Community Risk and Emergency Service Analysis

Standards of Cover

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LOVELAND FIRE RESCUE AUTHORITY

Community Risk and Emergency Service Analysis

Standards of Cover

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Author: Accreditation Manager Tyler Drage

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Ned Sparks

Accreditation Manager
Tyler Drage

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Fire Chief Randy Mirowski (retired)

- Thank you for having the vision to start LFRA on the path of good to great and building it to last.

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Executive Summary

In late 2009, under the leadership of Fire Chief Randy Mirowski (ret), Loveland Fire and Rescue began a journey of going from good to great and building the agency to last. This journey took a comprehensive look at every aspect of agency functions in an effort to improve efficiencies and make positive effects on both outputs and outcomes. Every employee became involved in building a better agency by training in situational awareness, leadership, strategy and tactics, and many other areas. These efforts included revisions to response plans, improvements to operational assignments, development of two dedicated support services companies, and improved incident management systems.

At the same time, executive leadership began working to improve the administrative functions of the agency through improved relationships with internal and external stakeholders. This effort culminated in with the formation of Loveland Fire Rescue Authority (LFRA) and the publication of the 2012 Strategic Plan, which outlined a vision for long-term improvement and growth of the new agency. The Strategic Plan also established several performance measures that allowed the agency to implement data-driven performance measurement. The Plan was adopted by both governing partners (City of Loveland and Loveland Rural Fire Protection District) and was formally adopted by the newly formed LFRA Board of Directors.

In August 2014, the agency took the first steps towards recognizing the successes that the membership had accomplished since 2009 by becoming a Registered Agency with the Commission on Fire Accreditation International (CFAI). Under the leadership of Fire Chief Mark Miller, LFRA is now on a mission of building enduring greatness into the fabric of the organization. LFRA conducted a comprehensive analysis of the hazards and risks within the agency's jurisdiction and viewed the results in the context of community expectations and agency organization. Upon completion of the risk analysis, a Standards of Cover (SOC) document was developed to address performance objectives, methodology, measurement, and evaluation of data-driven performance measures. This entire process resulted in the comprehensive planning and logistics document that is now before you: The LFRA Community Risk and Emergency Service Analysis – Standards of Cover.

Chapter 1 – Community Overview

Loveland Fire Rescue Authority (LFRA) is a consolidated fire protection and emergency service agency specializing in fire and rescue-related services. The City of Loveland and the Loveland Rural Fire Protection District are located 50 miles north of Denver, Colorado, along the eastern foothills of the Rocky Mountains and the Arapaho and Roosevelt National Forest. The organization's 88 full-time uniformed members, nine (9) civilian support staff members, and approximately 34 firefighter reserves provide the workforce for the agency. LFRA operates five fire stations that are staffed 24 hours, seven days per week, plus two reserve stations that are staffed by volunteers of the Big Thompson Canyon Volunteer Fire Department. The station at the Northern Colorado Regional Airport is staffed 40 hours per week by a dedicated Aircraft Rescue and Firefighting (ARFF) Engineer, with additional coverage provided on an as-needed basis for aircraft flight stand-by services. The agency operates seven paid fire companies, including five engines, one aerial truck company and one heavy rescue company. Within the agency's response area are portions of the neighboring communities of Johnstown, Masonville, Big Thompson Canyon, and the Pinewood Reservoir area. The most recent US Census data is from 2013, indicating that approximately 97,458 people live within the 194 square mile area served by LFRA.

Legal Basis for the Agency

LFRA was formed in January 2012, with the consolidation of the City of Loveland Fire Department and the Loveland Rural Fire Protection District. Loveland Fire and Rescue (LFR) had provided service to both coverage areas since approximately 1950 through a contractual agreement. However, the relationship was not firmly established and the contract required annual review and renewal, oftentimes resulting in long delays for a formal agreement. In 2012, the City and the Rural District adopted an intergovernmental agreement (IGA) establishing Loveland Fire Rescue Authority as a separate government entity. The IGA and its amendments are the basis of LFRA's existence and outlines the governance, management, funding, and operation of the agency. A five-person Board of Directors, appointed by the City Council and Rural District Board, governs LFRA. The Board

includes two City Council members, two Rural Board members, and the Loveland City Manager. At the time the Authority was formed, all LFRA personnel were City employees assigned to the Authority and all apparatus and buildings were leased to the Authority. During early 2015, LFRA began working to mature the agency by developing plans to migrate all personnel, apparatus and properties to the Authority. All employees were transferred into the Authority in November 2015, all apparatus transitioned into the Authority in January 2017. Ownership of existing fire station property has not changed but is being evaluated to determine the most efficient method of operation.

History of the Loveland Fire Department

Loveland's fire department has served the community since 1883, when it was organized by Frank Bartholf and was known as the Bartholf Hose Company. Oscar Hiker was elected as the first foreman of the newly formed company. Evidence indicates that members of the company considered themselves to be "the elite of Loveland" and needed to have substantial personal wealth or be prominent local merchants.[1]

On July 8, 1887, Loveland's Board of Trustees approved a motion to form the Loveland Hook and Ladder Company. This company catered to the "common" man and provided services identical to those provided by the Bartholf Hose Company. These two companies functioned almost totally separately, even though they shared the same firehouse that was built in November 1890. An intense rivalry formed between the two companies, which led the Board of Trustees to enact Ordinance Number 41 on March 6, 1894. Even though both companies remained in operation, this was essentially the first step in creating the Loveland Fire Department. The ordinance provided specific direction to the fire companies such as:[2]

> Section 1: *"…established a Fire Department for the Town of Loveland, which shall consist of a Chief Engineer and such other officers as may herefore be appointed, and*

[1] Loveland Fire Department: The First 125 Years. Lyons, Fran. Page 7.
[2] Loveland Fire Department: The First 125 Years. Lyons, Fran. Page 8.

members of such fire companies as may from time to time organized under the authority and by the direction of the Board of Trustees; and every such fire company shall appoint a foreman of the company, and may adopt such rules and by-laws for their own government as shall not be repugnant to the Ordinances of the Town or the laws of the State."

Section 3: *"Neither the Chief Engineer, nor other officer, nor any member of any fire company, shall be allowed, or paid, any compensation for services by reason of their being members of the Fire Department."*

Section 5: *Addressed the penalties for persons who neglect or refuse to obey orders, which was a five dollar fine for each and every offense.*

Section 17: *"Any company returning from a fire and finding in its possession any hose, ladder, hook, axe or other tool or implement or apparatus belonging to another company, shall immediately return the same to the company to which it belongs."*

On February 21, 1911, a petition from the Fire Department was presented to the Town Council to consolidate the Bartholf Hose Company and Loveland Hook and Ladder No. 1. The Council adopted a resolution that read: "Now Therefore Be it Resolved the said two fire companies are hereby consolidated and authorized to organize under the name of the Loveland Fire Department."[3]

In 1911, the Loveland Fire Department was authorized to have a staff of forty (40) volunteer firefighters. In 1912, Loveland Fire Department officially became a combination (paid and volunteer staff) department with the hiring of the first paid driver. In the 1950s, the Department was authorized to have a maximum of 50 volunteer firefighters. The Department increased the paid staff was hired during the 1950s and the 1960s. In the 1970s the volunteer ranks increased to a maximum of 60 personnel, and there were a total of 15 paid personnel. In the 1980s, the volunteer ranks increased to 70 personnel, and there was a total paid staff of 21. In the 1990s, the total staff increased to 103 with a total

[3] Loveland Fire Department: The First 125 Years. Lyons, Fran. Page 10.

volunteer force of 57 and a paid staff of 46. In the 2000s, the Department transitioned more towards a paid staff and volunteer personnel were required to sign up for shifts and/or serve as a member of one of the on-duty companies. By 2006, the field officer ranks held by volunteers were discontinued.

