



Danville
Fire
Department

Standards
of
Coverage

September 2014

Contents

Section One: SOC Process.....	4
Introduction.....	4
Acknowledgements.....	5
Section Two: Community Profile	6
Component A: Community Served.....	6
The City of Danville	6
Topography and Climate	6
Agency History.....	6
Legal Basis	9
Funding Sources and Restrictions	9
Component B: Services Provided	10
Description of Services.....	10
Description of Resources	13
Description of Workload	14
Baseline Performance	17
Component C: Community Expectations	23
Section Three: Risk Assessment (Component D).....	25
Introduction.....	25
Physical Risk Factors	25
Service Area	25
Topography.....	26
Transportation Network.....	26
Weather.....	28
Non-Weather Disaster Exposure	29
Summary.....	31
Physical Assets Protected	32
Community	32

Fire Districts	34
Properties and Buildings of Concern	39
Development and Population Growth.....	40
Community	40
Fire Districts	42
Service Demand.....	44
Community	44
Fire Districts	45
Critical Task Analysis.....	49
Effective Response Force	49
Critical Tasks.....	50
Resource Depletion.....	55
Section Four: Performance Measurement (Component E)	56
Distribution	56
Basic Measures	56
Performance Objective Measures	57
Concentration.....	59
Basic Measures	59
Performance Objective Measures	60
Reliability.....	61
Basic Measures	61
Performance Objective Measures	62
Summary	64
Section Five: Objective Adoption (Component F)	65
Introduction.....	65
Performance Statement for Structure Fire Responses	66
Benchmark Objectives.....	66
Baseline Statements.....	67

Performance Statements for EMS Responses.....	69
Benchmark Objectives.....	69
Baseline Statements.....	70
Performance Statements for Haz-Mat Responses.....	71
Benchmark Objectives.....	71
Baseline Statements.....	72
Performance Statements for Technical Rescue Responses.....	73
Notes Regarding Technical Rescue Response.....	73
Benchmark Objectives.....	74
Baseline Statements.....	75
Section Six: Compliance Methodology (Component G).....	76
Summary.....	76
Strengths and Weaknesses	77
Section Seven: Overall Evaluation (Component H)	79
Conclusions.....	79
Recommendations.....	80

Section One: SOC Process

Introduction

The following report serves as the Danville Fire Department “Integrated Risk Management Plan: Standards of Cover” document.

The Commission of Fire Accreditation International defines the Standards of Cover as the written policies and procedures which establish the distribution and concentration of fixed and mobile resources of an organization. The purpose of completing this document is to document and support delivery of the agency’s mission statement:

Danville Fire Department strives to protect life, property, and environment through prevention, mitigation, response, recovery, and education in order to promote the entire community’s health, safety, and well-being.

The Standards of Cover is a research-based process, which requires a comprehensive analysis of an agency’s current deployment of services. The document begins with an overview of the jurisdiction and community expectations and progresses into an extensive community risk assessment, followed by a four-year reliability study.

The final component of the Standards of Cover provides the organization with an overall assessment of system capabilities. The agency then develops recommendations to achieve community-identified service expectations and industry standards. The results of the study also assist the agency in developing realistic and achievable service objectives, which assist with compliance methodology and strategic planning.

This document conforms to the 5th edition of the CFAI Standards of Cover guidelines.

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Section Two: Community Profile

Component A: Community Served

The City of Danville

Danville is an independent city in the south-central Piedmont region of Virginia, approximately 250 miles southwest of Washington, DC and 200 miles west of Norfolk, VA. Named for the Dan River which runs thru it, Danville was settled in the 1750s, chartered as a town in 1883, and incorporated as a city in 1890. The city is served by two US highways, a bypass, a rail system which carries freight and passenger trains, and a regional airport.

The city limits encompass approximately 43 square miles of land. The estimated 2012 U.S. Census reported a population of just over 43,000; the resulting population density of 1,000 per square mile classifies Danville as suburban. Additional population demographic details are described in Section Three.

Topography and Climate

The Piedmont is characterized by low, rolling hills. Danville's average elevation is 500 feet above sea level, with variations of +/- 100 feet. Portions of undeveloped land are covered with forest and light brush. Soil is generally clay-like and grows increasingly sandy near waterways. The Dan River runs west-to-east through the heart of the city, dividing the City north and south.

Seasonal temperature averages range from 90°F in summer to 25°F in winter, with an annual average of 69°F. Average precipitation is 45 inches per year, including 4 to 5 inches of snow. Rare instances of extreme weather have included tornado, hurricane, violent thunderstorm, flash flood, and heavy snow or ice.

Agency History

Danville instituted the community's first paid (professional) fire department on January 1, 1884. Records indicate the first apparatus inventory consisted of one Button fire

engine, two Ainsleys, one hose reel, and four horses. Prior to 1884, services were provided by two private fire companies.



Headquarters on Patton Street, circa 1925

The annexation of Neapolis in 1896 prompted construction of a headquarters on Patton Street, where the Municipal Building stands today, as well as a second station just north of the Main Street Bridge which came to be known as the North Main Station.

Of historical note, the “Wreck of Old 97” occurred on September 27, 1903. The southbound Southern Railway passenger train No. 97 derailed and plunged into a ravine below the Stillhouse Trestle, killing eleven persons according to some accounts.

In 1924, a Seagrave ladder truck was added to the department’s inventory, equipped with solid rubber tires, a tiller, and a 75-foot hand-operated ladder. This replaced the hook and ladder, the last piece of horse-drawn equipment in the city.

1926 saw the Patton Street station relocated to a new building on Bridge Street, a facility still in use today as administrative headquarters. However, construction is now under way, and Station One is scheduled to have a new home on Lynn Street in mid-2014.

A third “West End” station, designed for horse-drawn apparatus, was also constructed in the early 1900s less than one block off Main Street.

A two-way radio communication system was installed in 1950, which allowed the Station One telephone switchboard to centrally receive fire calls and dispatch suppression services. The chiefs’ vehicles had two-way radios installed, but radios were not required in the engines.

A 1951 annexation required an additional station to serve the Schoolfield community around Dan River Mills. Station Four was initially located at the West Main Street and Augusta Avenue intersection and was rented from the textile company.

The same annexation prompted construction of a north-side station on Third Avenue. Station Five opened in 1957 and came to serve as the agency's training center with a five story training tower and drafting pit.

In 1971, the station on North Main Street was relocated to its current home on Piney Forest Road to provide better response to the western portions of the city.

In the summer of 1978, Station Three was relocated to Industrial Avenue near the intersection of South Main Street.

Danville's annexation of approximately 27 square miles of Pittsylvania County in January 1988 more than doubled the department's area of responsibility. As a result, Station Four was relocated to its current home on West Main Street, plans were made to add two stations, and six engine companies were added.

August 1990 saw completion of Station Seven on Airport Drive, adjacent to the city's regional airport and within sight of US Highway 58. Around this time, OSHA's endorsement of the Hazardous Waste Operations and Emergency Response (HAZWOPER) Standard prompted the state of Virginia to establish, fund, and train 12 regional Hazardous Material Response Teams. This resulted in an agreement with the Virginia Department of Emergency Management and ultimately the creation of a Regional Level III Response Team, which became operational in December 1990. The Danville Regional Haz-Mat Team was first based at Station Three but later moved to Station Seven.

Station Six was opened in August 1991 on the corner of Westover Drive and Beech Avenue to service the north and west end of the city.

Beginning in 1997, the department began training personnel to the Emergency Medical Technician (EMT) level of certification.

City Council authorized formation of a Fire Marshal's Office in 1998. This led to the creation of a Fire Prevention and Education Bureau and sworn officers with legal authority to investigate fires and enforce city fire code.

In 2000, Danville Fire Department (DFD) teamed up with Pittsylvania County Firefighter's Association and applied for a grant from the Virginia Department of Fire Programs. The \$325,000 award served as the primary funding for a burn building, which is now the centerpiece of the area's Regional Training Center at 658 Stinson Drive.

In 2001, the agency began its 10-year Insurance Services Office (ISO) fire protection analysis and in February 2002 received an ISO Rating of Class 2. DFD is one of only seven agencies in the Commonwealth to hold this distinction.

Legal Basis

The Commonwealth of Virginia, by statute, authorizes local entities to "establish as a department of government a fire/EMS department" (Section 27-6.1). Danville Fire Department is legally established by charter and registered by the Commonwealth of Virginia. The department's authority is granted by an elected City Council consisting of nine members and the City Manager.

Funding Sources and Restrictions

Under a City Manager/Council form of government, all department heads work directly for the City Manager. DFD prepares an annual organizational budget, which is presented for approval first to the City Manager and then to the Mayor and City Council. All city departments operate within the confines of the city's revenue stream, budgetary rules and regulations, and city policy. In fiscal year 2014, DFD's budget accounted for slightly more than 7 percent of General Fund expenditures.

In addition, DFD takes advantage of recurring grant opportunities from the State Homeland Security Program, Assistance to Firefighters, Rescue Squad Assistance, and local organizations. Grants typically fund equipment for technical rescue, Haz-Mat, or EMS.

Component B: Services Provided

Description of Services

Although fire and life safety remain DFD's primary consideration, the agency aggressively pursues fire prevention, property preservation, environmental conservation, and community education.

Fire Suppression. DFD's priority is fire suppression and mitigation. All responders are trained to applicable National Fire Protection Association's (NFPA) Standards.

Operations personnel are required to achieve FireFighter II or higher within two years of employment, and nearly two-thirds have an associate degree or higher in the fire protection field.

Pre-Hospital Emergency Medical Services (EMS). DFD frequently provides "first response" Basic Life Support (BLS) medical care. In fact, EMS incidents comprise 67% of calls processed. All responders are Virginia certified as Emergency Medical Technician D (EMT-D) to provide BLS intervention. Advanced Life Support (ALS) and transport are provided by two external organizations which are dispatched simultaneously with the engine company: Danville Life Saving Crew operates from headquarters on Christopher Lane and a base on Maplewood Street, and Regional One assists from Forestdale Drive.

Hazardous Materials. All DFD personnel are trained to the Operations level and provide support with specific Haz-Mat incident responsibilities, such as decontamination. In addition, DFD operates one of Virginia's thirteen strategically located Regional Hazardous Materials Response Teams. Under terms of contract, the Level III team is staffed with on-duty suppression personnel, and the state supplements funds for response units. Team personnel are trained to the Technician level and are given opportunity to pursue the Specialist level. This arrangement allows DFD to provide the community and region with the highest level of technical hazard intervention available. Danville's Haz-Mat Team consists of 30 individuals, averaging 10 members on each shift. For regional

responses, off-duty personnel are called in at the Commonwealth's expense to staff apparatus.

Hazardous Conditions. The department also responds to incidents that may not be immediately dangerous to life, health, or environment but which have the potential to become so without intervention. Hazardous Condition events include downed power lines, arcing wires, odor investigations, flammable and nonflammable gas leaks, liquid fuel leaks or spills, and motor vehicle crashes without injuries.

Technical Rescue. The DFD Technical Rescue Team (DFD-TRT) is a special operations team whose primary focus is intervention and mitigation of incidents categorized as technical rescue. This highly specialized form of emergency response involves training in one or more of the following components: High Angle, Trench, Confined Space, Structural Collapse, Vehicle Extrication, and Water Rescue. The DFD-TRT consists of 28 Technicians and has access to two equipment trailers, a utility truck, and a rescue engine outfitted with specialized equipment in addition to the standard complement of fire suppression and emergency medical equipment.

Public Service. Public Service incidents include assistance with disabled vehicles, lift assists with an EMS agency, smoke alarm installations, child restraint seat installations, blood pressure checks, and similar non-emergency services. Intervention is decided on a per-situation basis.

Fire Prevention and Education. Danville's Fire Prevention Bureau recognizes the importance of proactive community training and implements a multi-faceted fire and injury prevention initiative. These efforts include how to effect and enforce building, life safety, and fire prevention codes, along with performing fire cause investigations. Public education programs include:

- 9-1-1 Notification
- Exit Drills in the Home
- Get Alarmed Danville
- Fire Safety
- Injury Prevention
- Fire Extinguishers
- School Programs
- Safety for the Elderly
- Bicycle Safety
- Home Safety

The Bureau is staffed by a Battalion Chief and one Assistant Fire Marshal, and available engine companies are utilized as necessary.

Table 1: Summary of Services and Capability

Service	Schedule	Resources and Staff
Fire Suppression	24/7	7 engines 1 aerial apparatus 1 command response unit 1 safety officer 114 responders across 3 shifts
Emergency Medical	24/7	7 engines with BLS equipment 114 responders across 3 shifts
Hazardous Materials	24/7	3 specially equipped response units 2 equipment trailers 1 mass decontamination trailer 3 tow vehicles of varying capacity 30 personnel with one Team Leader/Haz-Mat Coordinator
Hazardous Conditions	24/7	7 engines miscellaneous support vehicles 114 responders across 3 shifts
Technical Rescue	24/7	1 specially equipped engine 2 trailers 1 tow vehicle 28 certified Technicians
Public Services	24/7 as available	7 engines 114 responders across 3 shifts
Fire Prevention	M-F 8-5 & request	2 staff vehicles 1 public education Safety Trailer (towed by one of the utility vehicles Fire Marshal and assistant

Mutual Aid. Every community touching Danville's city limits is serviced by volunteer fire departments, and DFD has written mutual aid agreements with each of them. Such incidents are rare, as noted in Table 2, but should be recognized as one of the department's services. The agreements with Providence and Pelham, North Carolina, were made in 1999, and the agreement with Pittsylvania County was updated October 2013. The older agreements will be updated in 2014. DFD has no automatic aid agreements.

Table 2: Mutual Aid Given by Year

Year	2009	2010	2011	2012	2013
Count	3	2	1	2	1

Description of Resources

DFD has apportioned its response area into seven first-due service areas, which are illustrated in Figure 1 of the Appendix. The outer district boundaries follow the city limits. Six districts have the Dan River as a boundary, four north of the river and two south. The seventh district spans the river in the central, downtown area. Fire district perimeters were determined primarily by travel times between stations.

Resources are assigned to stations, one in each of the seven fire districts. Front-line apparatus include seven engines, one ladder truck, one Haz-Mat truck, and one command vehicle. Reserve apparatus, which include two engines and a ladder truck, are immediately available for substitution of apparatus “out of service” for planned maintenance and unplanned mechanical issues.

Auxiliary apparatus are not staffed but can be made available as needed by transferring on-duty, cross-trained personnel. The assignment of front-line, reserve, and auxiliary resources is described in Table 3.

Table 3: Mobile Resources by Location

Mobile Resource	Station						
	#1	#2	#3	#4	#5	#6	#7
Engine	1	1	1	1	1	1	1
Ladder / Truck	1	R					R
Haz-Mat	1						X2
Command	1						
Tanker / Tender				X			
Brush Truck				X			
Tech Rescue					X		
Utility Truck	X				X		
Reserve Engine			R			R	

NOTES: Figures indicate front-line apparatus; 'X' indicates auxiliary apparatus; 'R' indicates reserve apparatus

Suppression personnel number 114 and are split into three shifts. Each shift is assigned one Battalion Chief and two lieutenants, each station is assigned a captain, and each

apparatus has one firefighter/engineer and two firefighters. Additional firefighters are staffed each shift to cover unplanned absences and auxiliary units. The organization chart in Figure 2 of the Appendix further describes the hierarchy and placement of personnel.

Description of Workload

To better understand service demand and community expectations, historic workload has been summarized. Figures are based on incidents from the period 2009 to 2013 as stored in the Record Management System (RMS).

As noted in Table 4, calls processed per day averaged 17.6 in 2011, 18.1 in 2012, and 18.4 in 2013. Though this reflects an overall increase of nearly 22% since 2009, the rate of increase slowed considerably in 2012 and dropped slightly more to 2.0% in 2013. The day of the week and the month of the year with the highest average call volume have changed every year for the past five years. Additional details and analysis are provided in Section Three Service Demand.

Table 4: Call Volume Summary by Year

Year	Total Calls	Increase	Daily Avg	Busy Day	Busy Month
2009	5,520		15.1	Wed	Sep
2010	5,957	7.9%	16.3	Fri	Oct
2011	6,420	7.8%	17.6	Tue	Aug
2012	6,596	2.7%	18.1	Mon	Jun
2013	6,727	2.0%	18.4	Tue	Dec

To further describe incident volumes, closing call types were broadly categorized by Virginia Fire Incident Reporting System (VFIRS) codes: Fire represents 100, 200, 400, and 700; EMS is 300; and Other includes 500, 600, 800, and 900. Table 5 and Figures 1 and 2 summarize call volumes by service category.

A comparison of the call distribution between service categories for the period 2009 to 2013 reveals the following:

- Though the overall proportion of EMS incidents has remained consistently near 67%, the total number of EMS incidents increased 18% between 2009 and 2013.
- The total number of Fire incidents in 2013 was 13% higher than in 2009, but 2012 and 2013 saw Fire calls as a smaller percentage of all calls. The average proportion of Fire incidents over the five years was 21%.
- Other calls generally comprise 11% of call volume. However, the overall number of non-EMS and non-Fire service calls saw a 50% increase in frequency from 2009 to 2013.

