE is used in many codes and standards. Stands for Personal Protective Equipment.

UNCERTAINTY ANALYSIS: As used herein, an analysis aimed toward gaining more knowledge about the utility and acceptance of a fire protection system in the community.

VULNERABILITY: A measure of adverse consequence that might occur to a structure as a result of exposure to an uncontrolled fire. It is usually expressed as an indication of the difference between a level of risk and a level of service. For example, if a building has a calculated fire flow of 4000 gpm and the level of service can only deliver 2,000 gpm; the structure is vulnerable to total loss unless the fire is controlled at the compartment level. Vulnerability is increased as the size and complexity of a risk exceeds the resources available to contain a fire to a limited level.
Appendix D - Critical Tasking per NFPA 1710

Critical tasks are tasks that must be conducted in a timely manner by firefighters at structure fires in order to control the fire prior to flashover. In creating standards of response coverage, the capability of arriving companies and individual firefighters to achieve these tasks must be assessed. Furthermore, there may be need for critical tasks to be developed for each risk category, if there is a higher level of expectation due to size or complexity of the risk. Firefighter safety must be emphasized when identifying critical tasks. Whenever interior fire operations require the use of at least a 1 ¾ inch hose and protective clothing including turnout gear and self contained breathing apparatus (SCBA), additional personnel must be staged to perform rescue functions for interior firefighters. In this situation, a command structure must also be in place. Critical tasks are described below. These descriptions are supplemented by a table that outlines the tasks that must be accomplished by the initial response force if a department is to control a fire in a typical fire risk if a fire is in progress upon their arrival.

Attack Line - a 1 ¾ inch hose that produces 125-150 gpm and is usually handled by a minimum of two firefighters, or a 2 ½ inch hose that produces 250 gpm handled by two or three firefighters. Generally each engine company carries a set of attack lines preconnected to the pump, one folded on the hose bed, and a special pack designed to be carried into high-rise buildings. The selection of attack line for a given situation depends on the type of structure, the distance to the seat of the fire, and the stage of the fire. The pre-connected lines are the fastest to use but are limited to fires within 200 feet of the pumper. When attack lines are needed beyond this limit, the hose bed or high-rise lines are used. 2 ½ inch attack line will be used when the fire has passed the flashover stage and threatens exposed unburned portions of the structure.

Search and Rescue - a minimum of two firefighters assigned to search for and remove living victims while the attack crew moves between the victims and the fire to stop it from advancing to them. A two-person crew is normally sufficient for most moderate risk structures, but additional crews are required in multistory buildings or structures with people who are not capable of self-preservation.

Ventilation Crew - a minimum of two firefighters to open horizontal or vertical ventilation channels when the attack crew is ready to enter the building. Vertical ventilation or ventilation of a multi-story building can require more than two firefighters. Ventilation removes superheated gases and obscuring smoke, thereby preventing flashover and allowing attack crews to see and work closer to the seat of the fire. Ventilation also gives the fire an exit route so the attack crew can "push" the fire out the opening they choose and keep it away from endangered people or unburned property. Ventilation must be closely timed with the fire attack. If it is performed too soon, the fire will receive additional oxygen and grow. If performed too late, the attack crew cannot push the fire in the desired direction. Instead, the gases and smoke will be forced back toward the
firefighters and their entry point, endangering them as well as any victims and unburned property they are protecting.

Back-up Line - a 1 ¾ inch or 2 ½ inch line that is taken in behind the attack crew to provide cover in case the fire overwhelms them or a problem develops with the attack line. Back-up lines require a minimum of two firefighters per 1 ¾ inch line. A 2 ½ inch line is used for back up when the fire is one that could grow rapidly if not stopped by the 1 ¾ inch attack line.

Rapid Intervention Crew - a minimum of two firefighters equipped with SCBA and available near the entry point to go into the structure, performs search and rescue, or serves as the backup crew if something goes wrong. OSHA, as of October 1998, requires this critical task.

Exposure Line - a 1 ¾ inch attack line staffed by two firefighters and taken above the fire in multi-story buildings to prevent fire expansion. This line is also used externally to protect nearby structures from igniting due to radiant heat. In situations where the heat release is great or structures are built close together, a 2 ½ inch line or deluge gun is used. The use of 2 ½ inch lines doubles the staffing requirement.

Pump Operator - one firefighter assigned to deliver water under the correct pressure to the attack, back up, and exposure lines, monitor the pressure changes caused by changing flows on each line, and ensure that water hammer does not endanger any of the hose line crews. This firefighter also completes the hose hookups to the correct discharges and the water supply hookup to the intake. The pump operator can sometimes make the hydrant hookup alone if the pumper is near a hydrant, but the hydrant spacing for moderate risk fires normally precludes this.