History of the Loveland Rural Fire Protection District

The Loveland Fire Department has a unique responsibility in that it provides fire protection to both the City of Loveland and the rural areas surrounding the City. Before the formation of Rural Fire Protection District, the Fire Department questioned the validity of responding outside of City limits. The City pumper could not be taken out of the City limits, which limited fire protection to the rural residents. In 1935, a Diamond T Pumper was purchased to provide fire pumper to rural residents.

On June 20, 1950, the Loveland Rural Fire Protection District was formed. The money raised through a mill levy was used to purchase a fire apparatus, to establish a contract with the City of Loveland to pay the wages of one of the four Fire Department employees, and to pay a $50.00 per month fire engine rental. The Rural District relied on the Loveland Volunteer Fire Department for their firefighters and supported them by making an annual contribution for their training and equipment.

The Rural District surrounds the City of Loveland and covers approximately 159 square miles. In 2005, Fire Station #8 was constructed by the Rural District to provide an operational base for the Big Thompson Canyon Volunteer Fire Department (BTCVFD). The Rural District also maintains two separate non-staffed fire stations in the Cedar Park and Storm Mountain areas of the Big Thompson Canyon.

From the time of its inception until the formation of the Authority, the Rural District relied upon a contractual relationship with the City of Loveland through the Loveland Fire and Rescue Department, and the volunteers with the Big Thompson Canyon Volunteer Fire Department to provide fire and emergency services within the Rural District.

History of the Loveland Fire Rescue Authority

On January 1, 2012, the City of Loveland and the Loveland Rural Fire Protection District entered into an Intergovernmental Agreement (IGA) which established the Loveland Fire Rescue Authority as a separate government entity. The agency is governed by a Board of Directors consisting of five (5) individuals – two (2) appointed Loveland City Council members, the Loveland City Manager, and two Rural District Board members.

The Authority is responsible for providing all emergency services within the boundaries of the Loveland Rural Fire Protection District and the City of Loveland. All employees of the Loveland Fire and Rescue Department were assigned by the City to work for the Authority and the City leased its fire stations, apparatus, and equipment to the Authority. The Rural District assigned the personnel in the BTCVFD to the Authority and also leased its apparatus and equipment to the Authority. Emergency operations of the Authority within the Rural District remain similar to the operations prior to the formation of the Authority, but the relationship between the two governing partners has improved dramatically. The Authority has a total strength of 128 personnel (94 paid, 34 BTCFD volunteer firefighters).

Loveland Fire Rescue Authority Timeline

1881 – City of Loveland incorporated as a municipality

1882 – First fire prevention ordinance in Loveland was enacted.

1883 – Frank Bartholf organized, supported and financed the first "team" known as the Bartholf Hose Company. Oscar Hiker was the first Fire Foreman (e.g., Fire Chief).

1887 – W.B. Sutherland and O.C. Tinkham petition the Loveland Board of Trustees to organize a hook and ladder company. The motion was approved to form the Loveland Hook and Ladder Company No. 1.

1890 – Hose House (fire station) constructed and housed both companies.

1894 – Ordinance No. 41 was enacted by the Town Board of Trustees. This ordinance formed a Fire Department for the Town and established standard operating procedures for the two fire companies.

1909 – City of Loveland enters into a contract with Seagrave Company for the purchase of the first motorized fire truck for the Fire Department. The City Council also started the process to construct a new city hall consisting of the Fire Department, Police Department and City offices. Local business owner Carlton C. Bushnell filed a lawsuit against the City stating that these purchases would exceed the yearly revenue of the City. The final decision of the court allowed the purchase of the fire truck and the construction of the new building. The building was located at 220 East 5th Street.

1909 – Bartholf Hose Company took delivery of a Seagrave chemical wagon. The City of Loveland became the third city in Colorado to become an owner of an automobile type fire apparatus (after Denver and Lamar).

1911 – A petition from the Fire Department was presented to the City Council to consolidate Bartholf Hose Company and Loveland Hook and Ladder Company No. 1. The Council adopted a resolution to consolidate the two companies and organize the Loveland Fire Department.

1911 – The 41 member of the two companies were combined under the direction of Chief J.D. Leas.

1912 – The first paid employee of the Loveland Fire Department was hired to serve as a fire truck driver.

1913 – The City Council approved the hiring of a permanent assistant fire truck driver.

1919 – The City of Loveland purchased a Federal cab and chassis with the 1909 Seagrave fire body mounted on it.

1925 – The City of Loveland purchased an American LaFrance pumper truck with a mid-mount pump under the seat capable of pumping 750 gallons of water per minute.

1935 – A Diamond T Pumper was purchased to provide fire protection to residents in the rural areas around the City of Loveland.

1937 – The Loveland Fire Department purchases a 1929 Fargo panel van to serve as a rescue truck. The Department also purchased an E & J resuscitator and sent personnel to a first aid/rescue school in Denver.

1939 – The Loveland Fire Department purchased a Ford one-ton panel van to serve as an ambulance.

1946 – The Fire Chief appointed the first three volunteer firefighters to the rank of Lieutenant.

1950 – The Loveland Fire Department makes the decision that the "ambulance is only to be used in emergency cases and the other calls are to be referred to the other ambulance services in town."

1950 – The Loveland Rural Fire Protection District was formed.

1953 – Firefighter Hal Meyers died while on duty. This is the only known death of a firefighter to occur on duty.

1960 – Formation of the Loveland Fire Department Dive Team

1963 – The Loveland Fire Department discontinues ambulance service.

1963 – Loveland Volunteer Fire Department incorporates, and forms Loveland Volunteer Fire Department, Inc.

1964 – An Engineer is hired bringing the total paid line staff to five (5).

1965 – Training Area is established on property east of the Fairgrounds.

1966 – Construction of a new fire station, located at 410 East 5th Street, is completed. This station replaces the original station that was built in 1909.

1968 – Big Thompson Canyon Volunteer Fire Department was formed.

1971 – An Engineer is hired, bringing the total paid line staff to six (6).

1971 – Formation of the Loveland Fire Department Hazardous Materials team.

1973 - Fire Captain Al Stevens is hired as Loveland's first Fire Marshal. The Fire Prevention Bureau is formed.

1974 – Fire Station #2, located at 2750 North Taft, is opened. The Rural Fire Protection District owned fire engine is also housed at Station #2.

1975 – The Loveland Fire Department took delivery of a Sutphen 85-foot aerial platform.

1979 – Six engineers were hired in anticipation of the opening of Fire Station #3. This brought the total paid staff to 21.

1979 – Loveland Fire Department authorized the paid position of Deputy Chief. Fire Captain Gene Barrett was promoted to the position of Deputy Chief.

1980 – Fire Station #3, located at 900 South Wilson, is opened.

1987 – Formation of the Loveland Fire Department Rope Rescue Team.

1990 – A paid Training Officer position was added to the staff.

1990 – The membership of Loveland Fire Department votes in favor of hiring a paid fire chief.

1991 – Chief Richard Minor was hired as the first paid chief for the Loveland Fire Department.

1991 – The first two female firefighters joined the volunteer ranks of the Loveland Fire Department.

1994 – Fire/Rescue Advisory Commission is formed. The Department became known as the Loveland Fire and Rescue Department. The Department ceases response with a City engine and Rural engine.

1995 – Fire Station #4, located at 4900 Earhart Road, was opened. Six (6) new engineers were hired to staff the station.