Figure 1: Service Category Breakdown for All Calls for Service by Year

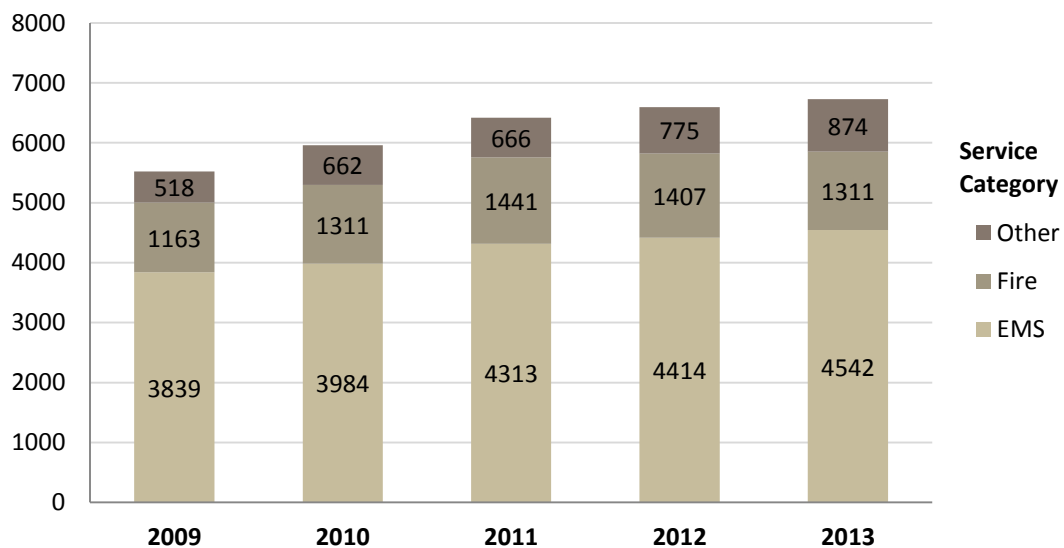


Figure 2: Service Category Trends as Percent of All Calls by Year

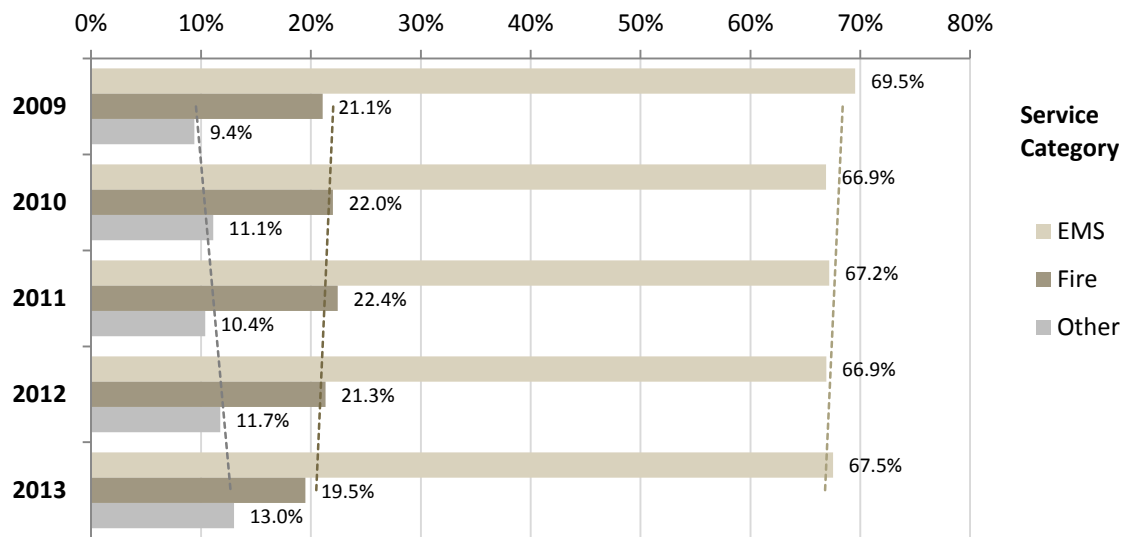
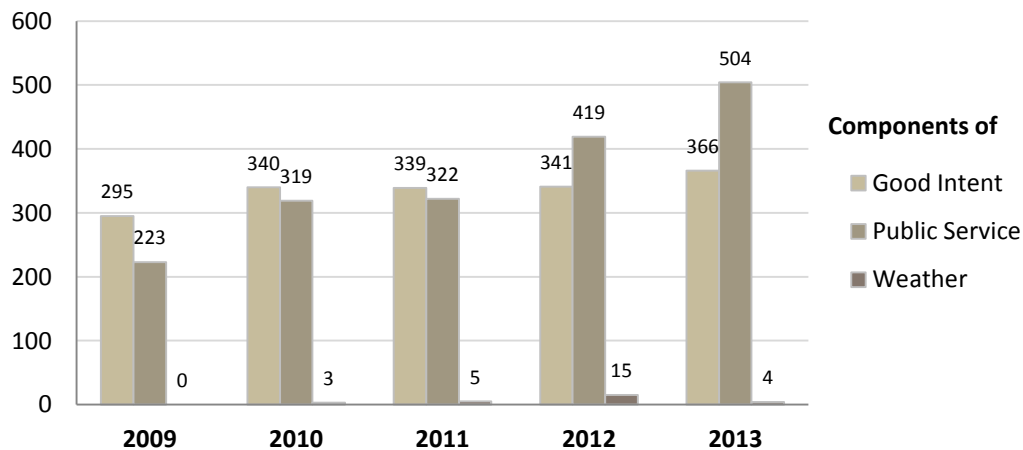


Table 5: Call Volume Details and Change by Service Category and Year

Category	Year	Call Count	% of Year	% Change Prev Year	% Change from 2009
EMS	2009	3,839	69.5%		
	2010	3,984	66.9%	3.8%	3.8%
	2011	4,313	67.2%	8.3%	12.3%
	2012	4,414	66.9%	2.3%	15.0%
	2013	4,542	67.5%	2.9%	18.3%
Fire	2009	1,163	21.1%		
	2010	1,311	22.0%	12.7%	12.7%
	2011	1,441	22.4%	9.9%	23.9%
	2012	1,407	21.3%	-2.4%	21.0%
	2013	1,311	19.5%	-6.8%	12.7%
Other	2009	518	9.4%		
	2010	662	11.1%	27.8%	27.8%
	2011	666	10.4%	0.6%	28.6%
	2012	775	11.7%	16.4%	49.6%
	2013	874	13.0%	12.8%	68.7%
All	2009	5520			
	2010	5957		7.9%	7.9%
	2011	6420		7.8%	16.3%
	2012	6596		2.7%	19.5%
	2013	6727		2.0%	21.9%

A breakdown of category “Other” into Good Intent, Public Service, and Weather reveals an additional trend. From 2009 to 2013 the total number of Public Service calls more than doubled in number and went from 4% of all calls to 7.5%.. [Good Intent calls are grouped with Other because the original call type of Fire or EMS is not maintained in the Fire Record Management System.]

Figure 3: Calls for Service Category "Other" by Year and Sub-Type



Additional call analysis is provided in Section Three for the community and for individual fire districts.

Baseline Performance

In addition to describing service demands, DFD has examined its delivery of those services.

Definition of Terms. The terms referenced in this report correspond to the NFPA’s 1710 Standard as follows:

Call Processing (Alarm Handling or Dispatch) – The time elapsed from when the call taker answers the 911 call until the first unit is dispatched.

Turnout – The time elapsed from unit dispatch to unit departure and comprised of preparatory activities such as donning protective gear and boarding the apparatus.

Travel – The time elapsed from when the responding unit is noted “en route” until the unit advises that it is on the scene. It does not include the time to actually reach the fire or patient after arrival at the location.

Total Response Time – The time elapsed from alarm until the first unit has arrived on scene.

Effective Response Force (ERF) Response Time – The time elapsed from alarm until all required units have arrived on scene.

This report also refers to Unit Response Time as the time elapsed from unit dispatch until the unit has arrived on scene.

Department Goals. DFD has a Standard Operating Guidelines (SOG) for Fire Apparatus Response and Readiness which reflects the department’s goals for turnout, travel, and ERF time:

- The Department’s goal is to have initial dispatch units on the street and responding within 60 seconds of dispatch on calls for EMS 90% of the time. For calls requiring full PPE, the goal is turnout in 90 seconds 90% of the time.
- The Department’s goal is to have the first-arriving unit on the scene of fire and EMS emergencies within 5 minutes of travel 90% of the time.
- The Department’s goal is to have the effective response force on the scene of an incident requiring a full structural response within 14 minutes of the initial call 90% of the time.

In addition, DFD Emergency Communications Policy and Procedures (P&P) include a department goal for dispatch time:

- It is the goal to have all emergency medical calls for service answered, processed to the extent necessary to initiate an appropriate response and dispatched within 60 seconds 90% of the time.

- It is the goal to have all fire related emergency calls answered, processed to the extent necessary to initiate an appropriate response and dispatched within 90 seconds 90% of the time.

The department's response and deployment standards are based upon a suburban population density and the fire demands of the community. The targeted service level objectives are based on industry standards and best practices. The objectives have been approved and adopted by the department's command staff and are accepted by the City Manager. The department's benchmark objectives and baseline service level performance are defined in detail in Section Five. The benchmarks referenced in the following tables represent the department's ideal performance objective and may not match current department policy for acceptable goals. In addition, because dispatch and turnout have different performance objectives for structure fires and medical calls, actual performance must be evaluated separately.

Dispatch. Two significant changes in call processing during the period 2009 to 2013 should be noted. First, on May 1, 2010 dispatchers began using ProQA for Fires (by Priority Dispatch Corporation). This protocol provides a standardized method for answering each call, prompts the dispatcher to ask specific questions, and makes recommendations for response codes based on the information collected. Until March 2014, a minimum number of questions had to be answered before the initial dispatch, which caused fire calls to have extended processing times. This process was evaluated and revised to allow dispatchers to "fast forward" obvious fire incidents directly to the dispatch step.

Second, on August 22, 2012 a major version change to the Computer Aided Dispatch (CAD) software impacted processing times for all call types. As dispatchers become experienced on the new version, processing times should demonstrate continued improvement. Table 6 details call processing times for each of the significant change periods, with a final column for 2013 improvements.

Table 6: 90th Percentile Dispatch Times in mm:ss by Change Period and Service

Service	Benchmark	1/1/2009 - 4/30/2010	5/1/2010 - 8/21/2012	8/22/2012 - 12/31/2013	1/1/2013 – 12/31/2013
Fire	01:00	01:09	02:39	02:38	02:32
EMS	01:00	00:33	00:46	00:57	00:50

Turnout. Though *average* historic turnout times fall in line with the benchmark, DFD has identified turnout as an area of improvement. The 90th percentile performance of first-arriving units has been consistent for the past three years, as demonstrated in Table 7. The significant increase from 2009 to 2010 was the result of a procedural change whereby responding apparatus cannot post “en route” until wheels are turning. This change caused a corresponding shift in 2009 and 2010 travel times in Table 8. Turnout times are now summarized and distributed department-wide on a monthly basis to increase awareness of performance, encourage consistency, and identify where improvements can be made.

Table 7: 90th Percentile Turnout Times in mm:ss by Year and Service

Service	Benchmark	All Years	2013	2012	2011	2010	2009
Fire	01:20	02:10	02:22	02:19	02:22	01:57	01:13
EMS	01:00	02:20	02:25	02:28	02:35	02:13	01:07

Travel. Historic 90th percentile performance values for the past three years meet the department’s suburban population category objectives for both first-arriving unit and ERF. Actual performance for travel times of first-arriving units improved overall for both structure fire and EMS call types from 2009 to 2013. The improvements may have been at least partly the result of minor first-due district boundary adjustments. As noted in turnout, the significant decrease from 2009 to 2010 was the result of an undocumented procedural change whereby responding apparatus cannot post “en route” until wheels are turning.

Table 8: 90th Percentile Travel Times in mm:ss by Year and Service

Measure	Service	Benchmark	All Years	2013	2012	2011	2010	2009
1st Arriving	Fire	05:00	04:40	04:00	03:52	04:14	04:14	05:26
	EMS	05:00	05:05	04:40	04:32	04:40	05:27	05:46
ERF	Fire	10:00	09:50	09:50	09:15	10:00	10:13	09:43

Response Times. At the 90th percentile, Total Response Time performance for the first-arriving unit has been within the objective consistently for structure fires and recently for EMS. Because of the historic fluctuations in call processing times, DFD evaluates both Unit Response Time (dispatch to arrival) and Total Response Time (alarm to arrival) for the first-arriving unit. This separation identifies the need for improvement in EMS responses which cannot be recognized with Total Response Time alone.

Table 9: 90th Percentile First-Arriving Response Times in mm:ss by Year and Service

Measure	Service	Benchmark	All Years	2013	2012	2011	2010	2009
1st Arriving	Fire	06:20	05:53	06:08	05:12	05:52	05:44	06:07
Unit Response	EMS	06:00	06:30	06:25	06:24	06:33	06:31	06:34
1st Arriving	Fire	07:20	07:28	07:48	07:10	07:58	07:38	06:50
Total Response	EMS	07:00	06:59	06:55	07:02	07:04	06:56	06:54

The record management system (RMS) provides no way to distinguish which of the units in the first alarm were required ERF units. Therefore, the last-arriving unit measures used to create a baseline occasionally include non-essential command or utility units. These units could not be removed entirely from the dataset because they sometimes serve as first responders, such as during bad weather or a unit out of service. In order to determine why ERF response times were considerably above objective, DFD evaluated ERF in various ways as demonstrated in Table 10. This analysis, particularly of last-arriving units for all fire calls, provides a better representation of actual ERF performance. Additional validation for including the ladder truck in this comparison is available in Section Four.

Table 10: Comparative 90th Percentile ERF Total Response Times in mm:ss by Year

Measure	Service	Benchmark	All Years	2013	2012	2011	2010	2009
Last-Arriving - Structure Fire	Fire	12:20	16:11	15:31	17:04	17:33	15:10	16:18
Last-Arriving – All Fire Calls	Fire	12:20	10:57	11:12	10:58	11:04	10:48	10:31
All ERF Units – Structure Fire	Fire	12:20	12:30	12:11	12:28	12:50	12:24	12:17
Ladder Truck	All	12:20	11:00	09:54	10:48	11:31	10:58	11:22

Component C: Community Expectations

As described in Component B Services Provided, DFD is expected to respond to medical and fire emergencies, to mitigate situations involving injury and potentially dangerous substances, to perform technical rescues, to educate the public on fire prevention and safety, and to assist with a number of non-emergency services. Though emergency calls are expected to have priority, non-emergency service calls are important to the community. This is evident in their increase both in frequency and as a percent of total calls, as shown in Table 11.

Table 11: Public Service Calls by Year

Year	Count	% of Year
2009	223	4.0%
2010	319	5.4%
2011	322	5.0%
2012	419	6.4%
2013	504	7.5%

The balance between a community's risks, expectations, and resources is determined through policy regarding public needs and funds. The economic reality is that most communities are unable to bear the cost of providing resources to fund every possible risk scenario. When DFD formulates its annual budget request, which is ultimately approved by representatives of the community in City Council, it is making recommendations on the level of risk that should be tolerated.

In 2001 DFD began its 10-year Insurance Services Office (ISO) fire protection analysis, and in February 2002 the agency received an ISO Rating of Class 2. Throughout this process, it became clear that the community's expectations, including elected officials, were as follows:

- To continue current, accepted response time performance
- To plan to maintain current levels of service regardless of population growth, annexation, or redevelopment
- To consider and propose potential improvements in services and delivery with financial prudence
- To be prepared to perform emergency duties upon arrival at the scene

- To have personnel familiar with their response area as well as the buildings and fire control systems within that response area.

DFD considers City Council priorities, historic service demand, and community expectations when developing its Strategic Plan.

Section Three: Risk Assessment (Component D)

Introduction

In order to determine the nature and number of resources necessary to provide sufficient and effective services, DFD has assessed physical, economic, sociologic, and demographic aspects of the community served.

For the purpose of this report, “hazard” is defined as a person, place, thing, quality, or action with potential to hurt, damage, injure, spoil, impair, or destroy people, property, infrastructure, or the environment.. The term “harm” represents the probable consequence of a hazard. “Risk” is defined as the probability of harm and “level of risk” as a categorized probability of harm. “Probability” represents the relative frequency with which a hazard is likely to occur.