Water Supply - a crew of one or two firefighters who must pull large diameter hose between the pumper and the nearest hydrants, hookup at the hydrant, and deliver a water supply to the pumper before its water tank runs dry. A pumper has about four minutes of water if one 1 ¾ -inch line is flowing. Once a hydrant line is in place, this person can often be given additional assignments.

Incident Command - an officer assigned to remain outside of the structure to coordinate the attack, evaluate results, redirect the attack, arrange for more resources, and monitor conditions that might jeopardize crew safety.

Utilities - at least one firefighter to secure natural gas, electrical supply, and water to the affected structures. Utilities must be secured before interior firefighters can open a concealed space such as an attic.

Ladder Operations - at least one and preferably two firefighters to set up the aerial ladder and a ground ladder to provide access to the roof of the structure when vertical ventilation is performed.
EMS/Rehabilitation - at least one firefighter to establish a treatment and rehabilitation sector in preparation for any victims found and any firefighters who are injured or physically drained. This latter event is a common occurrence during periods where there are high temperatures.

Safety Officer - one firefighter dedicated to the exterior of the structure with the sole responsibility of firefighter and scene safety. The majority of structure fires occur in moderate/typical risk occupancies. The table below shows the standards of cover required for the initial response force to accomplish the critical tasks necessary to mitigate a moderate/typical risk occupancy fire.

**Table 14 - Critical Tasks for Initial Response**

<table>
<thead>
<tr>
<th>Task</th>
<th>Personnel</th>
<th>Engine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial Attack Line</td>
<td>2-3</td>
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</tr>
<tr>
<td>Water Supply</td>
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<td>1st</td>
</tr>
<tr>
<td>Pump Operator</td>
<td>1</td>
<td>1st</td>
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<tr>
<td>RIC Crew</td>
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<td>Ventilation Crew</td>
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<td>Utilities</td>
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<tr>
<td>Ladder Operations</td>
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<td>Incident Command</td>
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<td>Exposure Line</td>
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</tbody>
</table>

As shown above, 14-15 firefighters are needed to accomplish the critical tasks necessary to control a moderate risk fire (2000 sq. ft.) in an efficient and effective manner. It should be noted that the table assumes the availability of three engine companies, one truck company, and a chief officer.
Appendix E - Risk Categories

Once risk factors have been identified by a fire agency, then risk categories should be developed. The fire service acknowledges the possibility that hundreds of different types of risk categories could exist within any individual community. Nevertheless, for a risk assessment to be effective, it must be manageable. Every occupancy should be placed into one of the following five risk categories.

Maximum Risk

An area or building to be classified as maximum risk should be of substantial size and contain properties presenting a high risk of life loss, loss of economic value to the community, or large loss in damage to the property in the event of a fire. Such areas would ordinarily be the highest fire flow areas. The structures within them may lack built in fire protection features and may contain occupants not capable of self-preservation. Examples of maximum risk areas include the following:

a) main shopping and business centers, large department stores, shopping malls, multi-story hotels, and office properties;

b) concentrations of high-risk industrial and commercial properties including hazardous materials facilities;

c) concentrations of theaters, cinemas, clubs, dance halls, bars and other areas with potential for large life loss;

d) buildings over two stories high with or without built in fire protection;

e) occupancies with occupants that may require assistance such as nonambulatory or restrained persons (i.e., nursing homes and hospitals);

f) build up of residential properties adjacent to maximum and high-risk areas;

g) any occupancy over 10,000 square feet without built in fire protection. Maximum risks frequently impact a fire agency's needs for multiple alarm capability and an adequate assessment of its ability to concentrate resources. Failure to identify these risks often results in the inability to control loss when a fire of this category of risk occurs. Proper risk identification of maximum risks is also fundamental to the assessment of need for an individual agency's mutual and automatic aid resources.

High-Risk

A high-risk area or building is defined as one that contains properties presenting a substantial risk of life loss, a severe financial impact on the community, or unusual
potential damage to property if there is a fire. Examples of such areas include the following:
  a) strip shopping centers and business centers not exceeding two stories;

  b) concentrated areas of revenue generating properties or high job loss to the community if business is lost;

  c) infrastructure facilities such as District, state, and federal facilities;

  d) large residential buildings exceeding 5000 square feet (mansions);

  e) properties deemed to be of historical value to the community; and

  f) any building with life safety and fire load beyond the reach of preconnected hose lines (200 feet).

**Moderate/Typical Risk**

An area or building is classified as a moderate risk when it contains built up areas of average size and the risk of life loss or damage to property if there is a fire in a single occupancy is usually limited to the occupants. In certain areas such as small apartment complexes, the risk of death or injury may be relatively high. Concentrations of property may vary, but generally will be of limited extent. Examples of moderate risk areas include the following:

  a) developments of generally detached single family housing;

  b) apartments with pre-connected hose line access (200 feet);

  c) industrial or commercial buildings under 10,000 square feet with built in fire protection not classified as maximum or high hazards. These risks are often the greatest factor in the distribution of fire stations to ensure fair and equitable access to initial attack capability.