1995 – Formation of the Loveland Fire and Rescue Department Honor Guard.

1998 – Fire Station #5, located at 251 Knobcone Avenue, was opened. Personnel hired to staff Engine 5.

2001 – Loveland Fire and Rescue Department hires five (5) personnel to serve as daytime firefighters. This provided three-person staffing on all companies, Monday through Friday from 0730 to 1530 hrs.

2004 – Fire Station #6, located at 4325 McWhinney Boulevard, was opened. Personnel hired to staff Engine 6.

2005 – Big Thompson Canyon Volunteer Fire Department Station #8 is constructed.

2006 – Formation of the Special Operations Team to consolidate Dive Rescue, Hazardous Materials, Rope Rescue, and Technical Rescue disciplines

2008 – Re-purposed Engine 2 to form a support company assigned to Station #2, termed Squad 2. This led to dedicated support and engine services (4 Engine Companies and 2 Truck Companies) for LFRA.

2012 – Formation of the Loveland Fire Rescue Authority which consolidated the City of Loveland and Rural Fire Protection District under one board. The Authority's Board of Directors consists of five members: three from the City of Loveland and two from the Rural Fire Protection District.

2012 – Fire Station #6 is remodeled to accommodate a second on-duty company. This double-company station houses Engine 6 and Truck 6, with the Truck Captain overseeing the shift training schedule.

2013 – Six (6) firefighters hired. This allowed Loveland Fire Rescue Authority to operate with a minimum staffing of three (3) personnel on each company. LFRA Fire Chief Randy Mirowski was selected as the Career Fire Chief of the Year by the International Association of Fire Chiefs (IAFC). The Big Thompson River flooded, completely destroying Big Thompson Canyon Fire Station #7.

2014 – A new Fire Station #2 was built at 3070 West 29th Street, located at the intersection of West 29th Street and North Wilson Avenue. This double-company station houses new a new heavy rescue (Rescue 2), replacing former Squad 2. Personnel were hired to staff Engine 2, increasing system coverage to five (5) engine companies and two (2) truck companies. The old Fire Station #2 was sold to Thompson Valley EMS. Created a Lieutenant position in the CSD to establish and oversee the new Engine Company Safety Assessment program.

2015 – Received a new 100-foot aerial tower and re-furbished 105 aerial ladder. Hired an Administrative Analyst position to assist with a wide variety of administrative duties. Created a new position for a Lieutenant in the Training Battalion. The CSD Lieutenant position was downgraded to an Engineer to accommodate this new position. Hired a part-time fire inspector in the CSD.

2016 – Hired an Engineer position dedicated to aircraft rescue and firefighting (ARFF) to ensure appropriate coverage for aircraft arrivals and departures. Promoted part-time fire inspector to full-time. Annexed new Training Center property into City limits and began a new engineering master plan process for the entire Training Center property. Promoted CSD Engineer position to Lieutenant to oversee fire investigation and hazardous materials permit programs.

2017 – Eliminated all reserve and part-time firefighter positions and transitioned to a full-time paid staffing model, with reserve firefighters continuing to provide coverage in the BTCVFD stations. Transferred all apparatus ownership from the City and Rural District to LFRA ownership. Hired a full-time human resources manager.

Loveland Fire Rescue Authority's rich history will continue as today's firefighters establish new traditions for their generation. The area protected by the Authority

continues to grow and the call volume continues to increase. Since its inception, the Loveland Fire Rescue Authority has been modeled by other fire service organizations, not just on the local level, but on regional, state and even national levels.

Agency Funding and Finances

LFRA is funded by the City of Loveland and the Loveland Rural Fire Protection District through a combination of property taxes in the Rural District plus property and sales tax revenues from the City's General Fund. LFRA also generates a small amount of revenue from permits and reimbursements for wildland and specialized deployments of fire-rescue services. The Fire Authority uses a revenue allocation formula for determining the contribution ratio for both the City of Loveland and the Loveland Rural Fire Protection District to the LFRA operations cost. The IGA for the Fire Authority breaks out the ratio as follows:

City of Loveland Contribution	82%
Loveland Rural District Contribution	18%
Total Contribution	100%

The formula is based primarily on historic call volume, or more specifically the percentage of calls that firefighters respond to within the City and Rural portions of the overall response area. These percentages are not intended to be exact, but rather a target representing the call volume and workload over a longer period of time. Approximately 20 years of call trends, 1990 to 2010, were analyzed to establish these percentages. Recent analysis of call volume indicated that distribution of calls reached the 82% City/18% Rural distribution ratio during 2014 (Figure 1). The revenue allocation formula is re-evaluated annually during the annual budget development process.

For 2015, LFRA had a proposed budget of approximately $10.3 million for operations and $1.2 million for ancillary administrative services (Human Resources, Information Technology, Fleet Management, Facilities Management, Legal, Finance, Risk) provided by the City of Loveland for a total full-cost budget of approximately $11.5 million. The agency's base budget increased to approximately $12.6 million for 2016.

Capital expenditures vary from year to year depending on equipment purchases and facility construction or improvement. Funds are received from the City's Capital Replacement Fund, Fire Capital Expansion Fees (CEFs) Fund, and capital dollars from the Rural District. The current plan, "Basic Services Model/Model One", calls for the involvement of both the City and Rural District capital replacement funds to continue independently until the year 2017 when the Fire Authority will establish a capital

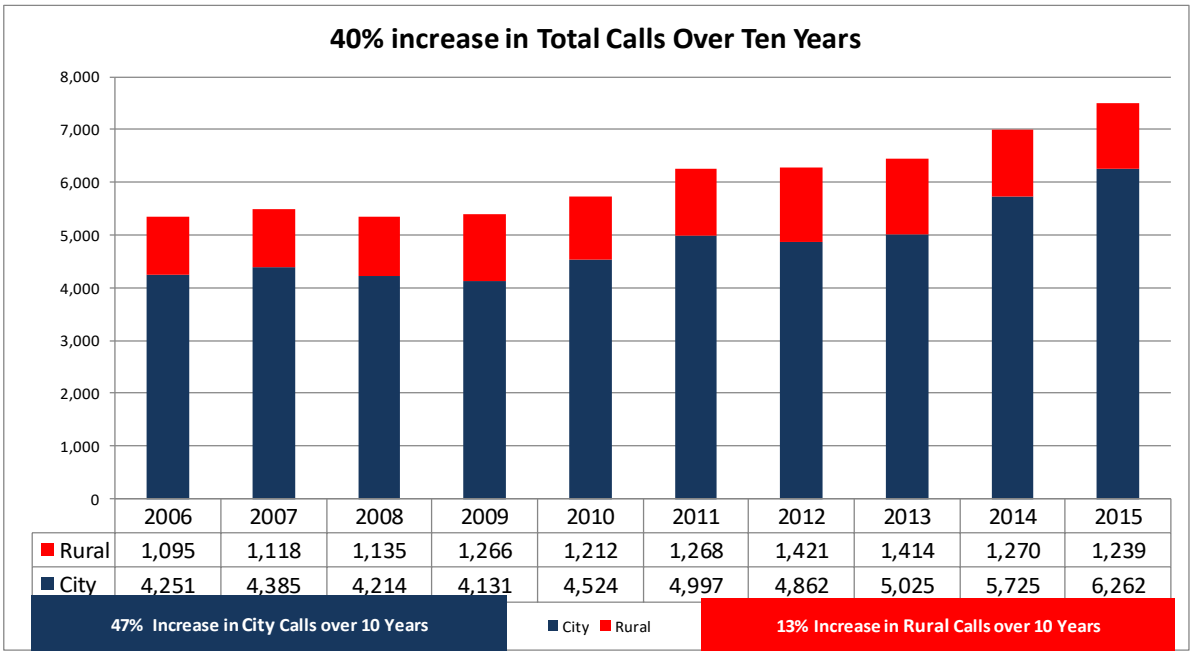


Figure 1: Call Volume Increase (2006-2015)

replacement fund for apparatus with a shared City/Rural funding scheme to be determined through research.