Physical Risk Factors

Service Area

The city has no boundaries which constitute a risk factor. Services are provided within the city limits for city residents and businesses. The Virginia moratorium on annexation prevents the city boundary from expanding, and no other changes are expected. Overall construction growth is nearly static, and the city’s street and utility infrastructure can support the marginal growth experienced. There are minor redevelopment projects anticipated for the downtown warehouse district which may add condominium units, shops, and restaurants, but there is nothing in project review with the Planning Department at this time.

Hydrants. DFD relies on an extensive hydrant system, public and private, as its primary water source. There are unprotected areas where pressurized hydrant water is not readily available or within reach. The department implements numerous tactics to resolve dry

area issues, such as large diameter hose for relay operations and water tanker (tender) operations.

Every engine carries the NFPA Standard minimum of 1,000 feet of four-inch supply hose. The department water tanker (tender) T1 carries 1,200 gallons of water along with portable storage devices to hold water for drafting. T1 also carries two 10' sections each of 6", 5", and 2 ½" Hard Sleeve that can be utilized to establish a water supply from static sources if necessary. In addition, mutual aid agreements from closest jurisdictions can be activated for additional water supply.

Topography

There is little in the topography of the Danville area that poses a serious hazard. The most significant physical risk factor posed by the rolling hills of the south-central Piedmont is runoff during heavy rains. Portions of the bank along the Dan River are difficult to access by land, both overgrown and up to a mile distant from roads, and require an initial response by water.

Transportation Network

Roads. Danville is generally bisected north/south by US Highway 29 and east/west by US Highway 58. Along with the US 29/58 expressway bypass and several state highways, these roads carry the majority of daily traffic. Table 12 is a summarized subset of Virginia Department of Transportation (VDOT) 2012 traffic data, including Annual Average Daily Traffic (AADT) and the percent of AADT which is truck-and-trailer traffic. The table includes highways over one mile or with AADT over 10,000. Higher traffic counts increase risk, particularly in situations where a trailer may contain hazardous materials.

Table 12: VDOT Traffic Counts 2012

Route	Miles	AADT	Truck+ Trailer
US 29	2.0	14,000	14.5%
US 29 BUS	9.3	18,082	0.7%
US 29/58 BYP	13.9	16,750	14.5%
US 58	6.2	19,640	12.5%
US 58 BUS	12.1	17,800	5.3%
VA 293	8.1	8,194	0.3%
VA 41	0.7	16,000	0.4%
VA 86	3.3	15,400	0.5%

NOTE: Traffic data is a subset of highway segments within city limits over one mile or having AADT over 10,000.

Rail Lines. Danville is served by two daily passenger trains on the Norfolk Southern Railway. In addition, 30 freight trains pass thru daily on average, each with 2 to 4 diesel locomotives carrying 5,000 gallons of fuel. Each freight train averages 125 rail cars, 5% of which are transporting regulated materials. There are 111 miles of active track within the city limits, much of which passes residential neighborhoods. Also of note, the railroad is within 1,500 feet of Danville Regional Medical Center and Gibson Middle School and less than 1,000 feet from Schoolfield Elementary and Dan River Crossing senior housing. Rail lines are depicted in Figure 3 of the Appendix, and Figure 4 of the Appendix is a listing of regulated materials.

DFD has a policy of avoiding railway grade crossings unless no acceptable overpass or underpass is available in the immediate area. Prohibited grade crossings are represented in Figure 5 of the Appendix. This policy does not impede the 4.5 minute travel time standard, as shown on the map, with the one potential exception of the Pine Tag community which has no alternate access.

Airports. The Danville Regional Airport is classified as a general aviation airport, handling smaller aircraft with low volumes of traffic. For example, in 2011 the airport averaged 50 to 55 operations per day.

Waterways. Although the Dan River is not a navigable waterway, there is risk related to recreational boat traffic and water-related activities such as fishing, swimming, floating, kayaking, and waterboarding.

Trails. Danville is home to a paved, 8.5-mile, multi-use trail system and a 35-mile single-track mountain bike trail system. The risk inherent to outdoor activities is increased when there is difficulty identifying a caller's location, particularly on unmarked paths. In addition, portions of the mountain bike trail are difficult to access. Figure 6 of the Appendix is a map overview of the major trails.

Weather

Though Danville experiences generally temperate weather, brief periods of severe weather are not unusual. NOAA's National Climatic Data Center (NCDC) indicates that during the period 1996 thru 2012, Danville weather events caused no deaths, 2 injuries, and nearly \$1.3 million in property damage.

Severe Storms. The most frequent hazards of severe storms are heavy rains and high winds, which contribute to motor vehicle crashes, downed trees and power lines, and false alarms. Heavy rains also contribute to flash floods. Severe storms occur occasionally throughout the year.

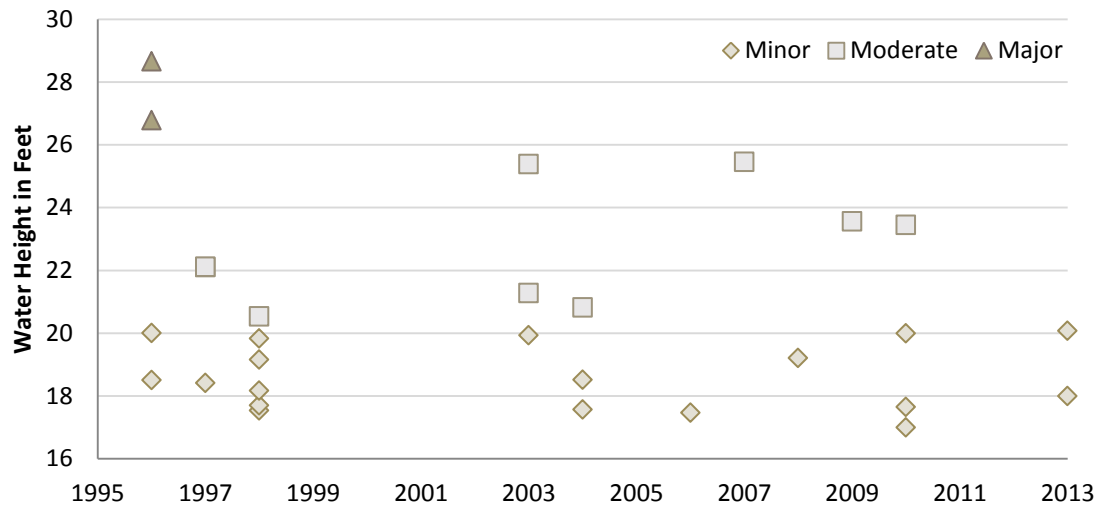
Flash Floods. Periods of torrential rainfall create localized flash floods, which contribute to an increase in motor vehicle crashes, stranded motorists, and stranded consumers. NCDC has 13 flash floods on record for the period 1996 to 2012.

Floods. Statistics for Danville from the National Weather Service indicate occasional minor flooding along the Dan River, infrequent moderate floods, and rare major floods. This is summarized in Figure 4 below. The majority of the floodplain is not inhabited, as can be seen in the map in Figure 7 of the Appendix. Major flooding that would stress organizational resources is considered low probability and low consequence.

Table 13: NCDC Weather Events 1996-2012

Weather Event	Count
Severe Storm	42
Flash Flood	13
Hail	10
Flood	8
Heavy Snow	8
High Wind	4
Tornado	1
Tropical Storm	1
Winter Storm	1

Figure 4: Categorized Historic Flood Levels 1996-2013



Snow and ice. Though Danville averages eight inches of snow a year, there are years with no snow. Ice accumulations during a winter storm are more often a hazard, causing motor vehicle crashes, downed trees and power lines, and an increase in fire incidents related to heating and cooking equipment during power outages.

Tornadoes. According to the Virginia Department of Emergency Management (VDEM), Danville experienced two tornadoes between 1950 and 2007 and one between 1996 and 2012. However, during the same period ending 2012, there were eight additional tornadoes within 30 miles.

Hurricanes. With Danville's geographic location 200 miles from the east coast, hurricanes are a rare hazard, averaging one per decade. More often, the region bears the remnants of tropical storms and tropical depressions, including tornadoes, high winds, and heavy rains.

Non-Weather Disaster Exposure

Pipeline Breaks. The west/northwest portion of the city is crossed by 32"- and 36"-diameter liquid fuel pipelines. This privately owned pipeline transmits as much as 1.2 billion gallons of fuel per day at up to 590 psi directly under Westover neighborhoods

and a private school's parking lot. The pipeline crosses the Dan River southwest of the city limits; a break upstream may impact the city's water intake, wildlife, and recreation. Northwest of the city limits, the pipeline also crosses the smaller Sandy River, which drains into the Dan River within the city limits; a break may impact wildlife and recreation.

A second pipeline, owned by a different company, passes slightly more than ½ mile outside the northern city limits and crosses the railroad north of the city.

Earthquakes. Although Danville has experienced minor tremors, the USGS website for calculating earthquake probability indicates zero probability of a magnitude 5 or higher quake in the next 10 years for the 50 kilometers surrounding Danville. The USGS Seismic Hazard Map can be found in Figure 8 of the Appendix.

Bridges. Being a “river city,” Danville has five bridges spanning the river, and two of those have separate spans for northbound and southbound traffic. These provide a number of alternative routes and would not prevent evacuation or transport unless multiple bridges were damaged simultaneously.

Summary

Table 14 is a summary of hazards with a calculated risk rating. The assessment uses the following rating criteria:

- History is the number of occurrences in the period 2009 to 2012, to be used as a reference for determining probability.
-
- | | |
|--|---|
| - Probability is based on the expected number of occurrences in a single year. | 0 = Unlikely (point value 1)
1 to 2 = Possible (point value 2)
3 or more = Likely (point value 3) |
|--|---|
-
- | | |
|---|--|
| - Vulnerability is based on population density of the expected impact area. If multiple districts are at risk, the highest value is used. | Rural = point value 1
Suburban = point value 2
Urban = point value 3 |
|---|--|
-
- | | |
|--|--|
| - Risk is a product of probability and vulnerability and has been categorized to describe the overall level of risk. | 1 to 3 = low
4 to 6 = medium
7 to 9 = high |
|--|--|

Table 14: Physical Risk Factors Analysis

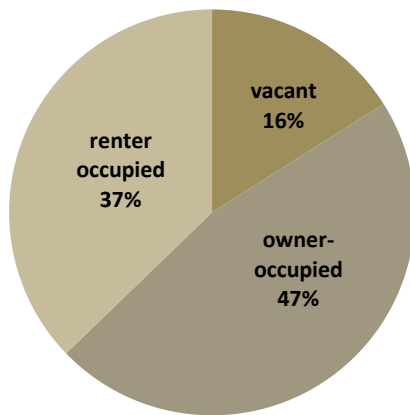
Risk Factors	History	Probability	Vulnerability	Risk
Railway Incident	2	1	3	3 - low
Airport Incident	2	1	1	1 - low
River/Water Incident	9	2	1	2 - low
Trail Incident	7	3	1	3 - low
Severe Storm	42	3	3	9 - high
Flash Flood	13	3	2	6 - medium
Flood	8	2	1	2 - low
Heavy Snow/Winter Storm	9	3	3	9 - high
Tornado	1	1	3	3 - low
Hurricane/Tropical Storm	1	2	3	6 - medium
Pipeline Break	0	1	2	2 - low
Earthquake (>=5magnitude)	0	1	3	3 - low
Multiple Bridge Incident	0	1	1	1 - low

Physical Assets Protected

Community

Danville has a long history in textiles and tobacco, and many commercial and residential buildings were constructed in the early and mid-1900s to support those industries. American Census data estimates that 68% of Danville's housing units were built 1960 or earlier.

Figure 5: Housing Occupancy Summary



Occupancy. With the decline of both industries beginning in the 1980s, the community is left with abandoned, vacant, and unoccupied structures. Census data estimated 16% of housing units were vacant in 2012, and a city blight abatement initiative in 2010 estimated another 1% of commercial structures were vacant, particularly in the historic downtown district. The same building survey in 2010 estimated 14% of all structures were in poor structural condition. Though the

evaluations were subjective, the results give an indication of areas where risk may be higher, particularly when compared with population density and income levels. The maps in Figure 9, 16, and 17 of the Appendix portray some of this data.

Of the 84% of all housing units which are occupied, 37% of those are rented.

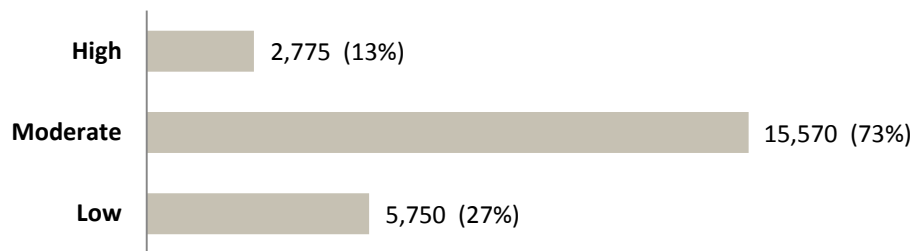
Land Use. With no building-specific square footage statistics available, risk was evaluated by land use and acreage. Land use is maintained by the Planning division of the Community Development department. Table 15 describes the assignment of risk categories to land use codes for the purpose of this report.

Table 15: Risk Category Assignments by Land Use

Land Use	Risk Category	Land Use	Risk Category
A - Low Density Single Family	moderate	G - Light Industry	moderate
B - Medium Density Single Family	moderate	H - Office/Professional	low
C - Multifamily	high	J – Public	low
D - Retail	moderate	K – Institutional	high
E - Commercial	low	M – Park	low
F - Heavy Industry	high	Z – Unknown	low

With those assignments, the community has predominantly moderate risk property. A further analysis of these categories appears later in this section.

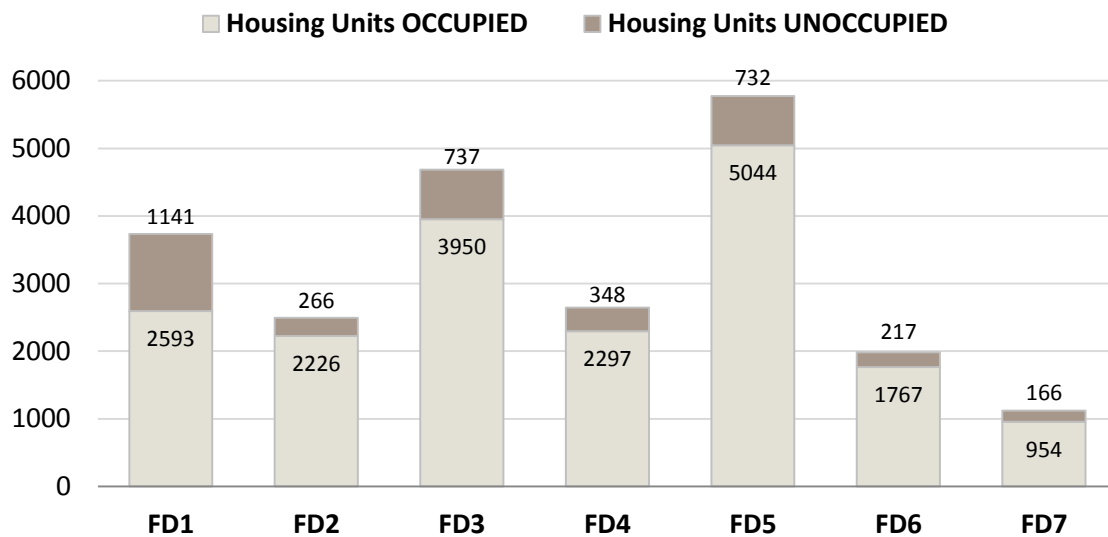
Figure 6: Land Use Risk Summary by Acres



Fire Districts

Occupancy. A comparison of the 2012 estimated census data summarized by fire district reveals large differences both in the total number of housing units and in the proportion of unoccupied units. District 5 has 25% of all housing units, and District 1 has the highest proportion of its housing units unoccupied. The map in Figure 9 of the Appendix provides a visualization of this census data.

Figure 7: Estimated 2012 Housing Unit Occupancy by Fire District



Pre-Plans. The pre-incident surveys (PIS) conducted annually by each shift provide an indication of specific hazards. The surveys cover business, retail, education, health care, places of assembly, storage, and other locations of concern. PIS contain basic information about structures, conditions, and response, but they contain no statistics on building dimensions or area. A fire record management system (RMS) implementation in spring 2014 will include a pre-plan module that will be used to capture additional structural information.

For the purpose of this report, hazard assessment points were assigned from the PIS as described in Table 16. In addition, sites deemed a special risk were assigned an additional 20 points. These special risk sites include the hospital, a mental health facility, industry with large quantities of hazardous materials, buildings with more than six stories, and sites flagged in the PIS with residence on premises plus high life safety hazard.