**Remote/Isolated/Rural Risks**

Areas or buildings may be classified as remote or rural risks if they are isolated from any centers of population and contain few buildings. Examples include the following:

  a) rural land with minimal occupied structures; and

  b) recreational areas.
Special Risks

Certain small areas, whether comprised of single buildings or complexes, require a first due response beyond that which is appropriate to the predominant risk of the surrounding area. These premises or small areas should be treated as special risks and given an appropriate predetermined response. Examples of such areas include the following:

a) isolated maximum or high-risk structures when they are in other risk areas;

b) railroad lines and interstates; and

c) elementary, junior high, and high schools with or without built in fire protection.
Appendix F – Results of Community Survey

<table>
<thead>
<tr>
<th>Please rate each of the following characteristics as they relate to the LFPD</th>
<th>Excellent</th>
<th>Good</th>
<th>Fair</th>
<th>Poor</th>
<th>% Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall value of the FD to the community</td>
<td>77%</td>
<td>21%</td>
<td>2%</td>
<td>0%</td>
<td>92</td>
</tr>
<tr>
<td>Overall appearance of fire dept apparatus</td>
<td>76%</td>
<td>24%</td>
<td>1%</td>
<td>0%</td>
<td>94</td>
</tr>
<tr>
<td>Overall appearance of fire dept staff &amp; responders</td>
<td>68%</td>
<td>30%</td>
<td>2%</td>
<td>0%</td>
<td>81</td>
</tr>
<tr>
<td>Overall appearance of District facilities</td>
<td>67%</td>
<td>31%</td>
<td>2%</td>
<td>0%</td>
<td>93</td>
</tr>
<tr>
<td>Overall support to local businesses or residents</td>
<td>65%</td>
<td>32%</td>
<td>3%</td>
<td>1%</td>
<td>68</td>
</tr>
<tr>
<td>Overall support of community events and activities</td>
<td>64%</td>
<td>32%</td>
<td>3%</td>
<td>1%</td>
<td>75</td>
</tr>
<tr>
<td>Overall response times to your emergencies</td>
<td>64%</td>
<td>30%</td>
<td>4%</td>
<td>1%</td>
<td>48</td>
</tr>
<tr>
<td>Overall image or reputation of the LFPD</td>
<td>63%</td>
<td>34%</td>
<td>3%</td>
<td>0%</td>
<td>84</td>
</tr>
<tr>
<td>Overall rating of the fire department</td>
<td>62%</td>
<td>36%</td>
<td>2%</td>
<td>1%</td>
<td>87</td>
</tr>
<tr>
<td>Overall presence of dept &amp; members in community</td>
<td>52%</td>
<td>40%</td>
<td>6%</td>
<td>1%</td>
<td>78</td>
</tr>
<tr>
<td>Overall accessibility to employees &amp; board members</td>
<td>50%</td>
<td>37%</td>
<td>10%</td>
<td>2%</td>
<td>38</td>
</tr>
<tr>
<td>Opportunities to become LFD volunteer firefighter</td>
<td>48%</td>
<td>43%</td>
<td>7%</td>
<td>2%</td>
<td>39</td>
</tr>
</tbody>
</table>

The following data is from only those respondents who indicated that the LFD has responded to their residence.

<table>
<thead>
<tr>
<th>Please rate each of the following characteristics as they relate to the LFPD</th>
<th>Excellent</th>
<th>Good</th>
<th>Fair</th>
<th>Poor</th>
<th>% Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall value of the fire dept to the community</td>
<td>81%</td>
<td>17%</td>
<td>1%</td>
<td>1%</td>
<td>28%</td>
</tr>
<tr>
<td>Overall appearance of fire dept apparatus</td>
<td>79%</td>
<td>21%</td>
<td>1%</td>
<td>0%</td>
<td>29%</td>
</tr>
<tr>
<td>Overall appearance of fire dept staff &amp; responders</td>
<td>71%</td>
<td>27%</td>
<td>1%</td>
<td>0%</td>
<td>26%</td>
</tr>
<tr>
<td>Overall appearance of District facilities</td>
<td>70%</td>
<td>29%</td>
<td>1%</td>
<td>0%</td>
<td>29%</td>
</tr>
<tr>
<td>Overall support to local businesses or residents</td>
<td>69%</td>
<td>28%</td>
<td>3%</td>
<td>0%</td>
<td>21%</td>
</tr>
<tr>
<td>Overall support of community events and activities</td>
<td>67%</td>
<td>29%</td>
<td>3%</td>
<td>1%</td>
<td>23%</td>
</tr>
<tr>
<td>Overall response times to your emergencies</td>
<td>65%</td>
<td>30%</td>
<td>4%</td>
<td>1%</td>
<td>15%</td>
</tr>
<tr>
<td>Overall image or reputation of the LFPD</td>
<td>67%</td>
<td>30%</td>
<td>3%</td>
<td>0%</td>
<td>26%</td>
</tr>
<tr>
<td>Overall rating of the fire department</td>
<td>63%</td>
<td>34%</td>
<td>2%</td>
<td>1%</td>
<td>27%</td>
</tr>
<tr>
<td>Overall presence of dept &amp; members in community</td>
<td>54%</td>
<td>39%</td>
<td>6%</td>
<td>1%</td>
<td>23%</td>
</tr>
</tbody>
</table>
### Please rate each of the following characteristics as they relate to the LFPD