Description of the Jurisdiction

LFRA is located within Larimer County (Figure 2) and serves the City of Loveland and the Loveland Rural Fire Protection District, covering approximately 194 square miles of area. Within this area, land uses vary from light industry, high-rise hotels and apartment buildings to agriculture and farm acreage. The 2013 US Census indicates that the present population is approximately 97,458 people, with 74,958 living within the City of Loveland and an additional 22,500 living in the Loveland Rural Fire Protection District. The population in the planning area is expected to grow to over 100,000 by the year 2020. The additional people are expected to live in higher densities and work in a variety of new industries and high tech businesses, with an emphasis on clean and new or alternative energy sources. This expected growth could be dramatically influenced with the addition and/or expansion of new developments such as the proposed Rocky Mountain Center for Innovation and Technology (RMCIT) project, which began operations in 2013, and The Brands, which was approved for development in early-2017.

Figure 2: Location of Larimer County

The city of Loveland is located less than one hour east of both Rocky Mountain National Park and the Roosevelt National Forest. The region offers a wide variety of diverse outdoor recreation opportunities including hiking and biking trails; city, county and state parks; lakes and rivers; golf courses and athletic fields; as well as indoor and outdoor swimming and recreation facilities. There are several institutions of higher education located in close proximity to the community and cultural opportunities abound. Loveland is home to a thriving arts community, with more than over 300 sculptors participating in

annual shows. The City of Loveland owns a publicly displayed art collection of nearly 300 permanent art placements valued collectively at more than $6 million.

Surrounding Jurisdictions

Loveland Fire Rescue Authority maintains healthy and effective relationships with all of the emergency service agencies with borders that are adjacent to or within LFRA's response area. Automatic and mutual aid agreements have been established with all of the surrounding jurisdictions. Following is a brief overview of each jurisdiction.

Thompson Valley EMS

Thompson Valley EMS (TVEMS) is the advanced life support ambulance provider for the entire LFRA response area. The Thompson Valley Health Services District is the governing body for TVEMS. This agency covers a service area of 450 square miles from six (6) staffed stations.

Poudre Fire Authority

Poudre Fire Authority (PFA) shares LFRA's northern border. PFA is the largest of LFRA's neighboring departments and protects the City of Fort Collins and the communities within the Poudre Valley Fire Protection District. PFA covers a 235 square mile service area with 177 uniformed personnel from twelve (12) staffed fire stations and one (1) volunteer staffed station.

Windsor Severance Fire Rescue

Windsor Severance Fire Rescue (WSFR) is located along the northeastern border of LFRA's jurisdiction. WSFR provides fire and rescue services to approximately 25,000 residents within a 97 square mile response area that includes the towns of Windsor and Severance, as well as unincorporated portions of both Weld and Larimer counties. WSFR provides coverage from three (3) staffed fire stations.

Berthoud Fire Protection District

The Berthoud Fire Protection District (BFPD) is located along LFRA's southern border and includes a 103 square mile service area. BFPD provides services to

approximately 17,500 residents from two (2) staffed fire stations. An effort to improve response performance along LFRA's southern boundary was implemented in April 2016, when the border that delineates LFRA and Berthoud jurisdiction was removed in the agencies' shared computer-aided dispatch (CAD) system, allowing for "closest apparatus" dispatching for incidents occurring in LFRA/Berthoud automatic aid areas.

Front Range Fire Rescue

Front Range Fire Rescue (FRFR) is a fire authority that is located along the southeastern edge of the LFRA response area. FRFR was formed as a result of an intergovernmental agreement between the Johnstown and Milliken Fire Protection Districts. FRFR provides fire and rescue services from three (3) fire stations to a coverage area of approximately 100 square miles.

Estes Valley Fire Protection District

The Estes Valley Fire Protection District (EVFPD) is located at the western edge of LFRA's response area, adjacent to Rocky Mountain National Park. Two (2) fire stations provide coverage to a service area of approximately 66 square miles.

Geography and Topography

Loveland Fire Rescue Authority's response area is situated along the eastern edge of the Rocky Mountains, in an area commonly referred to as Colorado's northern Front Range. The area's most prominent geological features are the Rocky Mountains to the west and numerous fresh water lakes, ponds, rivers, and waterways throughout the district (Figure 3). The elevation in the city is 4,982 feet above sea level. The topography in the wildland urban interface (WUI) portions of the response area are predominantly low, rolling hills, directly adjacent to the eastern range of the Rocky Mountains at an average elevation of over 5,000 feet above sea level. There are also steep mountainous areas within the wildland urban interface zone that have elevations over 7,000 feet above sea level (Figure 4).