Table 16: Pre-Plan Hazard Assessment

Hazards Noted in Pre-Plan	Points
Defensive attack	1
Occupant category of school, hotel/motel, daycare, nursing home, or place of assembly	1
Distance to nearest hydrant ≥ 1000 feet	1
Specific hazards noted on pre-plan	count
More than two stories	1
More than six stories	20
Residence on premises AND high life safety hazard	20

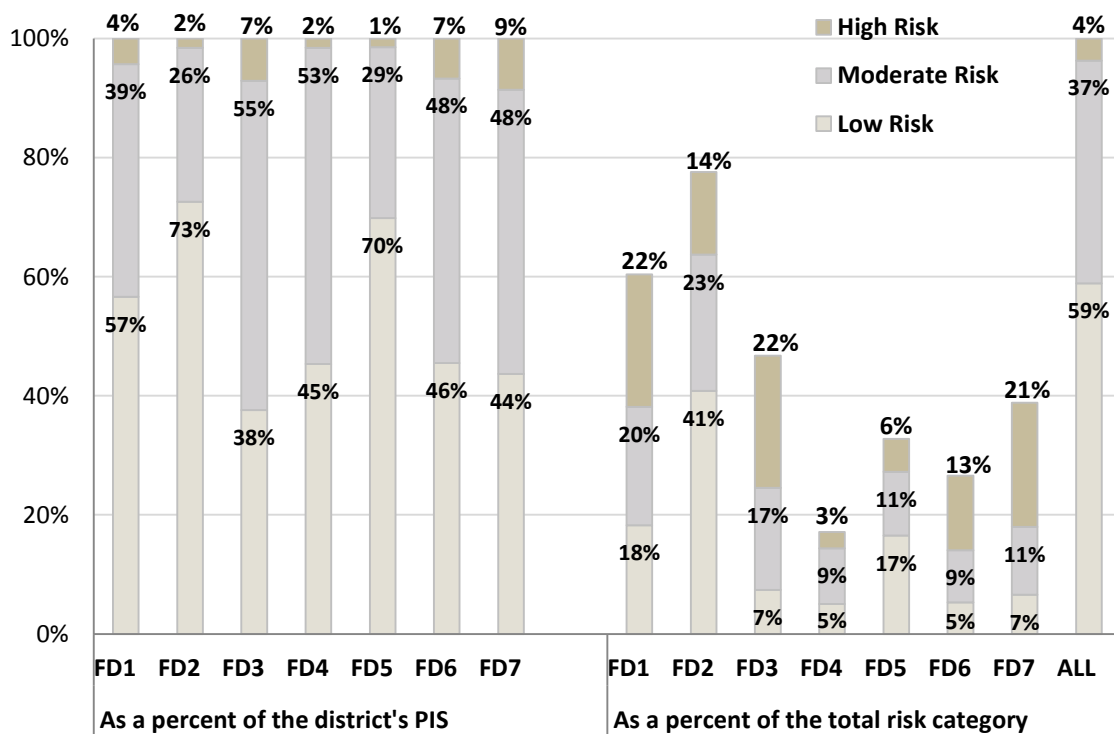
The total points for each site were then categorized into risk ratings:

Risk	Points
Low	0 - 1
Moderate	2 - 5
High	6 - 19
Special	20 +

Figure 8 represents two sets of data: each fire district's proportion of low, moderate, and high risk among its total surveyed sites, and each district's proportion of the entire risk category. Summary statistics of note include:

- Four percent of surveyed sites are high risk; three districts contain more than half of those high risk sites: District 1 (22%), District 3 (22%), and District 7 (21%).
- District 2 contains 41% of all low risk sites, more than twice as much as any other district, and 23% of all moderate risk sites.

Figure 8: Low, Moderate, and High Risk Summary based on Pre-Plan Hazards Assessment

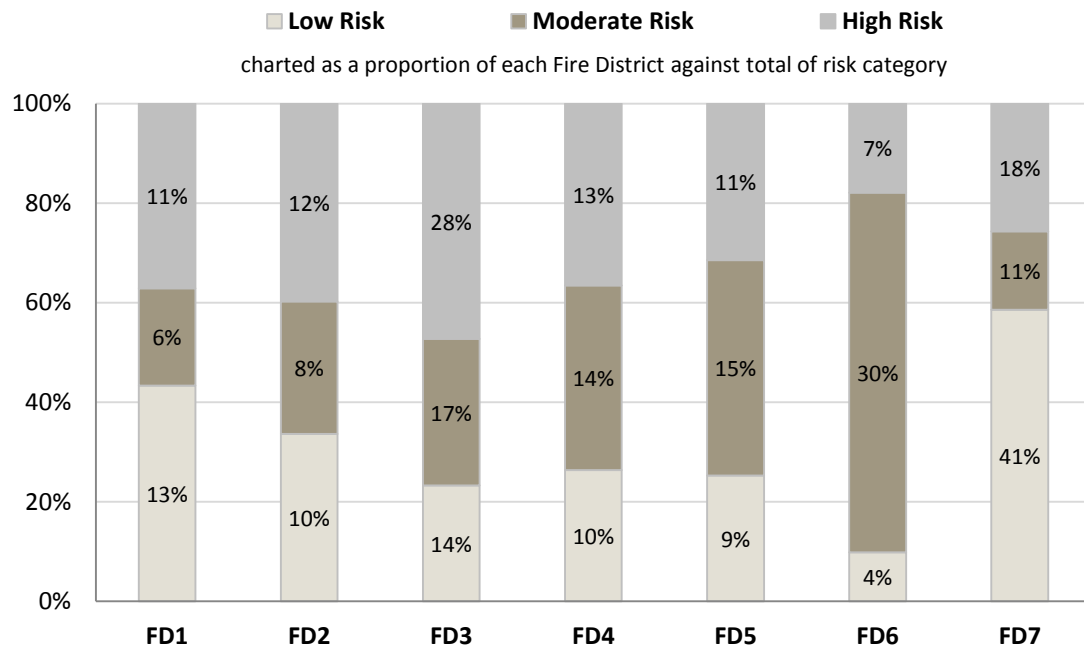


In addition, Fire District 1 has seven special risk sites, District 2 has two, District 3 has eleven, District 4 has four, District 5 has one, and Districts 6 and 7 have none. Special risk sites will be further described in the next section.

Land Use. As described above, risk categories were assigned to land use codes. These were further summarized for each Fire District.

Figure 9 demonstrates the proportions of these by total acres among fire districts. Though District 7 has the largest square mileage, as seen later in Figure 13, it is actually District 6 which has the largest acreage of land in use and has double the moderate risk property of any other district. District 3 has the largest proportion of high risk property.

Figure 9: Risk Assessment of Land Use by Acre per Fire District

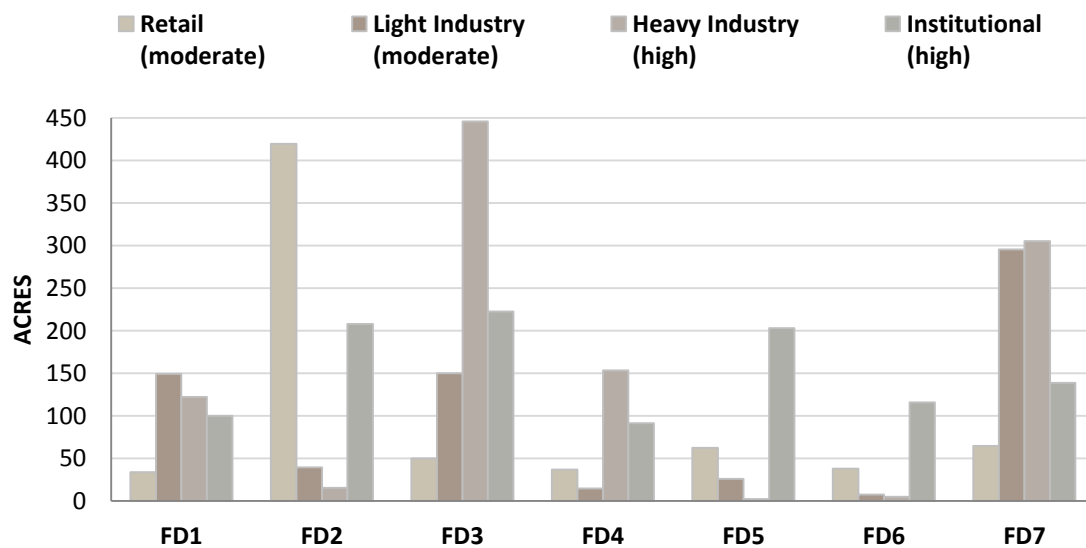


Moderate and high risk land use types were further analyzed by district for residential and non-residential use. All districts feature moderate amounts of retail and institutional property, but Figure 10 demonstrates the large variations in the types of risk present in each district. Of particular note:

- 62% of all city retail property is in District 2.
- District 7 has twice as much light industry as any other district and 43% of all light industry in the city.

- Heavy industry is almost entirely in District 3 (42%), District 7 (29%), and District 4 (15%).

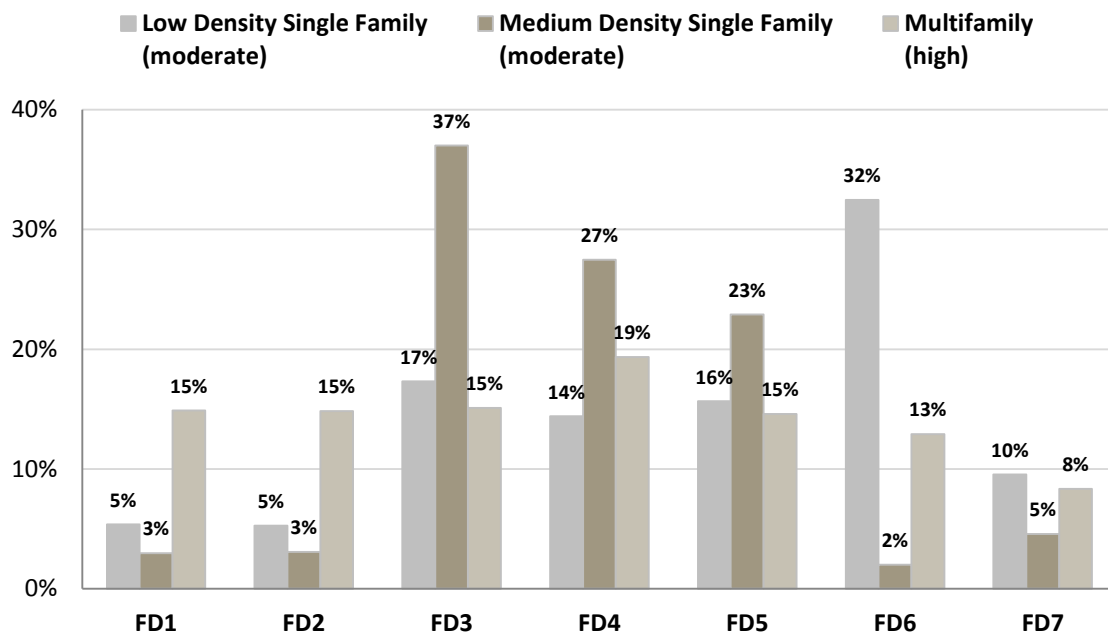
Figure 10: Summary of Moderate and High Risk Non-Residential Land Use by Fire District



A similar breakdown of residential property, summarized in Figure 11, revealed the following:

- District 6 has nearly twice the low density single family housing as any other district and 32% of the city's total low density single family housing.
- High risk multifamily property is spread nearly evenly between districts, with District 4 having slightly higher (19%) and District 7 slightly lower (8%) than the 15% average.
- District 3 has the largest percentage (37%) of medium density single family housing.

Figure 11: Summary of Moderate and High Risk Residential Land Use by Fire District



Properties and Buildings of Concern

The sites which require special consideration include the following:

- Hospice, assisted living, senior housing, and nursing homes
- Dormitories at Averett University
- Goodyear Tire and Rubber Company

In addition, Danville is home to the Virginia National Guard Unit, HHC 429th BSB. Military facilities are considered a risk in that they house and maintain essential resources, both mobile and stationary, essential to the community throughout an emergency event. The Danville Unit provides transportation and logistic support with access to a Medical Unit and a Water Treatment Unit from nearby communities.

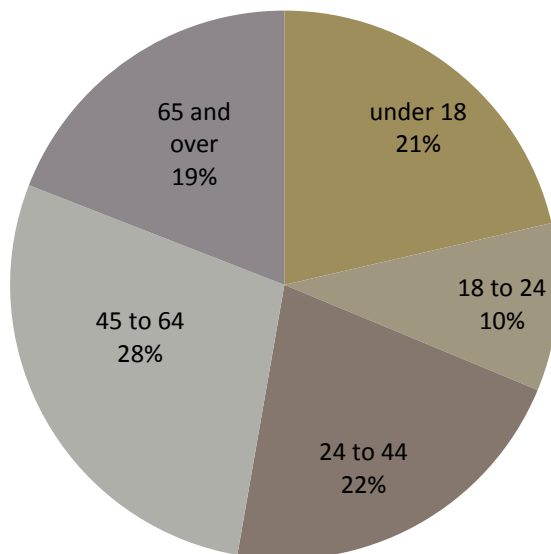
Development and Population Growth

Community

Population. During the period from 2000 to 2010, Danville lost 11% of its population. In the ten-year decrease of more than 5,300 people, 4,200 were due to net out-migration, and 1,100 were due to deaths outnumbering births. Estimated census figures for 2011 indicated a 0.2% decline, and 2012 figures estimated a turnaround of 0.5% gain.

This correlates with the city's overall age demographics. As of the estimated 2011 census, 19% of the population is 65 years and over, 10% is 75 years and over, and 36% of the 65-and-over population lives alone. Based on the population-percentage of younger age groups, this trend will continue. As noted in the table, Danville's higher risk population of 65-and-over is considerably higher than state and national averages.

Figure 12: Age Distribution



Comparison of At Risk Population Rates

Population 9 and under	
Danville	11.60%
Virginia	12.70%
United States	12.90%

Population 65 and over	
Danville	19.10%
Virginia	12.50%
United States	13.30%

Source: Estimated 2011 Census Data, table S0101

Of the population 65-and-over, a portion of this age group is in senior housing or assisted living, but the majority lives in single unit housing. In addition, according to estimated 2011 census figures, nearly half of the households with 65-and-over population are single person households.

The city's population has few fluctuations. The summer sees a slight decrease in the university and college student population. Averett University has an average enrollment of 900 students, Danville Community College has a year's enrollment of 1800, and Danville Regional Medical Center School of Health enrolls 100 students.

The largest employers may bring several thousand shift workers into the city on a given day, but there are no measures for many how are not local residents and therefore no way to measure the actual change in population.

Table 17: Top Five Employers

Goodyear Tire & Rubber Company	2,120
Danville Regional Medical Center / Stratford Health Center	1,241
Danville Public Schools	1,214
City of Danville	1,057
Nestle	640

Source: City of Danville Department of Economic Development

Economic Characteristics. According to USFA, socioeconomic factors have a proven history of impacting fire incident rates. The estimated 2011 Census figures indicated that Danville's percentage of the population living below poverty level is nearly twice the national average. Also of note, mean and medium income levels are considerably below state and national averages.

Table 18: Economic Characteristics

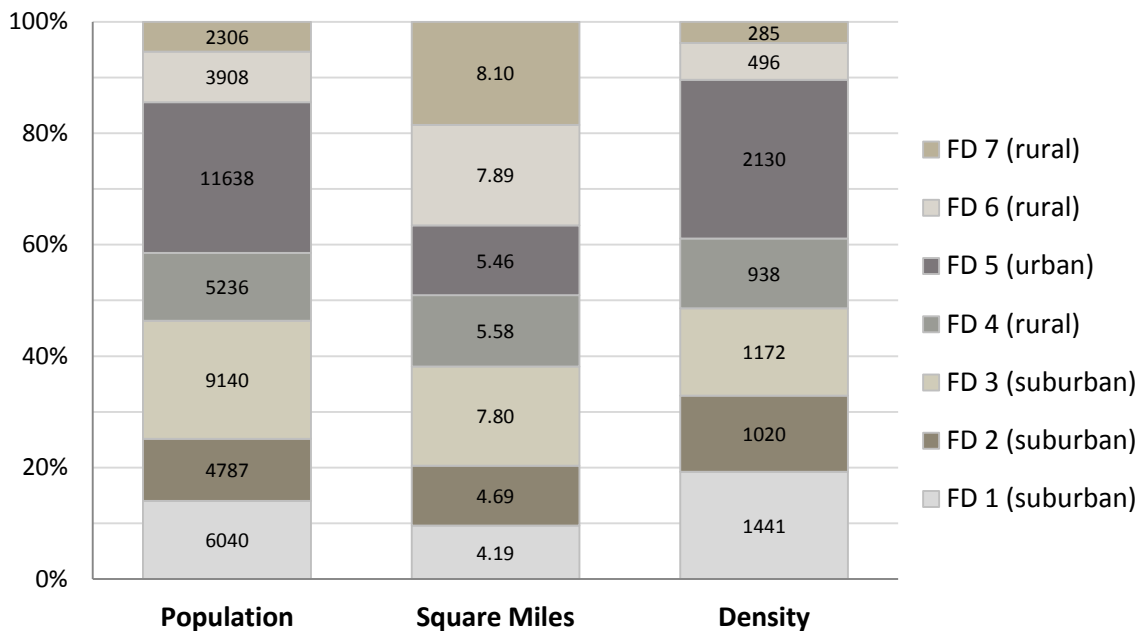
Locality	Below Poverty	Median Income	Mean Income
Danville	28.0%	\$ 30,701	\$ 40,633
Virginia	11.5%	\$ 61,882	\$ 84,041
United States	15.9%	\$ 50,502	\$ 69,821

Source: Estimated 2011 Census Data, table S1701 and S1901

Fire Districts

Though the city's overall population density is nearly 1,000 per square mile of land, individual districts differ widely in area and density. By definition of the Commission on Fire Accreditation International (CFAI), three districts are rural with population density less than 1,000 per square mile; three are suburban with population density between 1,000 to 2,000 per square mile; and one is urban with a population density over 2,000 per square mile.