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Excellent</th>
<th>Good</th>
<th>Fair</th>
<th>Poor</th>
<th>Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall accessibility to employees &amp; board members</td>
<td>50%</td>
<td>37%</td>
<td>9%</td>
<td>4%</td>
<td>12%</td>
</tr>
<tr>
<td>Opportunities to become LFD volunteer firefighter</td>
<td>49%</td>
<td>41%</td>
<td>7%</td>
<td>2%</td>
<td>12%</td>
</tr>
</tbody>
</table>

### Please rate how protected (safe) or unprotected (unsafe) you feel from the following:

<table>
<thead>
<tr>
<th>Event</th>
<th>Very safe</th>
<th>Safe somewhat</th>
<th>Neither safe or unsafe</th>
<th>Very unsafe</th>
<th>Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business fires</td>
<td>64%</td>
<td>27%</td>
<td>8%</td>
<td>1%</td>
<td>78%</td>
</tr>
<tr>
<td>Residential Fires</td>
<td>63%</td>
<td>32%</td>
<td>5%</td>
<td>1%</td>
<td>94%</td>
</tr>
<tr>
<td>Assisted living facility fires</td>
<td>63%</td>
<td>27%</td>
<td>8%</td>
<td>1%</td>
<td>62%</td>
</tr>
<tr>
<td>Haz-Mat fires</td>
<td>57%</td>
<td>32%</td>
<td>10%</td>
<td>2%</td>
<td>78%</td>
</tr>
<tr>
<td>Natural disasters</td>
<td>40%</td>
<td>40%</td>
<td>17%</td>
<td>3%</td>
<td>75%</td>
</tr>
<tr>
<td>Terrorist incidents</td>
<td>40%</td>
<td>34%</td>
<td>22%</td>
<td>4%</td>
<td>67%</td>
</tr>
</tbody>
</table>

### Please rate the quality of each of the following services or activities we provide

<table>
<thead>
<tr>
<th>Service</th>
<th>Excellent</th>
<th>Good</th>
<th>Fair</th>
<th>Poor</th>
<th>Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fire suppression</td>
<td>59%</td>
<td>37%</td>
<td>3%</td>
<td>1%</td>
<td>58%</td>
</tr>
<tr>
<td>Ambulance services</td>
<td>58%</td>
<td>38%</td>
<td>4%</td>
<td>0%</td>
<td>61%</td>
</tr>
<tr>
<td>Response to inquiries and complaints</td>
<td>51%</td>
<td>40%</td>
<td>7%</td>
<td>2%</td>
<td>37%</td>
</tr>
<tr>
<td>Fire Marshal's office</td>
<td>47%</td>
<td>43%</td>
<td>8%</td>
<td>2%</td>
<td>24%</td>
</tr>
<tr>
<td>Public education programs</td>
<td>46%</td>
<td>43%</td>
<td>9%</td>
<td>2%</td>
<td>54%</td>
</tr>
<tr>
<td>Overall performance of LFPD government</td>
<td>46%</td>
<td>45%</td>
<td>7%</td>
<td>2%</td>
<td>54%</td>
</tr>
<tr>
<td>Building inspections</td>
<td>44%</td>
<td>46%</td>
<td>8%</td>
<td>2%</td>
<td>33%</td>
</tr>
<tr>
<td>Website</td>
<td>44%</td>
<td>42%</td>
<td>13%</td>
<td>1%</td>
<td>25%</td>
</tr>
<tr>
<td>Public information</td>
<td>43%</td>
<td>43%</td>
<td>11%</td>
<td>3%</td>
<td>60%</td>
</tr>
<tr>
<td>Public input/access to LFPD business/planning</td>
<td>34%</td>
<td>47%</td>
<td>13%</td>
<td>6%</td>
<td>37%</td>
</tr>
<tr>
<td>City of Louisville Survey – Fire Services</td>
<td>60%</td>
<td>37%</td>
<td>3%</td>
<td>0%</td>
<td>Unknown</td>
</tr>
<tr>
<td>City of Louisville Survey – Ambulance Services</td>
<td>53%</td>
<td>42%</td>
<td>4%</td>
<td>1%</td>
<td>Unknown</td>
</tr>
</tbody>
</table>