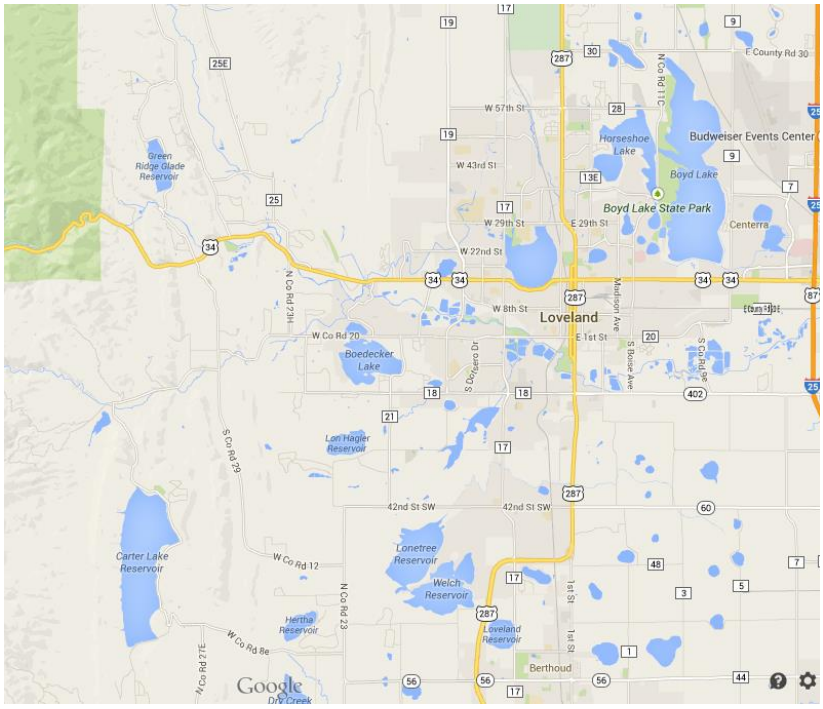


Figure 3: Geographic Features of the Loveland Area

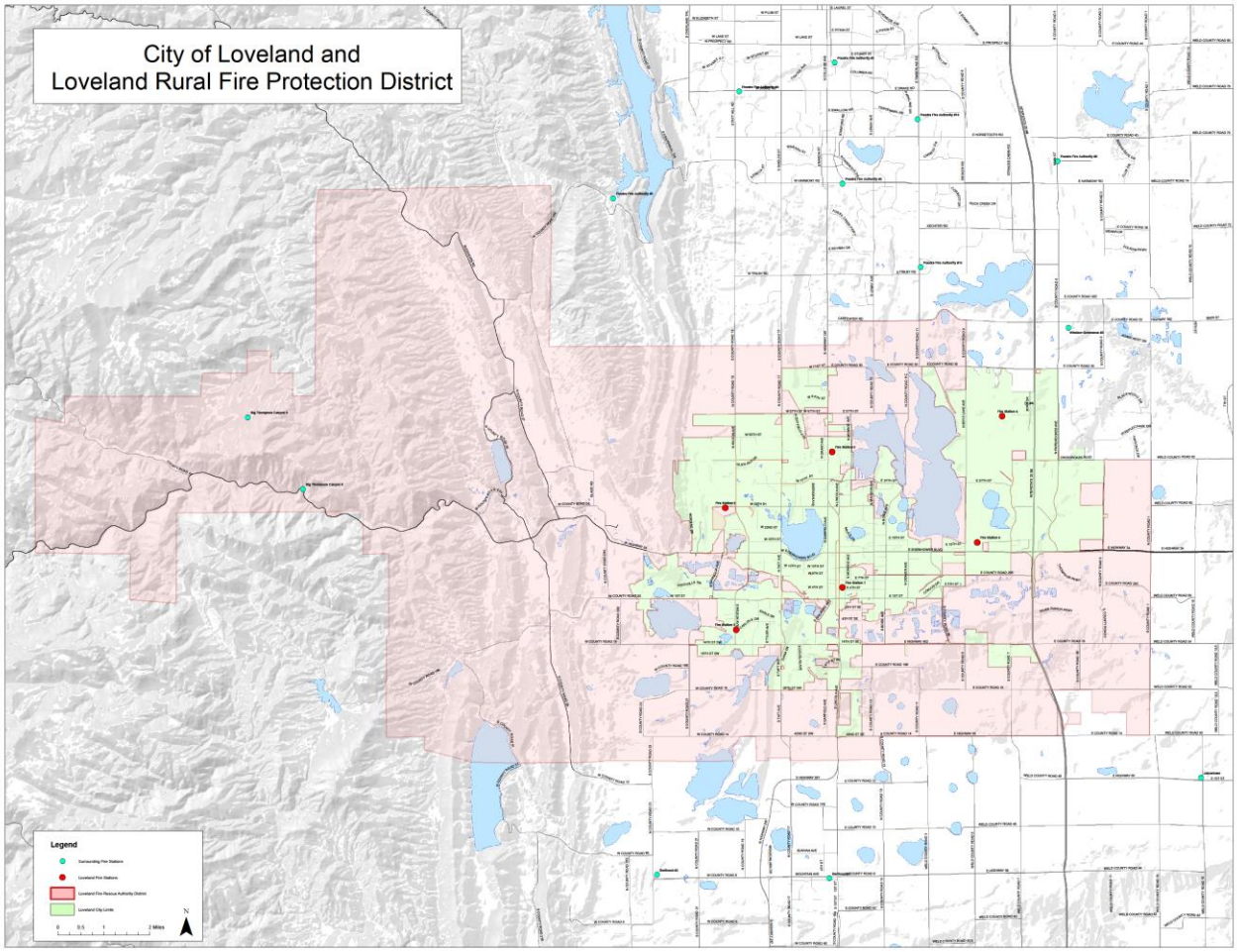


Figure 4: Topography of LFRA Response Area

The Big Thompson River runs diagonally from the west through the response area (Figure 5). During the September 2013 flood event, the river over-topped all north-south roads, dividing LFRA's response area into two separate areas for a period of several days. The response area also contains numerous streams, lakes, and ponds. Two large public recreation lakes are located within the LFRA district: Boyd Lake State Park near the eastern boundary and Carter Lake in the western foothills. Boyd Lake State Park is a 1,700 surface acre lake that is managed by the Colorado Division of Parks and Wildlife. It is the fourth busiest park in Colorado's State Park system and hosts approximately 500,000 visitors annually. In addition to boating of all kinds, approximately 150 acres of park facilities also include 148 full-hookup camp sites, numerous picnic areas, a public swimming beach and miles of hiking and biking trails. Larimer County Parks operates the 1,100-acre Carter Lake

in the foothills west of Loveland and Berthoud. The lake is surrounded by more than 1,000 acres of land that include campgrounds, public beaches and an extensive trail network.

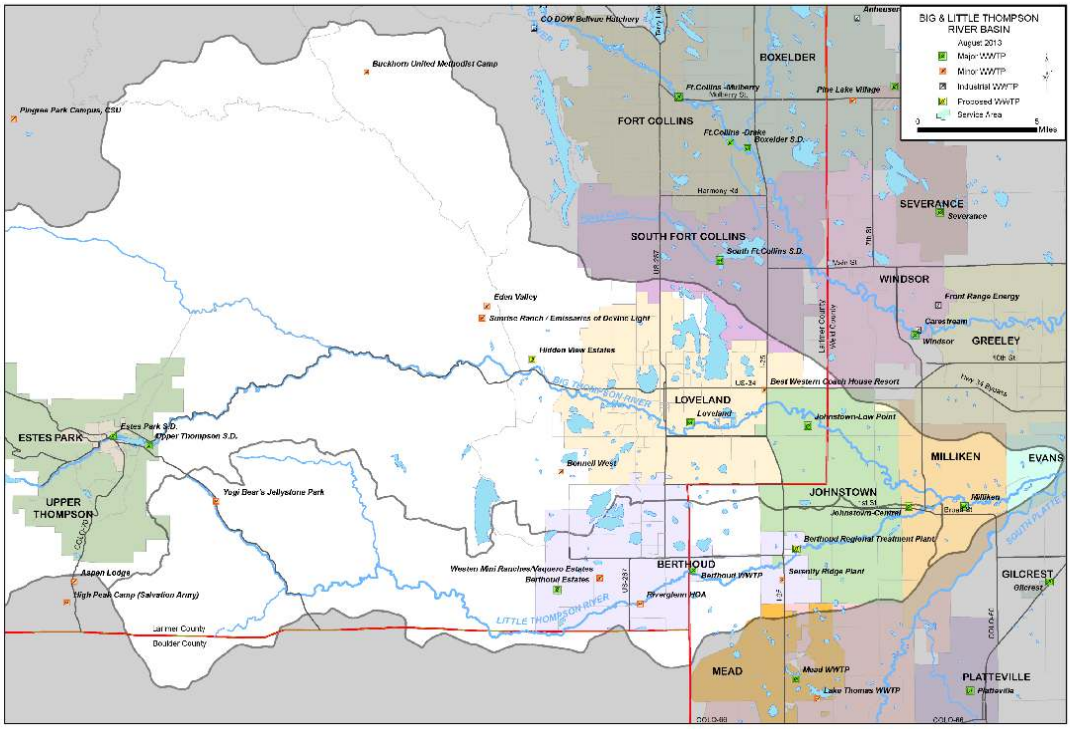


Figure 5: Big Thompson Watershed

Climate

The Loveland area enjoys a moderate climate with an annual average of more than 300 days of sunshine. The relatively low humidity tends to make winters feel warmer and summers cooler than might be experienced in the mid-western part of the country. The average high and low temperatures range from 86°F in July to an average low of 14°F in January (Figure 6). The highest recorded temperature was 105°F in July 2005, while the lowest recorded temperature was -31°F in December 1990. The area receives approximately 13.9 inches of annual precipitation, with the wettest month usually being in May. While the area typically receives moderate amounts of snowfall, snow can and often does become extreme, particularly in the months of March and April.