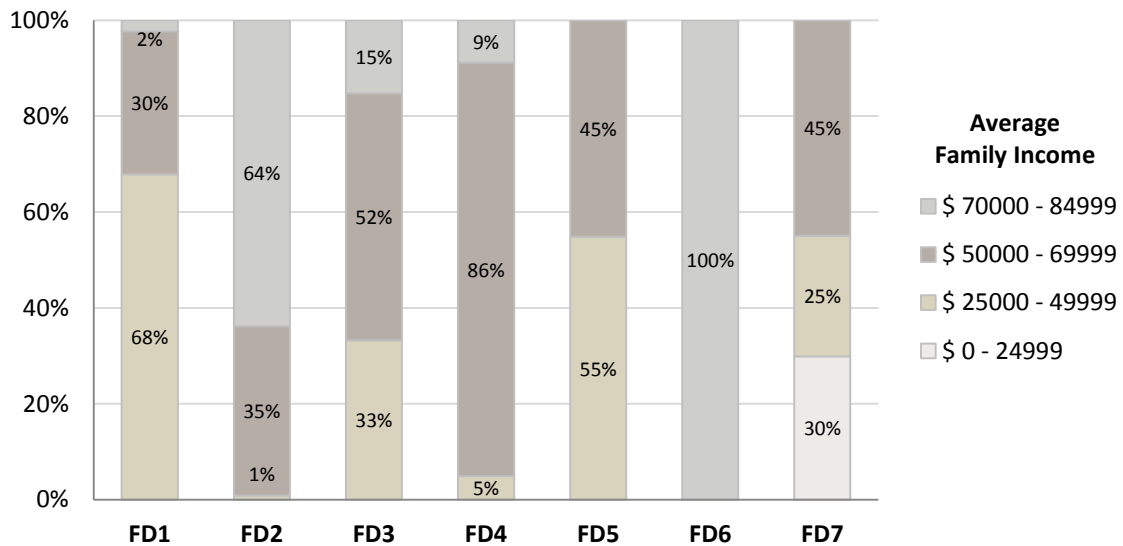
Figure 13: Fire Districts' Population, Area, and Population Density per Square Mile (2010 Census)



Development and new construction are minimal city-wide, though the downtown and portions of the riverfront have been targeted for redevelopment. In the past several years, a number of long-vacant warehouses downtown have been converted to multi-unit housing, and this trend is likely to continue as Danville rebrands its economy with technology and innovation.

Economic Characteristics. Census tract and block data do not correspond directly with fire district boundaries. However, with Geographic Information System (GIS) tools, census data can be spatially combined with fire districts and quantified, as seen in Figure 16 of the Appendix. The estimated 2011 average family income reported by census tract is summarized by area in Figure 14.

Figure 14: Average Family Income by Fire District According to the 2011 Estimated Census



Though this information is generalized, it indicates that a significant portion of the population in four districts are under the national average income of \$69,821 noted in Table 18. Figure 18 in the Appendix overlays average family income by census tract with overall call density.

Service Demand

Community

As demonstrated in Section Two and in Table 19 below, during the period 2009 to 2013 the total number of calls increased nearly 22%. However, the city maintained a consistent ratio between call categories: Fire (21%), EMS (68%), and Other (11%).

Time of Day, Day of Week, and Month. Peak call volumes for 2009 to 2013 are summarized in Tables 19 and 20 and charted in Figures 15 and 16. Though the busiest day of week has changed each year, the call volume is consistently high during early- to mid-afternoon. The busiest month of the year has changed each year, though on average for the five years December has been the busiest.

Table 19: Highest Call Volume Statistics for 2009-2013

Year	Hour	Day	Month
2009	17	Wed	Sep
2010	12	Fri	Oct
2011	12 & 14	Tue	Aug
2012	12	Mon	Jun
2013	11	Tue	Dec
ALL	13	Wed	Dec

Figure 15: Time of Day Call Volumes 2009-2013

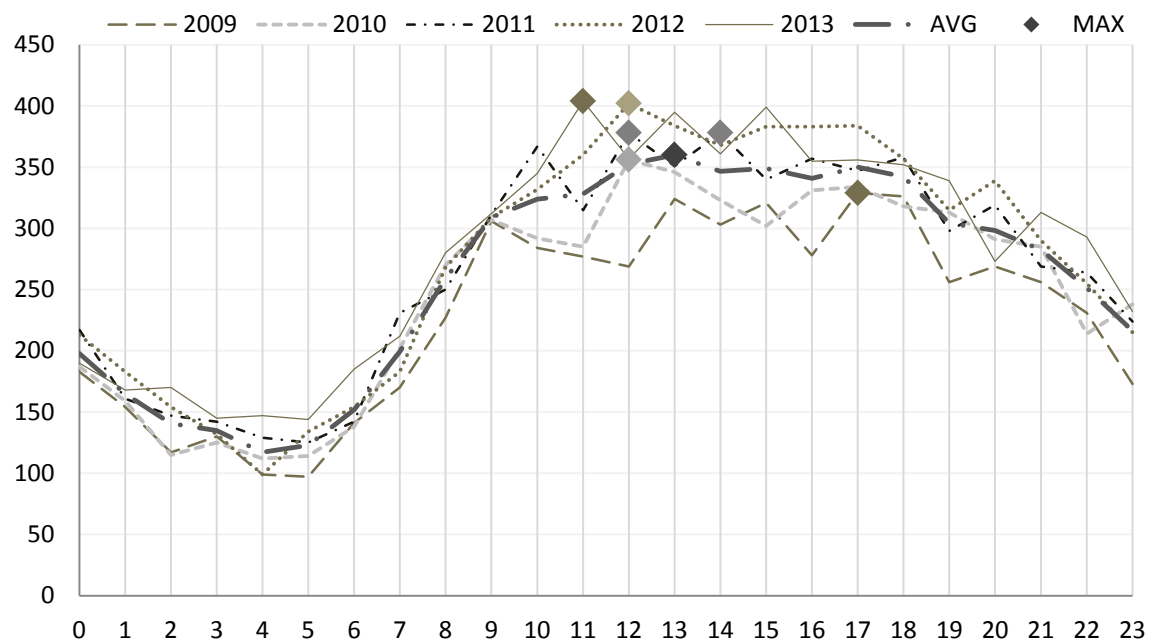
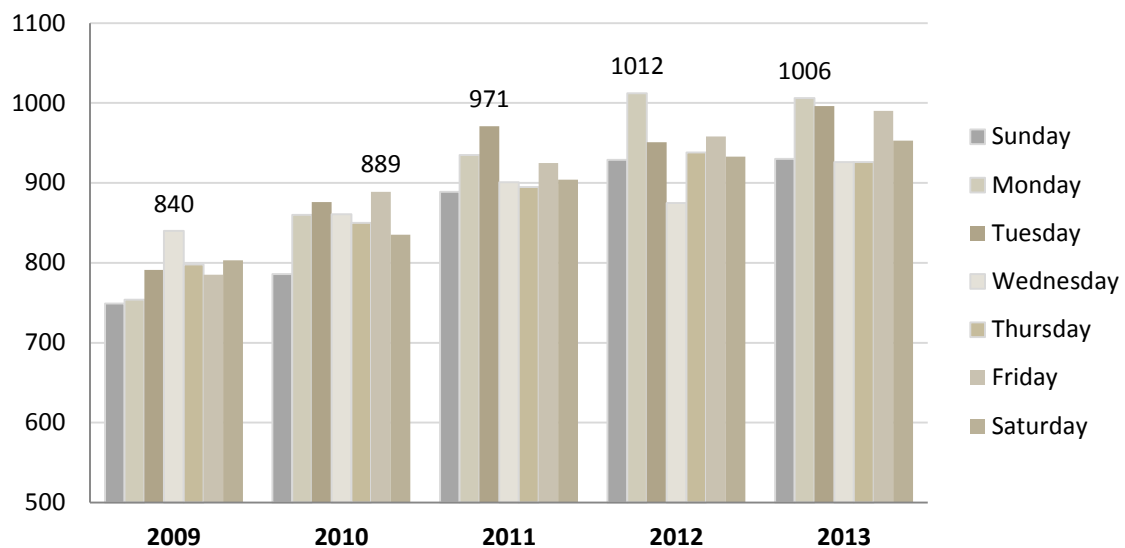


Table 20: Day of Week Call Volumes 2009-2013

Year	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
2009	749	754	791	840	798	785	803
2010	786	860	876	861	850	889	835
2011	889	935	971	901	895	925	904
2012	929	1012	951	875	938	958	933
2013	930	1006	996	926	926	990	953

Figure 16: Day of Week Call Volumes 2009-2013



Fire Districts

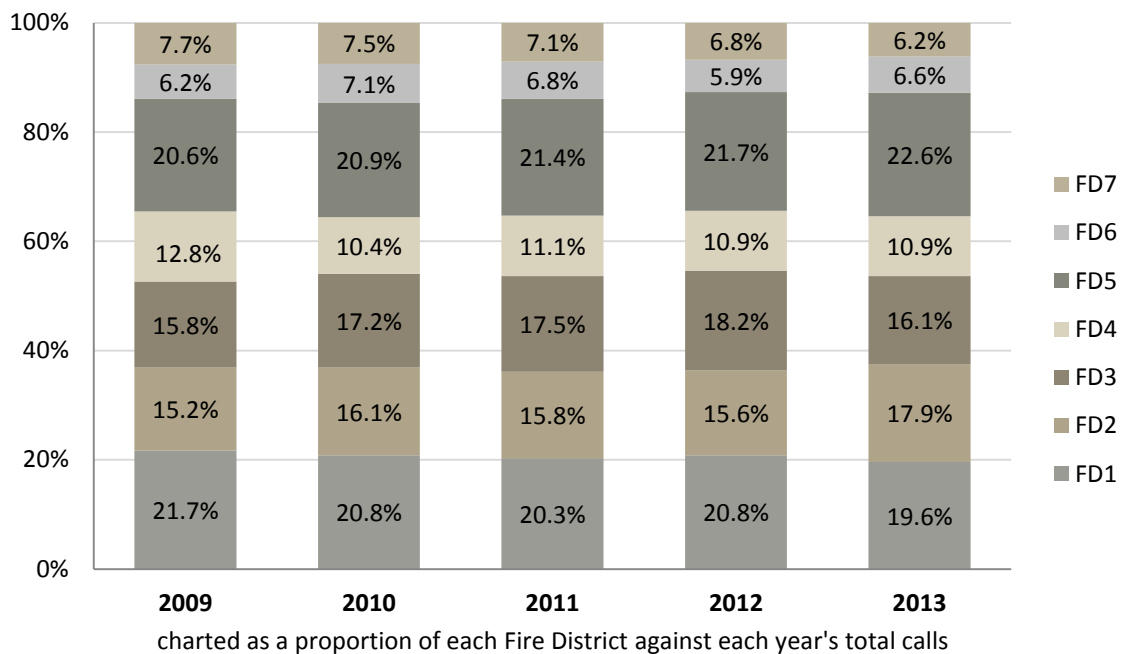
Section Two contained a Description of Workload that summarized total call volumes and service categories for the department. As detailed in Section Two, the department saw a 21.9% increase in call volume between 2009 and 2013. A comparison of the call distribution between individual districts for that period reveals the following:

- In 2011, 2012 and 2013, District 5 and District 1 had the highest call volumes. Each handled approximately 20% of all calls in those years.

- District 5 demonstrated small but consistent increases each year in its percentage of total calls, and District 7 had small but consistent decreases each year. Other districts maintained or fluctuated in call volume.
- The overall percent-of-change in call volume from 2009 to 2013 was an increase for all districts, but the amount varied greatly from 0.7% in District 7 to 44.0% in District 2.

Figure 17 is based on values from the “All” column in Table 21 and reflects each districts’ percent of calls for that year.

Figure 17: Service Call Summary by Year and Fire District



Each district was further analyzed for its portion of service categories, also detailed in Table 21. The trends for each service category for each district are easily visualized in Figure 18, as well as overall service demand. It should be noted that this chart indicates the district where incidents occurred and does not indicate all units involved in response. For example, District 6 and District 7 serve as Rapid Intervention Crews (RIC) for the west and east end of the city, and therefore respond to calls for which they are not first due and which are not reflected in Figure 18.

Figure 18: Service Categories for All Calls for Service by District and Year

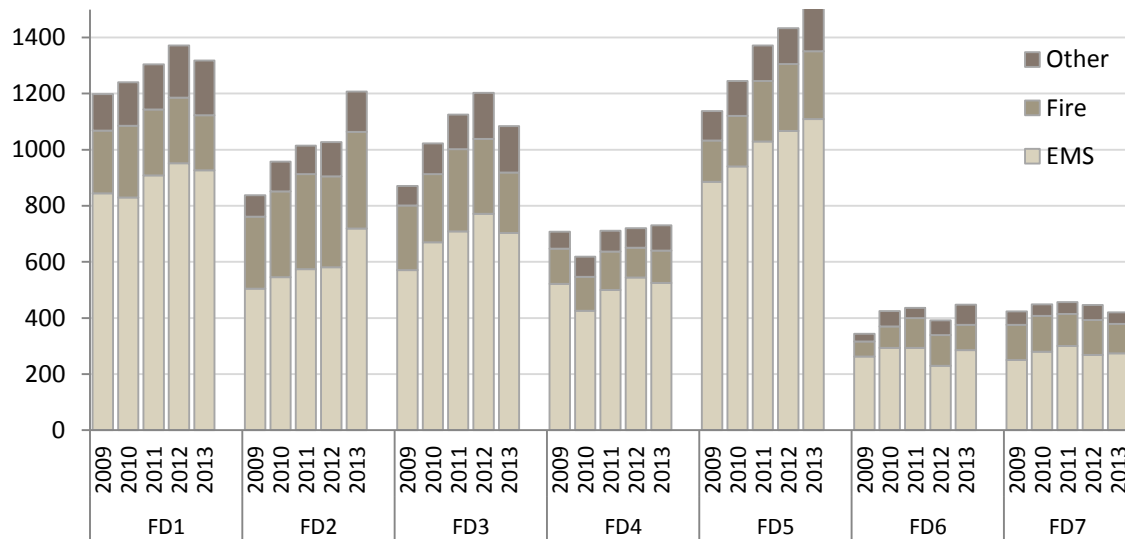


Table 21: Incident Count and Rate of Change by Service Category, District, and Year

District	Year	All		EMS		Fire		Other	
		Count	%Change	Count	%Change	Count	%Change	Count	%Change
FD1	2009	1198	-	844	-	224	-	130	-
	2010	1240	3.5%	830	-1.7%	255	13.8%	155	19.2%
	2011	1304	5.2%	908	9.4%	235	-7.8%	161	3.9%
	2012	1372	5.2%	952	4.8%	234	-0.4%	186	15.5%
	2013	1318	-4.0%	927	-2.6%	196	-16.6%	195	4.8%
	overall		10.0%		9.8%		-12.5%		50.0%
FD2	2009	838	-	505	-	256	-	77	-
	2010	957	14.2%	545	7.9%	306	19.5%	106	37.7%
	2011	1015	6.1%	574	5.3%	339	10.8%	102	-3.8%
	2012	1027	1.2%	581	1.2%	324	-4.4%	122	19.6%
	2013	1207	17.5%	719	23.8%	345	6.5%	143	17.2%
	overall		44.0%		42.4%		34.8%		85.7%
FD3	2009	871	-	571	-	230	-	70	-
	2010	1022	17.3%	670	17.3%	243	5.7%	109	55.7%
	2011	1125	10.1%	709	5.8%	293	20.6%	123	12.8%
	2012	1203	6.9%	771	8.7%	268	-8.5%	164	33.3%
	2013	1084	-9.9%	703	-8.8%	216	-19.4%	165	0.6%
	overall		24.5%		23.1%		-6.1%		135.7%
FD4	2009	708	-	521	-	126	-	61	-
	2010	619	-12.6%	426	-18.2%	121	-4.0%	72	18.0%