### Please rate your impressions of the following characteristics of LFPD employees and volunteer members

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Excellent</th>
<th>Good</th>
<th>Fair</th>
<th>Poor</th>
<th>Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Courtesy</td>
<td>69%</td>
<td>28%</td>
<td>3%</td>
<td>1%</td>
<td>63%</td>
</tr>
<tr>
<td>Responsiveness</td>
<td>67%</td>
<td>30%</td>
<td>3%</td>
<td>1%</td>
<td>58%</td>
</tr>
<tr>
<td>Overall impression</td>
<td>63%</td>
<td>34%</td>
<td>3%</td>
<td>1%</td>
<td>65%</td>
</tr>
</tbody>
</table>
### Please rate each of the following characteristics as they relate to the LFPD

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Excellent</th>
<th>Good</th>
<th>Fair</th>
<th>Poor</th>
<th>Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td>62%</td>
<td>35%</td>
<td>3%</td>
<td>1%</td>
<td>60</td>
</tr>
<tr>
<td>Response times within natl standards</td>
<td>79%</td>
<td>18%</td>
<td>3%</td>
<td>1%</td>
<td>92</td>
</tr>
<tr>
<td>Important to maintain Louisville specific fire dept</td>
<td>79%</td>
<td>17%</td>
<td>2%</td>
<td>1%</td>
<td>92</td>
</tr>
<tr>
<td>Build stations where they can meet above standards</td>
<td>60%</td>
<td>32%</td>
<td>6%</td>
<td>2%</td>
<td>91</td>
</tr>
<tr>
<td>Important to maintain station in old town</td>
<td>55%</td>
<td>32%</td>
<td>9%</td>
<td>4%</td>
<td>79</td>
</tr>
<tr>
<td>Have amb response times improved since LFD took over</td>
<td>53%</td>
<td>39%</td>
<td>6%</td>
<td>2%</td>
<td>27</td>
</tr>
<tr>
<td>Support 5,000 sq ft sprinkler ordinance - new structures</td>
<td>43%</td>
<td>38%</td>
<td>12%</td>
<td>7%</td>
<td>85</td>
</tr>
<tr>
<td>Consider $5/month tax increase to support round the clock career staffing</td>
<td>38%</td>
<td>39%</td>
<td>13%</td>
<td>10%</td>
<td>92</td>
</tr>
<tr>
<td>Important to maintain mostly volunteer dept</td>
<td>29%</td>
<td>46%</td>
<td>19%</td>
<td>6%</td>
<td>70</td>
</tr>
</tbody>
</table>

### As the District completes implementation of its comprehensive plan, to what extent do you support or oppose each of the following development questions or characteristics in the LFPD

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Strongly Support/ Agree</th>
<th>Somewhat Support/ Agree</th>
<th>Somewhat Oppose/ Disagree</th>
<th>Strongly Oppose/ Disagree</th>
<th>Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maintaining low property tax more important than building a new fire station</td>
<td>22%</td>
<td>30%</td>
<td>33%</td>
<td>14%</td>
<td>86</td>
</tr>
<tr>
<td>Support bond to build new station</td>
<td>20%</td>
<td>44%</td>
<td>21%</td>
<td>15%</td>
<td>88</td>
</tr>
<tr>
<td>Maintaining low property tax more important than quick response times</td>
<td>15%</td>
<td>26%</td>
<td>35%</td>
<td>25%</td>
<td>89</td>
</tr>
<tr>
<td>Consider joining LFD to maintain low tax rate</td>
<td>13%</td>
<td>21%</td>
<td>15%</td>
<td>50%</td>
<td>71</td>
</tr>
<tr>
<td>Establish special improvement District tax</td>
<td>38%</td>
<td>39%</td>
<td>12%</td>
<td>10%</td>
<td>81</td>
</tr>
<tr>
<td>Should LFD provide prescribed burns</td>
<td>39%</td>
<td>45%</td>
<td>10%</td>
<td>5%</td>
<td>86</td>
</tr>
</tbody>
</table>