The region is susceptible to severe thunderstorms and other severe weather events. Lightning is one of the most common and frequent weather-related hazards in the region. Lightning causes numerous fires in the wildland-urban interface throughout the year. Several people are also struck by lightning each year. The most severe lightning strike incident occurred on July 3, 2005, when at least nine people were injured by a lightning strike to the swim beach at Boyd Lake State Park. Another severe weather phenomenon, the microburst, is a short-lived weather event characterized by a very localized and intense column of sinking air. Microbursts are most common during the spring and summer. The sudden and intense winds created by a microburst pose a tremendous hazard to aircraft as well as to any wildland fires that may be active. The winds associated with microbursts are strong enough to knock over fully grown trees.

Figure 6: Regional Temperature Ranges

(Source: www.weather.com)

In recent years, there have been several extreme winter weather events that have each dumped several feet of snow on the region, resulting in extensive road closures, catastrophic property damage and numerous emergency calls for service. Additionally, the regional flood of September 12-13, 2013, resulted in massive flooding throughout the response area and actually divided the City of Loveland in half by flowing across all north-south roads from the mouth of the Big Thompson Canyon to well beyond Interstate 25.

Figure 7: Precipitation by Month

(Source: www.weather.com)

Population and Demographics

The population of the city of Loveland accounts for approximately 23% of the total population of Larimer County and the city is expected to see continued population growth through the year 2030. According to the VillageProfile website[4], the median age of Loveland's population (37.6 years) is older than Larimer County and Colorado median ages of 35.7 years and 36.2 years respectively. In 2012, it was reported that 14.2% of Loveland's total population consisted of people aged 65 years or older. By way of comparison, Larimer County has roughly 12.2% of the population at or above age 65. Conversely, 26.2% of Loveland's total population is under 19 years of age, compared to 25.2% of the total population of Larimer County being under age 19 (Tables 1-3). Population within the LFRA response area is primarily focused within the City of Loveland (Figure 8).

Loveland Population Age Distribution							
Under 10	14.0%	10-14	6.0%	15-19	6.0%	20-24	6.0%
25-34	13.0%	35-44	13.0%	45-54	15.0%	55-64	12.0%

Table 1: Loveland Population below 65 Years of Age

Population Comparison: Loveland vs. Larimer County		
Year	**Loveland**	**Larimer County**
1990	37,357	186,136
2000	50,608	251,494
2010	66,859	299,630
2011	68,203	305,525
2013	71,334	313,749
2014	72,651	324,122
2015	pending	333,577

Table 2: Loveland vs. Larimer County Population Comparison

Housing within the response area ranges from high-density apartments to widely separated farm and ranch acreages. Housing surveys conducted by the 2010 U.S. Census revealed approximately 20,000 units within the city. The website BestPlaces.net reports that the median home value in Loveland is $216,200 with home value appreciation of 8.50% over the last year. The website VillageProfile.com reports that the median household income in Loveland is approximately $46,467, which is lower than the national average of $50,221.

[4] http://www.villageprofile.com/colorado/loveland/demographics.html

However, the same website also reports that the cost of living in Loveland is approximately 9% lower than the national average.

U.S. Census People QuickFacts	Loveland	Colorado
Population, 2014 estimate	72,651	5,355,866
Population, 2013 estimate	71,334	5,191,709
Population, 2012 estimate	70,217	5,119,661
Population, 2010 estimate	66,824	5,048,575
Population, percent change, April 1, 2010 to July 1, 2014	8.7%	6.5%
Persons under 5 years, percent, 2010	6.8%	6.8%
Persons under 18 years, percent, 2010	23.9%	24.4%
Persons 65 years and over, percent, 2010	14.9%	10.9%
Female persons, percent, 2010	51.7%	49.9%
White alone, percent, 2010 (a)	91.5%	81.3%
Black or African American alone, percent, 2010 (a)	0.6%	4.0%
American Indian and Alaska Native alone, percent, 2010 (a)	0.8%	1.1%
Asian alone, percent, 2010 (a)	1.0%	2.8%
Native Hawaiian and Other Pacific Islander alone, percent, 2010 (a)	0.1%	0.1%
Two or More Races, percent, 2010	2.5%	3.4%
Hispanic or Latino, percent, 2010 (b)	11.7%	20.7%
White alone, not Hispanic or Latino, percent, 2010	84.8%	70.0%
Living in same house 1 year & over, percent, 2008-2012	83.4%	80.8%
Foreign born persons, percent, 2008-2012	4.4%	9.7%
Language other than English spoken at home, pct age 5+, 2008-2012	7.9%	16.8%
High school graduate or higher, percent of persons age 25+, 2008-2012	93.0%	89.9%
Bachelor's degree or higher, percent of persons age 25+, 2008-2012	32.4%	36.7%
Mean travel time to work (minutes), workers age 16+, 2008-2012	25.1	24.4
Housing units, 2010	28,557	2,212,898
Homeownership rate, 2008-2012	66.2%	65.9%
Housing units in multi-unit structures, percent, 2008-2012	23.2%	25.8%
Median value of owner-occupied housing units, 2008-2012	$210,300	$236,800
Persons per household, 2008-2012	2.41	2.51
Median household income, 2008-2012	$55,838	$58,244
Persons below poverty level, percent, 2008-2012	9.4%	12.9%