Standards of Cover

Danville Fire Department

	2011	711	14.9%	500	17.4%	137	13.2%	74	2.8%
	2012	720	1.3%	544	8.8%	106	-22.6%	70	-5.4%
	2013	730	1.4%	525	-3.5%	115	8.5%	90	28.6%
	overall		3.1%		0.8%		-8.7%		47.5%
FD5	2009	1138	-	886	-	147	-	105	-
	2010	1245	9.4%	940	6.1%	181	23.1%	124	18.1%
	2011	1372	10.2%	1029	9.5%	216	19.3%	127	2.4%
	2012	1433	4.4%	1067	3.7%	238	10.2%	128	0.8%
	2013	1519	6.0%	1109	3.9%	242	1.7%	168	31.3%
	overall		33.5%		25.2%		64.6%		60.0%
FD6	2009	344	-	262	-	54	-	28	-
	2010	424	23.3%	293	11.8%	77	42.6%	54	92.9%
	2011	436	2.8%	293	0.0%	107	39.0%	36	-33.3%
	2012	391	-10.3%	229	-21.8%	110	2.8%	52	44.4%
	2013	447	14.3%	285	24.5%	90	-18.2%	72	38.5%
	overall		29.9%		8.8%		66.7%		157.1%
FD7	2009	423	-	250	-	126	-	47	-
	2010	449	6.1%	280	12.0%	127	0.8%	42	-10.6%
	2011	457	1.8%	300	7.1%	114	-10.2%	43	2.4%
	2012	446	-2.4%	268	-10.7%	125	9.6%	53	23.3%
	2013	420	-5.8%	274	2.2%	105	-16.0%	41	-22.6%
	overall		0.7%		9.6%		-16.7%		-12.8%
ALL	2009	5520	-	3839	-	1163	-	518	-
	2010	5957	7.9%	3984	3.8%	1311	12.7%	662	27.8%
	2011	6420	7.8%	4313	8.3%	1441	9.9%	666	0.6%
	2012	6596	2.7%	4414	2.3%	1407	-2.4%	775	16.4%
	2013	6727	2.0%	4542	2.9%	1311	-6.8%	874	12.8%
	overall		21.8%		18.3%		12.6%		68.7%

Critical Task Analysis

Effective Response Force

Critical tasks are the duties and responsibilities that must be completed, sometimes simultaneously, to effectively intervene in an emergency. Before the appropriate critical tasks can be determined, dispatchers generate the initial response with the assistance of Computer Aided Dispatch (CAD) software, which collects and analyzes incident information. Initial “first alarm” response is determined with Emergency Fire Dispatch (EFD), a protocol with pre-structured questions, pre-arrival instructions, and pre-defined apparatus distribution and concentration response strategies.

DFD has developed more than 700 logic-driven, pre-emergency scenarios or response codes, which CAD uses to deploy resources based on incident details and resource availability. This protocol is detailed in Table 1 of the Appendix. The dispatcher stays on the line with the caller to obtain additional incident information, which may adjust the first alarm response.

Table 22: Summary of Effective Response Force (ERF) Categories Based on the Emergency Fire Dispatch (EFD) Protocol

Response Category	First Alarm Apparatus	Minimum Appar Staff	Support Staff
Basic	1	3	add up to 1
Low	2	7	add up to 3
Moderate	3	10	add up to 4
High	4	15	add up to 7 or more
Special	5	19	add 7 or more

Low Risk. A second apparatus – with at least the same capabilities as the first apparatus and with a minimum of three personnel – shall provide additional resources and support to the initial operations.

Moderate Risk. A third apparatus – preferably an aerial device with a minimum of four personnel – and a battalion chief shall provide additional resources and support to the initial operations.

High Risk. A fourth apparatus – with at least the same capabilities as the first apparatus and with a minimum of three personnel – and a Safety Officer shall serve as the Rapid Intervention Crew and assist with critical tasks.

Special Risk. A specialized apparatus – determined by the nature and location of the incident and with a minimum of three personnel – shall address the specific nature of the incident (i.e. Technical Rescue, Hazardous Material, or aerial).

In addition to the EFD protocol, DFD has established criteria for categorizing and assigning value to fire and non-fire risk in the community. For example, as described in the section on Physical Assets, engine companies gather contributing factors such as occupancy, construction, access, hazards, and concerns into pre-plans or pre-incident surveys (PIS) as part of pre-emergency risk reduction for commercial and public use structures. These documented factors aid in determining the resources necessary to safely and effectively accomplish critical tasks.

Critical Tasks

Depending on information gathered by dispatchers, EFD protocol determines the number of initial dispatch apparatus and support vehicles to handle critical tasks. In all incidents, the first arriving unit has the authority to upgrade the response if necessary. Staff assignments to critical tasks are the minimum number of personnel necessary for safe and effective incident operations. Staff may handle multiple tasks, particularly when a task is of short duration, such as Forcible Entry.

Notes. The following task lists represent assignment of DFD personnel. Patient transport is provided by an outside automatic aid agency, currently Danville Life Saving Crew (DLSC) or Regional One. Transport automatic aid and its staff are not included in the task lists, though it may be part of initial dispatch.

The apparatus and task descriptions in the following critical task lists use these terms:

- HMC or Hazardous Materials (Haz-Mat) Coordinator
- RIC or Rapid Intervention Crew (an Engine)
- IRIC or Initial Rapid Intervention Crew (an Engine)
- TRT or Tactical Rescue Team (an Engine)
- BC or Battalion Chief

Basic Response. Basic Response incidents (fire and non-fire) can be mitigated or stabilized with a single engine company response.

Table 23: Sample of Basic Response Critical Tasks with Staff Assignments

Emergency Medical First Alarm - 1 Engine	
Command/Communication	1
Patient Care	2
Total Minimum Staff	3

Vehicle Fire, No Exposures First Alarm - 1 Engine	
Command/Communication	1
Pump Operator	1
Attack Line	1
Total Minimum Staff	3

Minor Motor Vehicle Crash First Alarm - 1 Engine	
Command/Communication	1
Pump Operator	1
Attack Line/Patient Care	1
Total Minimum Staff	3

Occupied Elevator Malfunction First Alarm - 1 Engine	
Command/Communication	1
Pump Operator	1
Rescue/Intervention	1
Total Minimum Staff	3

Minor Fuel Spill First Alarm - 1 Engine	
Command/Communication	1
Pump Operator	1
Attack Line/Patient Care	1
Total Minimum Staff	3

Low Response. Low Response incidents are typically handled with a two-engine company response. The second engine may include specialty apparatus such as TRT or Haz-Mat. Support units may also be dispatched.

Table 24: Sample of Low Response Critical Tasks with Staff Assignments

Fuel Spill in Water		Simple Water Rescue	
First Alarm - 1 Engine, 1 HMC, 1 Truck		First Alarm - 1 Engine, 1 TRT	
Haz-Mat Coordinator	1	Command/Communication/Safety	1
Pump Operator	1	Pump Operator	1
Support/Intervention	3	Support/Intervention	3
Total Minimum Staff	7	Total Minimum Staff	7

Moderate Response. Moderate Response incidents are typically handled with a two engine response but include tasks which require additional staff and equipment. Support units may also be dispatched.

Table 25: Sample of Moderate Response Critical Tasks with Staff Assignments

Aircraft Incident	
First Alarm - 2 Engines, 1 Truck, 1 BC, 1 Safety	
Command/Communication	1
Safety	1
Pump Operator	1
1st Attack Line	2
2nd Attack Line	2
Extrication	2
Patient Care	2
Total Minimum Staff	10

High Response. High Response incidents are typically handled with a three engine response, one of which is the RIC. These incidents include tasks which require additional staff and equipment. Support units may also be dispatched.

Table 26: Sample of High Response Critical Tasks with Staff Assignments

Vehicle Fire Threatening a Structure	
First Alarm - 3 Engines, 1 Truck, 1 BC, 1 Safety	
Command/Communication	1
Safety	1
Pump Operator	1
1st Attack Line	2
Water Supply	1
Backup Line (IRIC)	2
RIC	3
Search/Rescue	2
Forcible Entry	2
Utilities	2
Ventilation	2
Total Minimum Staff	15

Special Response. Special Response incidents are typically handled with a three engine response, one of which is the RIC. These incidents include tasks which require additional staff and equipment. Support units may also be dispatched.

Table 27: Sample of Special Response Critical Tasks with Staff Assignments

High-Rise Structure Fire	
First Alarm - 3 Engines, 2 Trucks, 1 BC, 1 Safety	
Command/Communication	1
Safety	1
Pump Operator	1
1st Attack Line	2
Water Supply	1
Backup Line (IRIC)	2
RIC	3
Search/Rescue	2
Lobby	1
Forcible Entry	2
Utilities	2
Ventilation	2
Total Minimum Staff	19

Special Response – Technical Rescue. The DFD Technical Rescue Team (DFD-TRT) has identified unit assignments, staffing, and critical tasks for its special services. These are documented in DFD-TRT Standard Operating Guidelines. Table 17 is samples of technical rescue critical task analysis. HTR designates heavy tactical rescue.

Table 28: Sample of Technical Rescue Special Response Critical Tasks with Staff Assignments

DFD-TRT Vehicle Rescue/Extrication Engine 5		DFD-TRT Trench Rescue Engine 5, Utility 2, large HTR trailer	
Command	1	Command	1
Safety	1	Safety	1
Stabilization & Extrication	4	TRT Branch Director	1
Total Minimum Staff *	6	Panel Unit	4
*NOTE: Staffing may require recall.		Shoring Unit	3
		Cut Unit	2
		Air Supply Unit	1
		Patient Packaging & Removal	4
		Total Minimum Staff *	17
		*NOTE: Staffing may require recall.	

Resource Depletion

The senior staff has authority to call in off-duty personnel in order to maintain minimum staffing, to staff reserve apparatus, and to supplement resources committed to a large-scale incident. According to DFD operating guidelines, a long-term “state of emergency” incident would activate a switch to two shifts with additional staff from the third shift.

Section Four: Performance Measurement (Component E)

Distribution

Basic Measures

Population, district size, and housing statistics for each fire district were described in detail in Section Three. Table 29 summarizes those statistics again and adds miles of road, presenting each as a percent of the measure's total.

Table 29: Basic Distribution Measures by Fire District

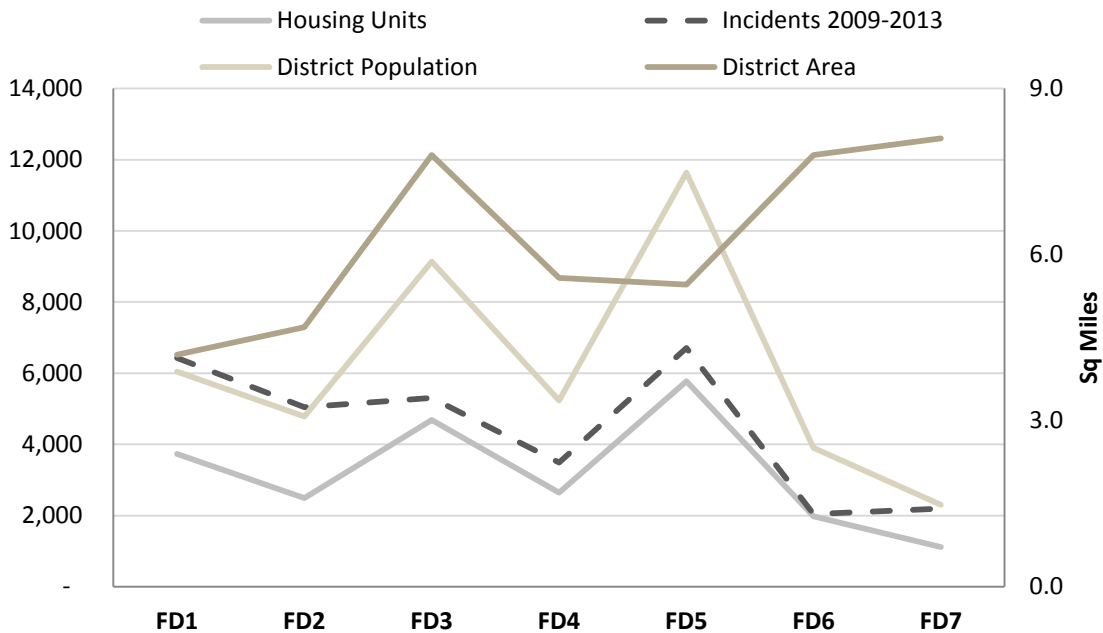
Fire District	Area (SqMi)	Road (Mi)	Population	Housing Units
FD1	18%	13%	14%	17%
FD2	11%	13%	11%	11%
FD3	13%	21%	21%	21%
FD4	19%	13%	12%	12%
FD5	10%	17%	27%	26%
FD6	18%	12%	9%	9%
FD7	13%	12%	5%	5%

Figure 19 adds incident volume and compares it with population and area for each district. Since the larger districts are rural, there is a slightly inverse relationship between area and incident volume. Table 30 describes the ratio of total service calls to population and housing units over the period 2009 to 2013.

Table 30: Incident Ratio to Population and Housing Units by District

Incident Ratio 1:	FD1	FD2	FD3	FD4	FD5	FD6	FD7
to Population	1.07	1.05	0.58	0.67	0.58	0.52	0.95
to Housing Units	1.72	2.02	1.13	1.32	1.16	1.03	1.96

Figure 19: Population, Area, and Incidents by District



Performance Objective Measures

Travel Times. Historic travel times are a critical indicator of distribution. DFD's performance objectives include the first arriving unit on the scene of all emergencies within 5 minutes of travel 90% of the time. In 2013 DFD met this objective for all calls for service and for each service category except Haz-Mat. Actual 90th percentile performance for the period 2009 to 2013 is summarized in Table 31.

Table 31: Summary of 90th Percentile Travel Time Performance by Service Category and Year

Service	Benchmark	All Years	2013	2012	2011	2010	2009
Structure Fire	05:00	04:40	04:00	03:52	04:14	04:14	05:26
All Fire Calls	05:00	05:00	04:40	04:37	04:37	05:03	05:37
EMS	05:00	05:05	04:40	04:32	04:40	05:27	05:46
Haz-Mat	05:00	04:50	05:37	03:43	04:24	04:42	05:05
Tech Rescue	05:00	04:36	03:23	03:34	02:14	02:24	04:56
All Calls	05:00	05:08	04:47	04:39	04:42	05:24	05:47

Additional evaluation was made to determine whether the objective is realistic. The values in Table 32 were calculated with Geographic Information System (GIS) tools. According to that analysis, less than 2% of all service area addresses cannot be reached in 5 minutes travelling at posted speed limits. More than half of those addresses are in District 5, and a large portion of the remaining are in District 2.

Table 32: Summary of Addresses and Roads NOT Served by a 5 Minute Drive-Time

Fire District	Address Count	% of All Address	Road Miles	% of All Roads
FD1	4	0.02%	0.28	0.07%
FD2	115	0.51%	0.78	0.19%
FD3	40	0.18%	0.97	0.24%
FD4	16	0.07%	0.14	0.03%
FD5	158	0.70%	1.16	0.28%
FD6	26	0.11%	0.39	0.10%
FD7	10	0.04%	0.24	0.06%
Total	369	1.62%	3.96	0.96%

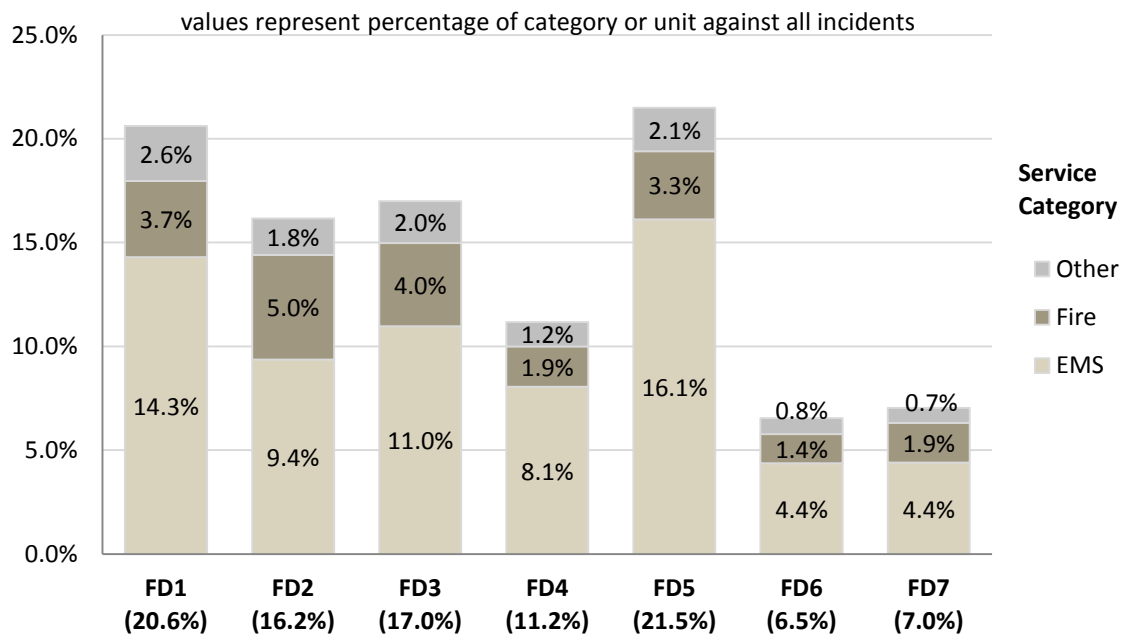
The address analysis is depicted in Figure 10 of the Appendix. In addition, the map in Figure 11 of the Appendix summarizes catchment or the overlap of each station's 5 minute drive-time area.