### How important, if at all, is each of the following questions

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Essential</th>
<th>Very Important</th>
<th>Somewhat Important</th>
<th>Not at all Important</th>
<th>Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smoke/carbon monoxide detectors important in homes</td>
<td>62%</td>
<td>28%</td>
<td>9%</td>
<td>1%</td>
<td>96</td>
</tr>
<tr>
<td>Important to meet natl response time guidelines</td>
<td>50%</td>
<td>37%</td>
<td>12%</td>
<td>2%</td>
<td>94</td>
</tr>
<tr>
<td>Important to work or do business in sprinklered bldg</td>
<td>34%</td>
<td>37%</td>
<td>25%</td>
<td>4%</td>
<td>96</td>
</tr>
<tr>
<td>Important for LFD to maintain family's</td>
<td>32%</td>
<td>38%</td>
<td>25%</td>
<td>6%</td>
<td>96</td>
</tr>
<tr>
<td>Characteristics</td>
<td>Excellent</td>
<td>Good</td>
<td>Fair</td>
<td>Poor</td>
<td>Responding</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------------</td>
<td>-----------</td>
<td>------</td>
<td>------</td>
<td>------</td>
<td>------------</td>
</tr>
<tr>
<td>Responding quality of life</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>How important is it that each fire station be staffed with a minimum number of 3 firefighters, 24/7</td>
<td>27%</td>
<td>38%</td>
<td>29%</td>
<td>6%</td>
<td>93</td>
</tr>
<tr>
<td>Important for LFD to reduce ISO</td>
<td>21%</td>
<td>42%</td>
<td>33%</td>
<td>4%</td>
<td>89</td>
</tr>
<tr>
<td>Important to maintain volunteer fire dept</td>
<td>13%</td>
<td>24%</td>
<td>41%</td>
<td>22%</td>
<td>94</td>
</tr>
<tr>
<td>Important for dist to televise board meetings</td>
<td>9%</td>
<td>14%</td>
<td>41%</td>
<td>36%</td>
<td>96</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sources of information about the LFPD</th>
<th>Always</th>
<th>Frequently</th>
<th>Sometimes</th>
<th>Never</th>
<th>Responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>District newsletter</td>
<td>18%</td>
<td>18%</td>
<td>28%</td>
<td>36%</td>
<td>97</td>
</tr>
<tr>
<td>Louisville Times</td>
<td>13%</td>
<td>18%</td>
<td>33%</td>
<td>36%</td>
<td>98</td>
</tr>
<tr>
<td>Boulder Daily Camera</td>
<td>12%</td>
<td>18%</td>
<td>28%</td>
<td>42%</td>
<td>97</td>
</tr>
<tr>
<td>District volunteer members or employees</td>
<td>3%</td>
<td>7%</td>
<td>19%</td>
<td>71%</td>
<td>97</td>
</tr>
<tr>
<td>LFD website</td>
<td>2%</td>
<td>2%</td>
<td>13%</td>
<td>83%</td>
<td>96</td>
</tr>
<tr>
<td>District Board meetings</td>
<td>1%</td>
<td>1%</td>
<td>6%</td>
<td>92%</td>
<td>96</td>
</tr>
</tbody>
</table>
# Appendix F – 2005 Action Plan Completion Summary