Table 3: Loveland Population Quick Facts from U.S. Census Bureau

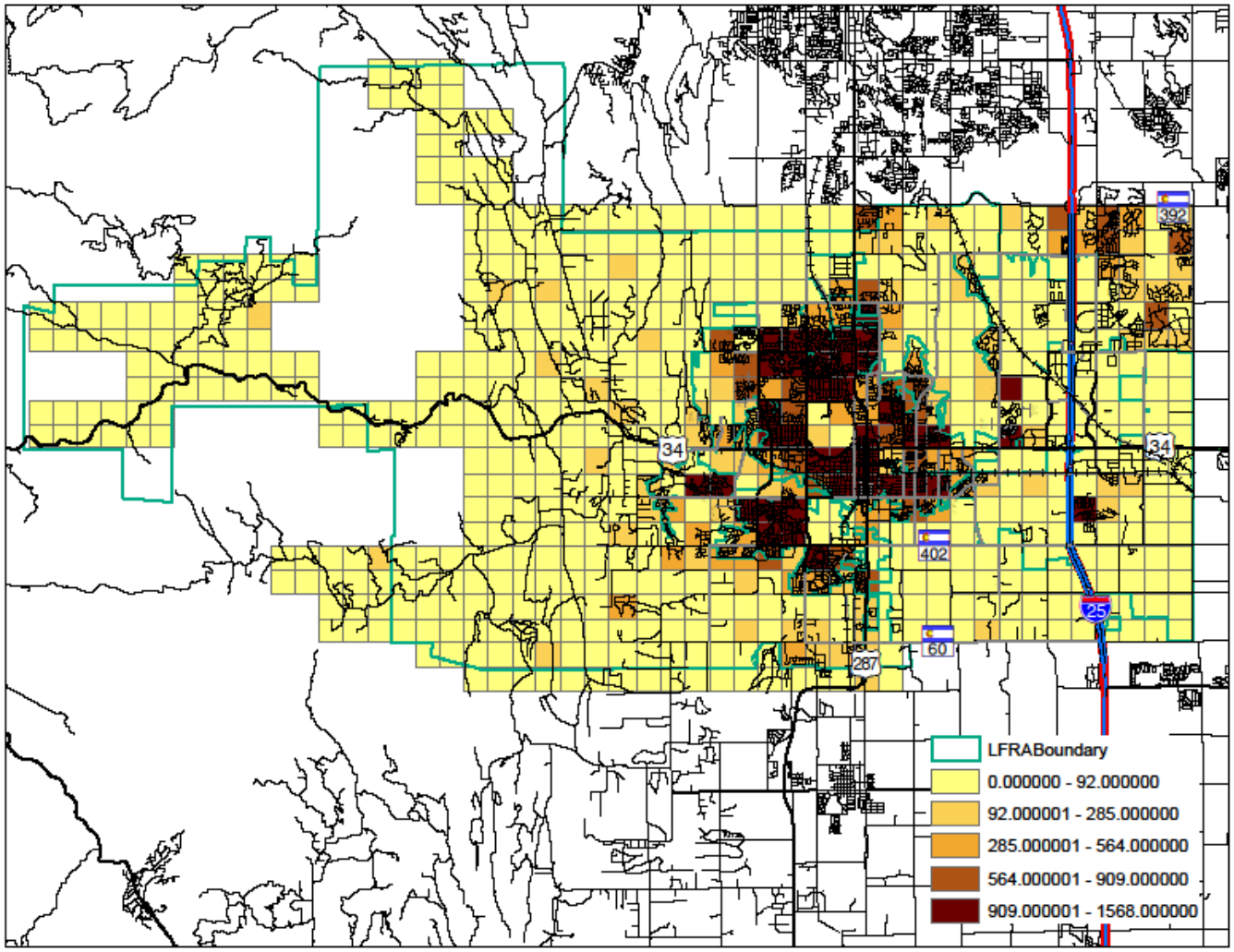


Figure 8: Population Density in LFRA Response Area

Schools[5]

The LFRA response area is served by the Thompson School District (TSD). The TSD is the 17th largest school district in Colorado, encompassing 362 square miles including the city of Loveland, town of Berthoud, the southern portion of Fort Collins as well as portions of Larimer, Weld and Boulder counties (Figure 9). The TSD is the largest employer in the LFRA planning area. TSD is a kindergarten through 12th grade school district with 13 early childhood centers, 20 elementary schools, one K-8 school, five middle schools, five high schools and two charter schools (Table 4). School district enrollment for the 2016-2017 school year was more than 16,000 students. TSD schools offer educational options including International Baccalaureate (IB) and pre-IB programs; a Science, Technology, Engineering & Mathematics (STEM) focus at one high school and two elementary schools; Core Knowledge programs; the Loveland area Integrated School of the Arts (LISA), K-12; Advanced Placement programs and the Loveland/Berthoud Enrichment Access Program (LEAP), which supports parents who choose to school their children at home or outside a public setting. The district's TCAP scores are consistently above state averages.

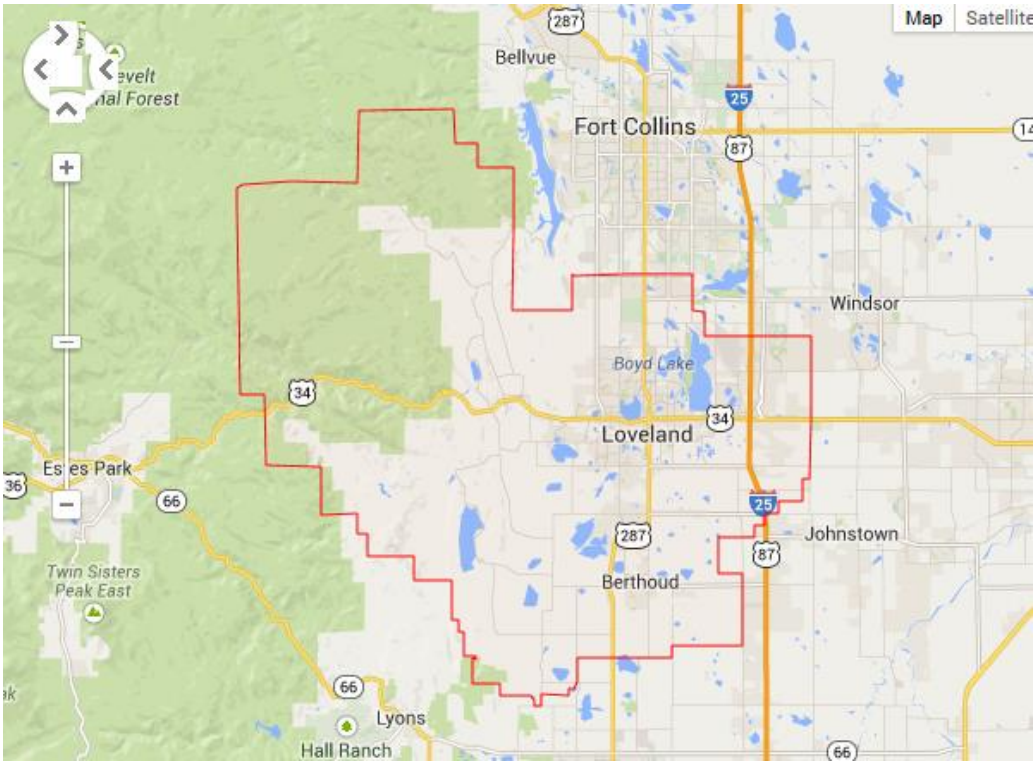


Figure 9: Thompson School District

[5] http://www.thompsonschools.org/Page/6358

Schools within LFRA Response Area							
School Name	**School Address**	**Ground Level Sq. Ft.**	**No. of Stories**	**Exterior Wall Construction**	**Roof Construction**	**Roof Covering**	**% Sprinkled**
B.F. Kitchen Elementary School	915 Deborah Dr.	30,297	1	Brick	Wood frame and deck	Single ply membrane	0
Big Thompson Elementary School	7702 W. Hwy 34	23,100	2	Brick	Wood frame and deck	Built up	0
Bill Reed Middle School	370 W. 4th St.	44,441	3	Brick	Steel frame and deck	Single ply membrane	100
Carrie Martin Elementary School	4129 Joni Ln.	32,649	1	Brick	Steel frame and deck	TPO	0
Centennial Elementary School	1555 W. 37th St.	58,156	1	Brick	Steel frame and deck	TPO	100
Conrad Ball Middle School	2660 N. Monroe Ave.	93,060	1	Brick	Steel frame and deck	Single ply membrane	50
Ferguson High School	1101 Hilltop Dr.	26,952	2	Block, Brick and Stucco	Wood frame and deck	Asphalt shingles	100
Garfield Elementary School	720 N. Colorado Ave	39,325	1	Brick	Steel frame, concrete deck	Built up	0
High Plains School	4255 Buffalo Mountain Drive	63,563	2	Brick	Steel frame, concrete deck	Built-up	100
Laurene Edmondson Elementary School	307 W. 49th St.	31,853	1	Brick	Steel frame and deck	Single ply membrane	0
Lincoln Elementary School	3312 N. Douglas Ave.	39,496	1	Brick	Wood frame and deck	Built up	0
Loveland High School	920 W. 29th St.	210,851	1	Brick	Steel frame, concrete deck	Single ply membrane	5
Lucille Erwin Middle School	4700 Lucerne St.	81,386	2	Brick and Stucco	Steel frame and deck	Single ply EDPM	100
Mary Blair Elementary School	860 E. 29th St.	48,906	1	Brick	Steel frame and deck	Single ply EDPM	0
Monroe Elementary School	1500 N. Monroe Ave.	50,358	1	Brick	Steel frame and deck	Single ply EDPM	0
Mountain View High School	3500 Mountain Lion Dr.	187,716	2	Block	Steel frame and deck	Single ply EDPM	100
Namaqua Elementary School	209 Namaqua Ave.	51,291	1	Brick	Wood frame and deck	Single ply EDPM	0
Sarah Milner Elementary School	743 Jocelyn Dr.	36,729	1	Brick	Steel frame and deck	Single ply EDPM	0
Stansberry Elementary School	407 E. 42nd Ave.	32,076	1	Brick	Wood frame and deck	Metal	0
Thompson Valley High School	1669 Eagle Dr.	218,063	1	Brick	Steel frame, concrete deck	Single ply membrane	5
Truscott Elementary School	211 E. 6th St.	43,006	2	Brick	Wood frame and deck	Built up	0
Van Buren Elementary School	1811 W. 15th St.	32,777	1	Brick	Wood frame and deck	Single ply membrane	0
Walt Clark Middle School	2605 Carlisle Dr.	98,445	1	Brick	Steel frame and deck	Single ply membrane	5
Winona Elementary School	201 S. Boise Ave.	65,483	1	Brick	Wood frame and deck	Single ply EDPM	100