Concentration

Basic Measures

Service Calls. Section Three's Service Demand detailed service calls by fire district, service category, and year. Figure 20 is a summary of incident volume by service district over the period 2009 to 2013. It should be noted that this chart indicates the district where incidents occurred and does not indicate all units involved in responses. For example, District 6 and District 7 serve as Rapid Intervention Crews (RIC) for the west and east end of the city, and therefore respond to calls for which they are not first due and which are not reflected in Figure 20.

Figure 20: Calls for Service by First-Due District and Service Category



These figures indicate considerable differences in overall service demand, which partially correlate with district population. Figure 19 compares the above incident volumes with each district's population and area.

Call Density. Figure 1 clearly demonstrates the districts with higher call volumes. For more specific call density, the heat maps in Figure 13, 14, and 15 of the Appendix indicate specific locations within districts for the period 2009 to 2013.

Performance Objective Measures

ERF response time performance was detailed in Section Two Component B and does not meet the department's objective when considering last-arriving units on structure fires. However, additional analysis of a full structural assignment benefits from consideration of the performance of the department's single frontline ladder. Unit L1 is centrally located at Station 1 and is generally the second unit on calls requiring two or more units. The map in Figure 12 of the Appendix depicts the estimated 11-minute drive-time area for ladder truck L1. Of all incidents to which unit L1 responded from 2009 to 2013, its 90th percentile total response time (alarm to arrival) was 11 minutes.

Various ERF performance measures are compared below.

Table 33: Comparative 90th Percentile ERF Total Response Times in mm:ss by Year

Measure	Bench mark	All Years	2013	2012	2011	2010	2009
Last-Arriving - Structure Fire	12:20	16:11	15:31	17:04	17:33	15:10	16:18
Last-Arriving – All Fire Calls	12:20	10:57	11:12	10:58	11:04	10:48	10:31
All ERF Units – Structure Fire	12:20	12:30	12:11	12:28	12:50	12:24	12:17
Ladder Truck – All Calls	12:20	11:00	09:54	10:48	11:31	10:58	11:22

The entire city falls within a drive-time of 15 minutes from Station 1. The longest estimated drive-time from any station is 18 minutes from Station 7 at the eastern city limits to an address point on the west side.

Reliability

Basic Measures

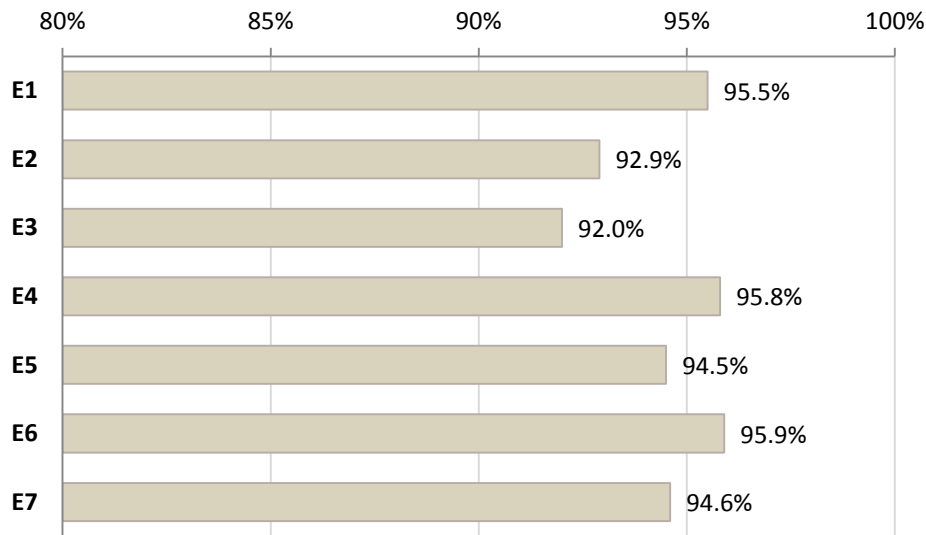
Unit Availability. As mentioned in Section Two Component A, DFD does not rely on mutual aid to answer its calls for service. DFD apparatus provide sufficient coverage for the entire service area. The Record Management System (RMS) does not specify which of multiple responding units was primary. However, all seven fire districts have a single engine which is primary responder for its district. The centrally located station in District 1 also houses the ladder truck, which backs up Engine 1. Each RMS incident has a location district and a responding district, which match unless the first-due is unavailable. To evaluate distribution, response times were examined on incidents where the responding district was the same as the incident district, as detailed below.

Table 34 demonstrates the historic availability of the primary responding units for each district and Figure 21 depicts the overall availability for the period 2009 to 2013. All stations responded to 94% or better of their district's calls in 2013.

Table 34: First-Due Unit Availability for All Calls for Service by Year

Unit	2009	2010	2011	2012	2013	All Years
E1/L1	95.2%	94.6%	95.5%	94.8%	97.5%	95.5%
E2	92.8%	91.4%	93.6%	92.6%	93.9%	92.9%
E3	91.0%	93.3%	90.7%	90.2%	94.8%	92.0%
E4	94.9%	94.7%	95.9%	96.3%	97.3%	95.8%
E5	95.2%	94.1%	93.1%	94.6%	95.6%	94.5%
E6	95.6%	96.5%	95.0%	95.9%	96.6%	95.9%
E7	95.0%	94.7%	93.4%	93.3%	96.9%	94.6%

Figure 21: Overall Primary Unit Availability for All Calls for Service



The RMS does not track call stacking or incident queuing.

Performance Objective Measures

Reliability can be represented in part by the ability of a unit to perform its functions in a routine and consistent manner.

Turnout and Travel Times. As noted in Section Two Component B, total response times are meeting objective. However, because response times are composed in part of turnout and travel, these were further analyzed by district for reliability. Figure 22 depicts incidents with first-arriving turnout times beyond the performance objective as a percentage of that district's total incidents of that call type for the year, and Figure 23 does the same for travel times. Average turnout times are within objective; therefore engine companies must improve consistency. Travel times are excellent and within objective.

Figure 22: First-Due Units with Turnout Times Greater than Objective by Year, Call Type, and Fire District

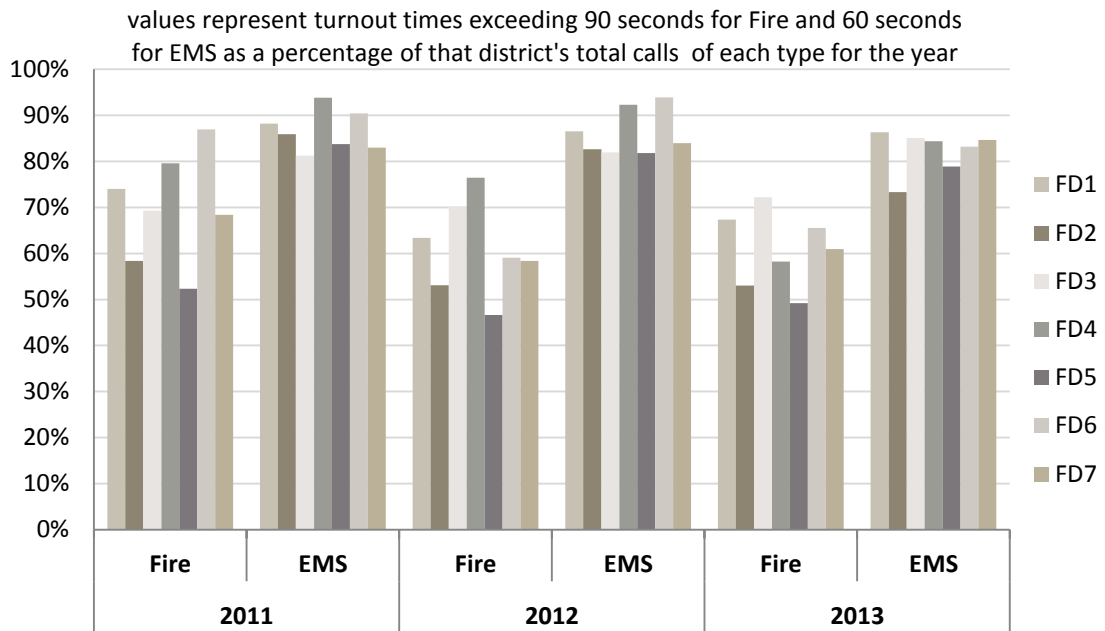
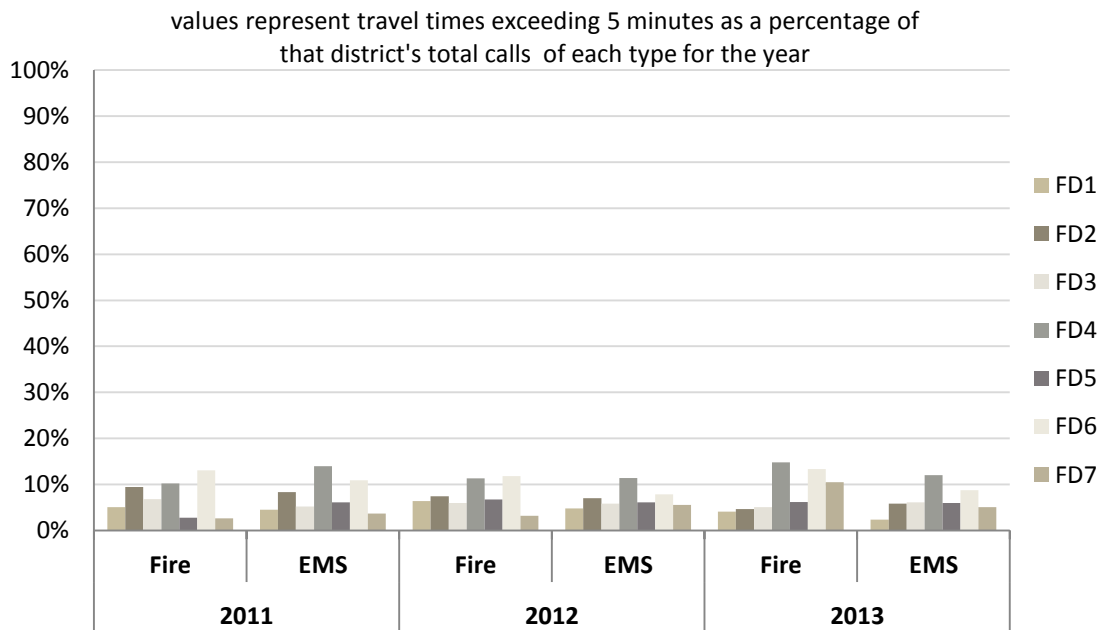


Figure 23: First-Due Units with Travel Times Greater than Objective by Year, Call Type, and Fire District



Summary

First-due unit availability is excellent for all service districts. All stations have a single first-due resource except for Station 1, which has a ladder truck as second due. As already noted, turnout and travel times exceed objectives in all districts, and this is evident in the reliability measures.

Table 35 summarizes availability and reliability for first-due district and first-due unit for the period 2009 to 2013. Reliability was based on a total response time (alarm to on-scene) less than or equal to the objective of 7 minutes for EMS calls and 8 minutes for Fire calls.

Table 35: Availability and Reliability by Fire District for 2009 to 2013

	FD1	FD2	FD3	FD4	FD5	FD6	FD7
First-Due District Workload	6,433	5,044	5,305	3,488	6,707	2,042	2,195
First-Due Unit Responses	6,145	4,687	4,880	3,343	6,339	1,959	2,077
First-Due Availability	95.5%	92.9%	92.0%	95.8%	94.5%	95.9%	94.6%
First-Due District Reliability	92.8%	90.7%	90.8%	84.3%	90.5%	83.1%	91.2%
First-Due Unit Reliability	96.0%	93.6%	92.4%	86.3%	90.9%	85.2%	91.8%

Section Five: Objective Adoption (Component F)

Introduction

Benchmarks represent the industry ideal for suburban communities as documented in the Commission on Fire Accreditation International (CFAI) Fire and Emergency Service Self-Assessment Manual (FESSAM) 8th edition. DFD has adopted benchmark performance objectives to identify the superlative performance standard to which the department aspires:

Baselines represent the department's day-to-day performance based on the resources currently available and historic response time measures. DFD will use these baselines to evaluate its actual ongoing performance and to define where improvements can be effected to bring baselines closer to benchmarks.

The following statements summarize DFD benchmark objectives for first-arriving units (distribution) and effective response force (concentration) for services provided. Each benchmark is followed with a corresponding baseline statement describing the department's actual historic performance.

Performance Statement for Structure Fire Responses

DFD's response and deployment standards are based upon its suburban population densities and the community's service demands. DFD does not rely on the use of automatic aid or mutual aid from neighboring fire departments to provide its effective response force complement of personnel. Seven fire stations provide citywide coverage; department staffing is based upon department guidelines for front-line apparatus. DFD does not distinguish service zones within fire districts and provides equal services to all areas of the city. The targeted service level objectives in the benchmark statements are based on industry standards and best practices and have been approved and adopted by DFD's administration.

Benchmark Objectives

DFD's benchmark service level objectives for structure fires are as follows:

For 90 percent of all structure fires, the total response time for the *first-arriving unit* staffed with a minimum of 3 firefighters shall be 7 minutes 20 seconds. The first-arriving unit for all risk levels shall be capable of providing 500 gallons of water and 1,250 gallons per minute (gpm) pumping capacity; assessing scene safety; initiating command; requesting additional resources; establishing and advancing an attack line flowing a minimum of 100 gpm; and establishing an uninterrupted water supply. These operations shall be done in accordance with departmental standard operating guidelines while providing for the safety of responders and the general public.

For 90 percent of all structure fires, the total response time for the arrival of the *effective response force* (ERF) staffed with a minimum of 15 firefighters and officers shall be 12 minutes 20 seconds. The ERF for all risk levels shall be capable of assessing scene safety; establishing command; requesting additional resources; establishing and advancing an attack line and backup line; complying with the Occupational Safety and Health Administration (OSHA) requirements of two in-two out; completing forcible entry; establishing an uninterrupted water

supply; containing the fire; rescuing at-risk victims; ventilating the structure; controlling utilities; and performing salvage operations. These operations shall be done in accordance with departmental standard operating guidelines while providing for the safety of responders and the general public.

Baseline Statements

The following baseline statements reflect DFD's actual performance on structure fire incidents from 2009 to 2013.

For 90 percent of all structure fires, the total response time for the *first-arriving unit* staffed with a minimum of 3 firefighters is 7 minutes 28 seconds. The first-arriving unit for all risk levels is capable of providing 500 gallons of water and 1,250 gallons per minute (gpm) pumping capacity; assessing scene safety; initiating command; requesting additional resources; establishing and advancing an attack line flowing a minimum of 100 gpm; and establishing an uninterrupted water supply. These operations are done in accordance with departmental standard operating guidelines while providing for the safety of responders and the general public.

For 90 percent of all structure fires, the total response time for the arrival of the *effective response force* (ERF) is 16 minutes 11 seconds. The ERF for all risk levels is capable of full scene assessment; establishing command; requesting additional resources; establishing and advancing an attack line and backup line; complying with the Occupational Safety and Health Administration (OSHA) requirements of two in-two out; completing forcible entry; establishing an uninterrupted water supply; containing the fire; rescuing at-risk victims; ventilating the structure; controlling utilities; and performing salvage operations. These operations are done in accordance with departmental standard operating guidelines while providing for the safety of responders and the general public.

Table 36: Structure Fires Baseline Performance 90th Percentile Times in mm:ss

Performance Measures		2009 - 2013	2013	2012	2011	2010	2009
Alarm Handling	Pick-up to Dispatch	02:36	02:36	02:37	03:06	02:43	01:12
Turnout	1st Unit	02:10	02:22	02:19	02:22	01:57	01:13
Travel	1st Unit (Distribution)	04:40	04:00	03:52	04:14	04:14	05:26
	ERF (Concentration)	09:50	09:50	09:15	10:00	10:13	09:43
Total Response	1st Unit (Distribution)	07:28	07:48	07:10	07:58	07:38	06:50
	ERF (Concentration)	16:11	15:31	17:04	17:33	15:10	16:18
Incident Counts		582	112	106	129	108	129

Performance Statements for EMS Responses

DFD's response and deployment standards are based upon its suburban population densities and the community's service demands. DFD does not rely on the use of automatic aid or mutual aid from neighboring fire departments to provide its effective response force complement of personnel. Seven fire stations provide citywide coverage; department staffing is based upon department guidelines for front-line apparatus. DFD does not distinguish service zones within fire districts and provides equal services to all areas of the city. The targeted service level objectives in the benchmark statements are based on industry standards and best practices and have been approved and adopted by DFD's administration.