<table>
<thead>
<tr>
<th>Priority</th>
<th>Finding Number</th>
<th>Recommendation</th>
<th>In Effect</th>
<th>Responsible Party</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4</td>
<td>Strongly consider transitioning the volunteer pager on-call program to the “Duty Crew” model, (complemented by “pager on-call” volunteers). Complete new staffing implementation plan as an interim measure to improve staffing coverage.</td>
<td>Complete</td>
<td>Fire Chief</td>
</tr>
<tr>
<td>1a</td>
<td>4</td>
<td>The department should consider transitioning to a “reserve firefighter” program to reduce operating costs.</td>
<td>Complete</td>
<td>Fire Chief</td>
</tr>
<tr>
<td>1b</td>
<td>3</td>
<td>As an interim measure the department should consider re-engineering existing response procedures to reduce response times and maximize available personnel. Implementing a QRV or initial attack concept would minimize the need for highly qualified engineers for every call. This concept would also include placement of an additional type #6 or equal apparatus to be added to the fleet.</td>
<td>Complete</td>
<td>Fire Chief</td>
</tr>
<tr>
<td>2</td>
<td>14</td>
<td>All verbal mutual and auto aid agreements should be formalized. The department should also strongly consider joining the Denver Metro mutual aid agreement for the purpose of mass casualty and natural disaster incidents.</td>
<td>Complete</td>
<td>Fire Chief</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>Implement a staffing strategy that will ensure District coverage 24/7. A “combination” type staffing profile will improve; response times, initial attack capabilities, EMS intervention and survivability.</td>
<td>Complete</td>
<td>Fire Chief</td>
</tr>
<tr>
<td>3a</td>
<td>3,5</td>
<td>Hire a minimum of nine firefighter / paramedics and firefighter / EMTs. Personnel will also support all Fire, EMS and Fire Prevention programs to minimize operating costs.</td>
<td>Complete</td>
<td>Fire Chief</td>
</tr>
<tr>
<td>3b</td>
<td>3,5</td>
<td>As an alternative, policy makers must consider other ALS staffing requirements (should the preferred paramedic transport option not be feasible) i.e., Paramedic Engine Companies.</td>
<td>Complete</td>
<td>Fire Chief</td>
</tr>
<tr>
<td>3c</td>
<td>14</td>
<td>Board of Director’s to adopt, by resolution, the departments performance and standards of cover goals. Seek the necessary public funding and support to implement the proposed programmatic need of the District.</td>
<td>Complete</td>
<td>Board of Directors</td>
</tr>
<tr>
<td>3d</td>
<td>3</td>
<td>Develop a communication system to help ensure a smooth transition to a combination department.</td>
<td>Complete</td>
<td>Fire Chief</td>
</tr>
<tr>
<td>Priority</td>
<td>Finding Number</td>
<td>Recommendation</td>
<td>In Effect</td>
<td>Responsible Party</td>
</tr>
<tr>
<td>----------</td>
<td>----------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
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<td>---------------------</td>
</tr>
<tr>
<td>3e</td>
<td>3</td>
<td>If the District implements an in-house ALS transport program, consideration should be given to eliminate redundancies and improve cost effectiveness. The District should consider a regional delivery approach by teaming with the City of Lafayette and Rocky Mountain Fire Authority. Each department will maintain local control; however resources and equipment can be shared to improve the eastern Boulder County EMS delivery system.</td>
<td>Complete</td>
<td>Fire Chief</td>
</tr>
<tr>
<td>4</td>
<td>10,11</td>
<td>Implement a fleet management replacement plan as outlined in the comprehensive planning document. The department should add one (1) Quint or Type -1 Engine to maintain the required fire flow for the District. Additionally, two (2), type-I ambulances should be procured to support implementation of transport ALS. The department should also strongly consider adding an additional type 6 apparatus to facilitate the QRV, initial attack concept. Finally, Refurbish 2716 by 2008.</td>
<td>Complete</td>
<td>Fire Chief</td>
</tr>
<tr>
<td>4a</td>
<td>12</td>
<td>Implement a computer based maintenance management system. Program will aid management in identifying reoccurring problems and help to predict apparatus and equipment life expectancy.</td>
<td>Complete</td>
<td>Fleet &amp; Facilities Division</td>
</tr>
<tr>
<td>5</td>
<td>15</td>
<td>Develop a more formalized SOG and policy implementation program. The Department lacks many basic infrastructure support documents. The FD Management Team should develop as a minimum the Volunteer program manual and a more comprehensive SOG manual. Reformat current procedures to meet a “Code” format, Develop a comprehensive Safety plan (NFPA 1500 Occupational Safety and Health Program), develop Job descriptions for all current and future positions.</td>
<td>Complete</td>
<td>Fire Chief</td>
</tr>
<tr>
<td>6</td>
<td>2</td>
<td>Rebuild Station # 1 in the current location resulting in a building which is up-to-date with respect to current Building Codes. A third fire station should be constructed in the southeast part of the District to decrease response times for the high-risk occupancies in the area and to support the City of Louisville’s planned commercial and residential growth.</td>
<td>Complete</td>
<td>Fire Chief</td>
</tr>
<tr>
<td>6a</td>
<td>13</td>
<td>Implement a graded approach to upgrade the department’s antiquated information management systems including but not limited to; telecommunications, wake-up alert systems, NFIRS data reporting system, NEXTEL phones for all command and career staff, etc.</td>
<td>Complete</td>
<td>Fire Chief</td>
</tr>
<tr>
<td>Priority</td>
<td>Finding Number</td>
<td>Recommendation</td>
<td>In Effect</td>
<td>Responsible Party</td>
</tr>
<tr>
<td>---------</td>
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</tr>
<tr>
<td>7</td>
<td>1</td>
<td>Develop a more comprehensive risk inventory system. This includes an expansion of the existing pre-fire plans. It is also desirable to complete at least 10 high hazard target occupancies each year. The Department should consider contracting this activity to facilitate completion.</td>
<td>Complete</td>
<td>Fire Chief</td>
</tr>
<tr>
<td>8</td>
<td>7</td>
<td>Develop a Fire Prevention Program manual that outlines how all prevention and life safety programs are managed. Develop a set of procedures that outlines the programs expectations and outlines the program elements</td>
<td>Complete</td>
<td>LSFPD</td>
</tr>
<tr>
<td>8a</td>
<td>7</td>
<td>Upgrade the LSFPD inspection reporting and tracking system. Strongly consider transitioning to computer generated inspection reports. This should reduce unnecessary manipulation of inspection documents and reduce duplication of efforts. A computer based system will also assist in developing a much needed trends analysis to identify reoccurring hazards.</td>
<td>Complete</td>
<td>LSFPD</td>
</tr>
<tr>
<td>8b</td>
<td>8</td>
<td>Evaluate public educational opportunities. To the extent possible, provide at least 4 CPR classes each year to the public. Expand PubEd programs.</td>
<td>Complete</td>
<td>LSFPD</td>
</tr>
<tr>
<td>9</td>
<td>6</td>
<td>Hire a full time training and professional development officer.</td>
<td>Complete</td>
<td>Fire Chief</td>
</tr>
<tr>
<td>9a</td>
<td>6</td>
<td>Develop and implement a comprehensive training program manual and support SOGs. This objective is critical to maintain program continuity and safety.</td>
<td>Complete</td>
<td>Training Division</td>
</tr>
<tr>
<td>9b</td>
<td>6</td>
<td>Upgrade the existing learning resource center at Station #1. Until a new facility can be constructed, the existing facility must have the necessary tables, chairs &amp; AV equipment to meet the department's continuing education requirements.</td>
<td>Complete</td>
<td>Training Division</td>
</tr>
<tr>
<td>9c</td>
<td>6</td>
<td>Transition all certifications programs to IFSAC. To the extent possible train a group of personnel to NWCG-S190/130 (for the purpose of supporting mutual aid and to improve wildland safety).</td>
<td>Complete</td>
<td>Training Division</td>
</tr>
<tr>
<td>9d</td>
<td>6</td>
<td>Evaluate the feasibility of constructing a small training facility within District boundaries. Also evaluate the possibility of locating a county training facility in the District.</td>
<td>Evaluation</td>
<td>Fire Chief</td>
</tr>
<tr>
<td>10</td>
<td>9</td>
<td>Initiate an annual review of department specific goals and objective of each program element. This review should include baseline and benchmark performance measures for fire services. Consider utilizing a retreat concept to facilitate this process.</td>
<td>Complete</td>
<td>Board of Directors</td>
</tr>
<tr>
<td>Priority</td>
<td>Finding Number</td>
<td>Recommendation</td>
<td>In Effect</td>
<td>Responsible Party</td>
</tr>
<tr>
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<td>-------------------</td>
</tr>
<tr>
<td>12</td>
<td>14</td>
<td>Continue to support the City of Louisville and Boulder County disaster management plan.</td>
<td>Complete</td>
<td>Fire Chief</td>
</tr>
</tbody>
</table>
### Appendix G - Financial Comparison of Local Fire Protection Districts (2010 Data)