Benchmark Objectives

DFD's benchmark service level objective for EMS responses is as follows:

For 90 percent of all EMS incidents, the total response time for the *first-due unit* staffed with a minimum of 3 firefighters shall be 7 minutes. The first-arriving unit shall be capable of assessing scene safety; initiating command; sizing-up the situation; conducting initial patient assessment; obtaining vitals and patient medical history; initiating mitigation efforts within one minute of arrival; providing first responder medical aid, including automatic external defibrillation; and assisting transport personnel with packaging the patient.

The department relies upon Danville Life Saving Crew, a contracted external agency, to complete the effective response force component of its emergency medical services program. The fire department company shall provide basic life support aid including automatic external defibrillation until the third-party provider arrives on scene. If the third-party provider unit arrives on scene first, its personnel will initiate care, and the staff from the fire department company will provide support as needed.

Baseline Statements

The following baseline statements reflect DFD's actual performance on EMS incidents from 2009 to 2013.

For 90 percent of all EMS incidents, the total response time for the *first-due unit* staffed with a minimum of 3 firefighters is 6 minutes 59 seconds. The first-arriving unit are capable of assessing scene safety; initiating command; sizing-up the situation; conducting initial patient assessment; obtaining vitals and patient medical history; initiating mitigation efforts within one minute of arrival; providing first responder medical aid, including automatic external defibrillation; and assisting transport personnel with packaging the patient.

The department relies upon Danville Life Saving Crew, a contracted external agency, to complete the effective response force component of its emergency medical services program. The fire department company provides basic life support aid including automatic external defibrillation until the third-party provider arrives on scene. If the third-party provider unit arrives on scene first, its personnel initiate care, and the staff from the fire department company provide support as needed.

Table 37: EMS Baseline Performance 90th Percentile Times in mm:ss

Performance Measures	2009 - 2013	2013	2012	2011	2010	2009
Alarm Handling	00:58	00:58	01:15	01:05	00:46	00:44
Turnout	02:20	02:25	02:28	02:35	02:13	01:07
Travel	05:05	04:40	04:32	04:40	05:27	05:46
Total Response	06:59	06:55	07:02	07:04	06:56	06:54
Incident Counts	21,063	4,525	4,378	4,302	3,951	3,812

Performance Statements for Haz-Mat Responses

DFD's response and deployment standards are based upon its suburban population densities and the community's service demands. DFD does not rely on the use of automatic aid or mutual aid from neighboring fire departments to provide its effective response force complement of personnel. Seven fire stations provide citywide coverage; department staffing is based upon department guidelines for front-line apparatus. DFD does not distinguish service zones within fire districts and provides equal services to all areas of the city. The targeted service level objectives in the benchmark statements are based on industry standards and best practices and have been approved and adopted by DFD's administration.

Benchmark Objectives

DFD's benchmark service level objective for Haz-Mat responses is as follows:

For 90 percent of all Haz-Mat incidents, the total response time for the ***first-arriving unit*** staffed with a minimum of 3 firefighters shall be 7 minutes 20 seconds. The first-arriving unit shall be capable of assessing scene safety; establishing command; sizing-up the situation; initiating mitigation efforts within one minute of arrival; requesting additional resources; establishing control zones; and providing initial emergency decontamination. These operations shall be done in accordance with departmental standard operating guidelines while providing for the safety of responders and the general public.

For 90 percent of all Haz-Mat incidents, the total response time for the arrival of the ***effective response force*** (ERF) shall be 12 minutes 20 seconds. The ERF for all risk levels shall be capable of advanced assessment; technical entry; product identification; securing leaks; and technical and/or mass decontamination. These operations shall be done in accordance with departmental standard operating guidelines while providing for the safety of responders and the general public.

Baseline Statements

The following baseline statements reflect DFD's actual performance on Haz-Mat incidents from 2009 to 2013.

For 90 percent of all Haz-Mat incidents, the total response time for the *first-arriving unit* staffed with a minimum of 3 firefighters is 8 minutes 12 seconds.

The first-arriving unit is capable of assessing scene safety; establishing command; sizing-up the situation; initiating mitigation efforts within one minute of arrival; requesting additional resources; establishing control zones; and providing initial emergency decontamination. These operations are done in accordance with departmental standard operating guidelines while providing for the safety of responders and the general public.

For 90 percent of all Haz-Mat incidents, the total response time for the arrival of the *effective response force* (ERF) is 12 minutes 7 seconds. The ERF for all risk levels are capable of advanced assessment; technical entry; product identification; securing leaks; and technical and/or mass decontamination. These operations are done in accordance with departmental standard operating guidelines while providing for the safety of responders and the general public.

Table 38: Haz-Mat Baseline Performance 90th Percentile Times in mm:ss

Performance Measures		2009 - 2013	2013	2012	2011	2010	2009
Alarm Handling	Pick-up to Dispatch	03:27	03:35	03:52	04:18	03:05	01:11
Turnout	1st Unit	02:12	02:19	02:04	02:35	01:55	01:25
Travel	1st Unit (Distribution)	04:50	05:37	03:43	04:24	04:42	05:05
	ERF (Concentration)	07:10	07:55	05:46	07:54	07:38	05:41
Total Response	1st Unit (Distribution)	08:12	09:39	08:18	08:38	07:20	06:52
	ERF (Concentration)	12:07	12:39	12:15	13:09	10:33	09:03
Incident Counts		148	21	31	39	30	31

Performance Statements for Technical Rescue Responses

DFD's response and deployment standards are based upon its suburban population densities and the community's service demands. DFD does not rely on the use of automatic aid or mutual aid from neighboring fire departments to provide its effective response force complement of personnel. Seven fire stations provide citywide coverage; department staffing is based upon department guidelines for front-line apparatus. The Technical Rescue Team operates out of Station 5. DFD does not distinguish service zones within fire districts and provides equal services to all areas of the city. The targeted service level objectives in the benchmark statements are based on industry standards and best practices and have been approved and adopted by DFD's administration.

Notes Regarding Technical Rescue Response

Danville Life Saving Crew (DLSC), an agency external to DFD, is primary provider of vehicle extrication services and water rescue in the City of Danville. In the event of a *motor vehicle crash* (MVC), the Emergency Communications Center (ECC) dispatches the first-due engine and a second engine on roads of more than two lanes and/or over 45 mph for traffic control. DLSC will respond a transport and crash truck to all MVCs if available. After a working extrication is confirmed and a DLSC crash truck is not responding or requests assistance, Engine 5 is dispatched. Extrication can be handled with standard company staffing.

In the event of a *water rescue*, the ECC dispatches the first-due engine and Engine 5. DLSC responds with a transport, a special operations truck, and a water rescue team. Engine 5 supports and assists as necessary. Working together, DFD and DLSC will develop an incident action plan to safely perform the rescue. Water rescue response assistance can be handled with standard company staffing.

In the event of a *confined space, structural collapse, high/low-angle, or trench rescue* the first-due engine, Engine 5, and the appropriate equipment trailer respond. DLSC

responds a transport. After a rescue is confirmed, the TRT Coordinator is notified and the appropriate number of additional team members is recalled to the incident.

Benchmark Objectives

DFD's benchmark service level objective for Technical Rescue responses is as follows:

For 90 percent of all Technical Rescue incidents, the total response time for the *first-arriving unit* staffed with a minimum of 3 firefighters shall be 7 minutes 20 seconds. The first-arriving unit shall be capable of assessing scene safety; establishing command; sizing-up the situation; initiating mitigation efforts within one minute of arrival; requesting additional resources; and establishing control zones. These operations shall be done in accordance with departmental standard operating guidelines while providing for the safety of responders and the general public.

For 90 percent of all Technical Rescue incidents, the total response time for the arrival of the *effective response force* (ERF) shall be 12 minutes 20 seconds. The ERF for all risk levels shall be capable of full assessment; tactical preparation and operations; air supply; and patient packaging and removal. These operations shall be done in accordance with departmental standard operating guidelines while providing for the safety of responders and the general public.

Baseline Statements

The following baseline statements reflect DFD's actual performance on Technical Rescue incidents from 2009 to 2013. As noted, the TRT most often assists the outside agency primarily responsible for vehicle extrication services and water rescue. Incident counts and performance measures do not reflect all such assistance at this time.

For 90 percent of all Technical Rescue incidents, the total response time for the *first-arriving unit* staffed with a minimum of 3 firefighters is 8 minutes 5 seconds. The first-arriving unit is capable of assessing scene safety; establishing command; sizing-up the situation; initiating mitigation efforts within one minute of arrival; requesting additional resources; and establishing control zones. These operations are done in accordance with departmental standard operating guidelines while providing for the safety of responders and the general public.

For 90 percent of all Technical Rescue incidents, the total response time for the arrival of the *effective response force* (ERF) is 15 minutes 51 seconds. The ERF for all risk levels are capable of full assessment; tactical preparation and operations; air supply; and patient packaging and removal. These operations are done in accordance with departmental standard operating guidelines while providing for the safety of responders and the general public.

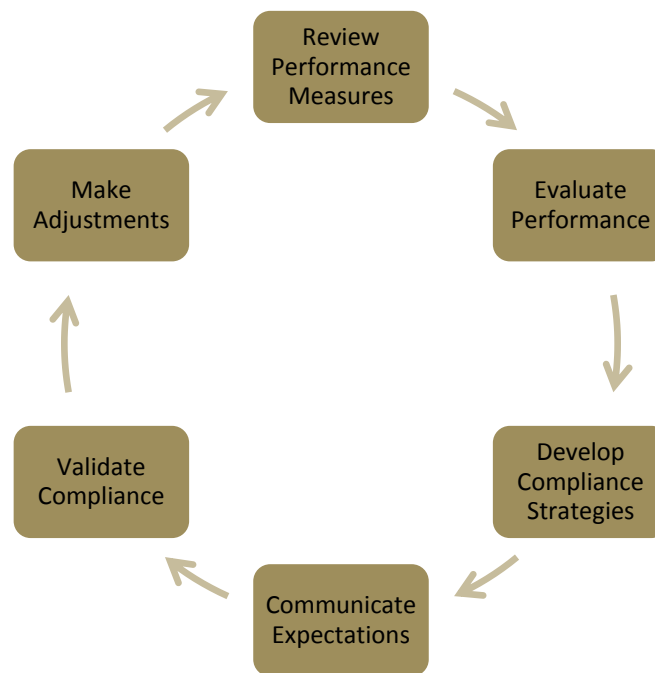
Table 39: Technical Rescue Baseline Performance 90th Percentile Times in mm:ss

Performance Measures		2009 - 2013	2013	2012	2011	2010	2009
Alarm Handling	Pick-up to Dispatch	04:05	04:17	03:45	06:21	01:51	02:16
Turnout	1st Unit	02:13	02:05	02:31	02:11	02:12	00:49
Travel	1st Unit (Distribution)	04:36	03:23	03:34	02:14	02:24	04:56
	ERF (Concentration)	06:33	05:25	05:07	02:54	07:46	08:44
Total Response	1st Unit (Distribution)	08:05	07:32	07:00	10:39	06:02	07:22
	ERF (Concentration)	15:51	09:49	14:34	11:27	12:19	16:10
Incident Counts		24	5	8	4	6	4

Section Six: Compliance Methodology (Component G)

Summary

With the completion of this Standards of Cover, Danville Fire Department (DFD) has reviewed performance measures and adjusted its documented performance objectives. In addition, the agency will use the CFAI model for compliance methodology to provide continuous evaluation of services, as illustrated below.



For DFD, the primary strategies for accomplishing this ongoing evaluation are internal audits as well as short- and long-term planning. When combined, these two changes should precipitate a shift toward performance awareness and proactive decisions. Audit processes are further described in the next section. Where objectives and procedures need to be revised, corresponding notification and training will be provided to personnel.

Strengths and Weaknesses

DFD has recognized the following strengths and weaknesses as a result of its data collection for this report:

Data quality. Because DFD also manages the PSAP, incident units and times are automatically populated in the fire Record Management System (RMS) by a Computer Aided Dispatch (CAD) interface. This guarantees all incidents are recorded. Reports can be generated at the incident or apparatus level. There were instances of incomplete data, such as missing “en route” times on units with arrival times (less than 1%) and obviously incorrect values where the alarm or dispatch time was later than the “en route” time (less than 1%). There is no way to determine whether these few instances were software or computer operator glitches, or whether a unit did not report a time. Ongoing scheduled reports and performance measure review will identify such instances and allow for timely correction.

Call type. When gathering statistics for this report, it became apparent that the department cannot identify incidents for which the call type changed. In addition, there are incidents where the closing call type should have changed and did not, particularly on “Other” calls for service and Special Risk incidents. For example, the department knows more vehicle extrications were performed than the data indicates. Two potential solutions include training personnel on the importance of updating the call type and exploring methods for recording both initial and closing call types in the RMS.

In the determination of the actual number of extrication calls, there may be confusion between calls where the agency initiates extrication or whether the extrication is the sole responsibility of a secondary agency. DFD may determine that all extrications need to be identified as such when assistance is provided.

First-due unit. The current RMS cannot absolutely identify the first-due unit on a multi-unit response. The incident’s location district provides the default first-due, which would be dispatched in most instances. Because the department is implementing a new RMS in

spring 2014, it will investigate the potential for flagging the first-due unit. In addition, this information is retained in CAD and could potentially be extracted and correlated to the RMS incident.

Performance review and evaluation. The most important change is consistent, periodic reviews of actual performance. With implementation of the new RMS, weekly and monthly reports of call process, turnout, and travel times will be reviewed by the Operations Chief to identify extended times and obtain explanations. A second level of audit will be conducted by the Emergency Communications Center (ECC) manager/coordinator and will be based on independent CAD data. This will lead to evaluations of individual processes to determine potential improvements and will document legitimate reasons for performance exceptions.

In addition, performance measures at the community, fire district, first-due unit, and Effective Response Force levels will be reviewed on an annual basis and evaluated against department objectives and industry standards.

Communication and accountability. As important as reviewing performance is internal notification to personnel of performance objectives and subsequent measurements. The monthly call report, which currently focuses on call volume and is emailed to the entire department, will be changed to include actual 90th percentile performance by station and shift.

In the process of creating this SOC, the agency administrator has revised and established performance objectives. These will be conveyed to agency personnel via staff meetings and internal communications. On an annual basis, the administrator will review objectives and performance to determine if processes are adequate, if service demand has changed, or if community expectations are being met.

Existing biannual Senior Staff meetings will be revised to include planning items, such as developing and confirming compliance strategies and determining necessary training and communication.

Section Seven: Overall Evaluation (Component H)

Conclusions

Danville Fire Department experienced a nearly 20% increase in overall call volumes between 2009 and 2012. The actual rate of increase has slowed each of those years for Fire and EMS calls but has nearly doubled for call type Other, particularly in the category of Public Service. Assistance calls are not expected to decline, due to the percentage of 65-and-over population. All fire districts have been able to handle their respective increases.

As reflected in the availability analysis, DFD provides excellent coverage of its first-due service areas. First-due unit availability is between 92 and 97% in all districts for the four year period. Small decreases are evident for most districts in the last two years, which corresponds to changes in call volumes; the biggest decreases in availability were in the districts with the largest call volume increases.

Actual performance and reliability analysis revealed that responses are not meeting department objectives. First-arriving units arrive within performance objectives between 67 and 80% of the time, with an overall department measure of 75% for the four year period 2009 to 2012. This is the result of three factors: sustained increases in call processing times, turnout times which exceed objective, and travel times longer than the 4.5 minute expectation. Travel times reflected improvements in 2011 and 2012.

Recommendations

All response districts are adequately staffed with resources, and community expectations are being met with no assistance from outside agencies. However, DFD should remain aware of trends in concentration of population and incident volume. For example, downtown redevelopment projects could significantly change the multi-unit housing distribution and occupancy rates for Fire District 1 in the next ten years.

In addition, DFD must fully implement the strategies defined in its Compliance Methodology. Before the creation of this Standards of Cover, DFD had only two documented performance objectives for turnout and response and no process for reviewing or evaluating actual performance measures. Defining, reviewing, and communicating performance objectives and measures are necessary to evaluating service delivery. Establishing clear performance expectations and then reporting actual performance measures on a monthly basis are expected to raise awareness and thereby improve response times.

Finally, DFD should commit to an annual report and review of performance as part of its planning process.