<table>
<thead>
<tr>
<th>District</th>
<th>Operating Budget</th>
<th>Population</th>
<th>Cost per Capita</th>
</tr>
</thead>
<tbody>
<tr>
<td>Berthoud</td>
<td>$2,450,00</td>
<td>18000</td>
<td>$136.11</td>
</tr>
<tr>
<td>Boulder Rural</td>
<td>$3,200,00</td>
<td>18000</td>
<td>$177.78</td>
</tr>
<tr>
<td>Brighton</td>
<td>$6,549,01</td>
<td>32120</td>
<td>$203.89</td>
</tr>
<tr>
<td>Castle Rock</td>
<td>$8,594.51</td>
<td>45000</td>
<td>$190.99</td>
</tr>
<tr>
<td>Elizabeth</td>
<td>$4,037.15</td>
<td>50000</td>
<td>$310.55</td>
</tr>
<tr>
<td>Evergreen</td>
<td>$3,056.49</td>
<td>16000</td>
<td>$61.13</td>
</tr>
<tr>
<td>Fairmount</td>
<td>$2,976.51</td>
<td>12750</td>
<td>$186.03</td>
</tr>
<tr>
<td>Franktown</td>
<td>$2,750.00</td>
<td>18500</td>
<td>$215.69</td>
</tr>
<tr>
<td>Frederick/Firestone</td>
<td>$6,314.83</td>
<td>26000</td>
<td>$341.34</td>
</tr>
<tr>
<td>Louisville</td>
<td>$2,979.39</td>
<td>50000</td>
<td>$114.59</td>
</tr>
<tr>
<td>Mt View</td>
<td>$4,037.15</td>
<td>82000</td>
<td>$218.80</td>
</tr>
<tr>
<td>North Metro</td>
<td>$10,939.9</td>
<td>32000</td>
<td>$199.39</td>
</tr>
<tr>
<td>Rocky Mountain</td>
<td>$16,350.0</td>
<td>20000</td>
<td>$149.89</td>
</tr>
<tr>
<td>Windsor-Severance</td>
<td>$4,796.49</td>
<td></td>
<td>$300.00</td>
</tr>
</tbody>
</table>

- Operating Budget in $2,000,000
- Population in 1,000
- Cost per Capita in $1,000