Table 4 continued on next page

Private and Charter Schools							
School Name	**School Address**	**Ground Level Sq. Ft.**	**No. of Stories**	**Exterior Wall Construction**	**Roof Construction**	**Roof Covering**	**% Sprinkled**
Campion Academy	300 SW 42nd St.	33,000	1	Brick and block	Steel frame, metal deck	Foam, membrane	0
HMS Richards Elementary School	342 SW 42nd St.	11,556	2	Block, Steel frame	Steel frame, metal deck	Metal	0
Immanuel Lutheran School	4650 Sunview Dr.	48,801	2	Steel & Sheet Metal/Stucco	Steel frame, metal deck	Membrane	100
Loveland Classical Schools	3835 SW 14th St.	25,997	2	Wood frame/Stucco	Wood frame and deck	Membrane	100
Loveland Classical Schools	3015 W 29th St.	New building being constructed during 2017					
Loveland Protestant Reformed School	705 E. 57th St.	10,500	1	Steel	Steel frame, metal deck	Steel	0
New Vision Charter School	2366 E. 1st St.	36,624	2	Brick	Steel frame, metal deck	Membrane	100
Resurrection Christian School	6508 E. Crossroads Blvd.	221,754	2	Steel & Sheet Metal/Stucco	Steel frame, metal deck	Metal EPDM & TPO	100
Saint John the Evangelist School	1730 W. 12th St.	35,361	1	Brick and block	Steel frame, metal deck	Membrane	100

Table 4: Schools within LFRA Response Area

Transportation

The City of Loveland cooperates with Larimer County in master planning urban streets through the Larimer County Urban Area Street Standards document. According to the City of Loveland 2035 Transportation Plan, the street network within the city of Loveland has approximately 330 miles of arterial, collector and local streets (Figure 10). Loveland's historic core is identified as the downtown area bounded on the south by 1st Street, on the east by Madison Avenue, on the north by Eisenhower Boulevard, and on the west by Taft Avenue. The city's downtown core was fully developed early in Loveland's history and consists of a tight grid of residential streets and commercial streets with many options for traversing the area by vehicle.

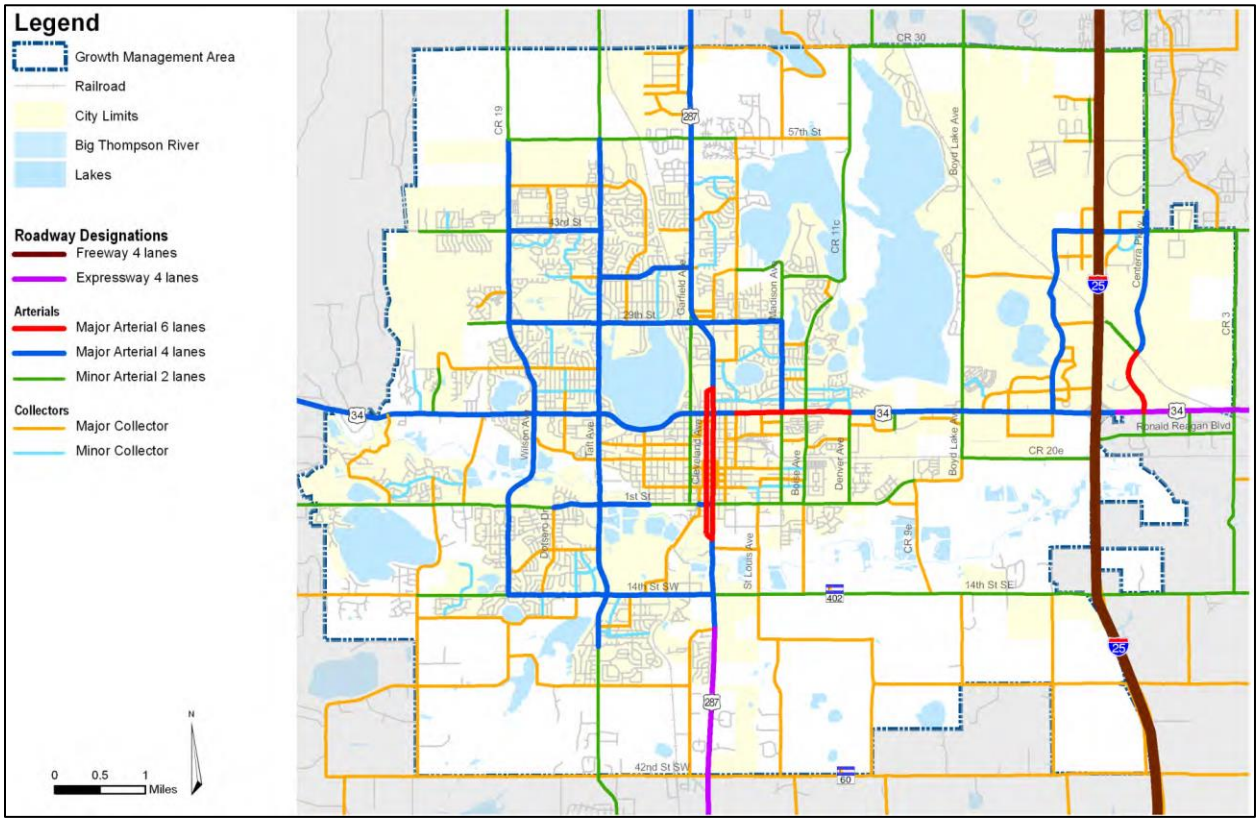


Figure 10: City of Loveland Street Network

The growth experienced since the late 1970s has resulted in fewer through streets, more curving roads and cul-de-sacs. The presence of a large number of lakes and ponds also helps to isolate sections of the city, making through travel more difficult in the areas beyond the city's urban core. Loveland classifies streets using the hierarchy of arterial, collector and local streets[6]. The functional classification of streets is related to the degree of mobility or access they provide. Arterial streets function primarily to provide mobility through the community and typically are two, four or six lanes wide, carrying traffic volumes in excess of 7,000 vehicles per day, providing limited access and accommodate higher travel speeds. Collector streets have less restricted access points, "collecting" traffic from local areas by providing mobility through connections to the arterial network. Collectors typically consist of two lanes and carry 1,000 to 7,000 vehicles per day.

In addition to the street network within Loveland, there are also three active rail lines traversing the city (Figure 11). The Burlington Northern-Santa Fe (BNSF) runs north to south through the city, the Union Pacific Railroad (UPRR) runs northwest to southeast through the city, and the Great Western Railway (GWR) runs east to west through the city. There are a total of 33 public and private rail/road crossings within the city[7]. The primary east-west thoroughfare in the city is Eisenhower Boulevard, which crosses the railway by way of an overpass, allowing for consistent and unobstructed east-west travel through the city.

6 City of Loveland 2035 Transportation Plan, page 14.
7 City of Loveland Railroad Grade Crossing Study, April 2009, page 1.

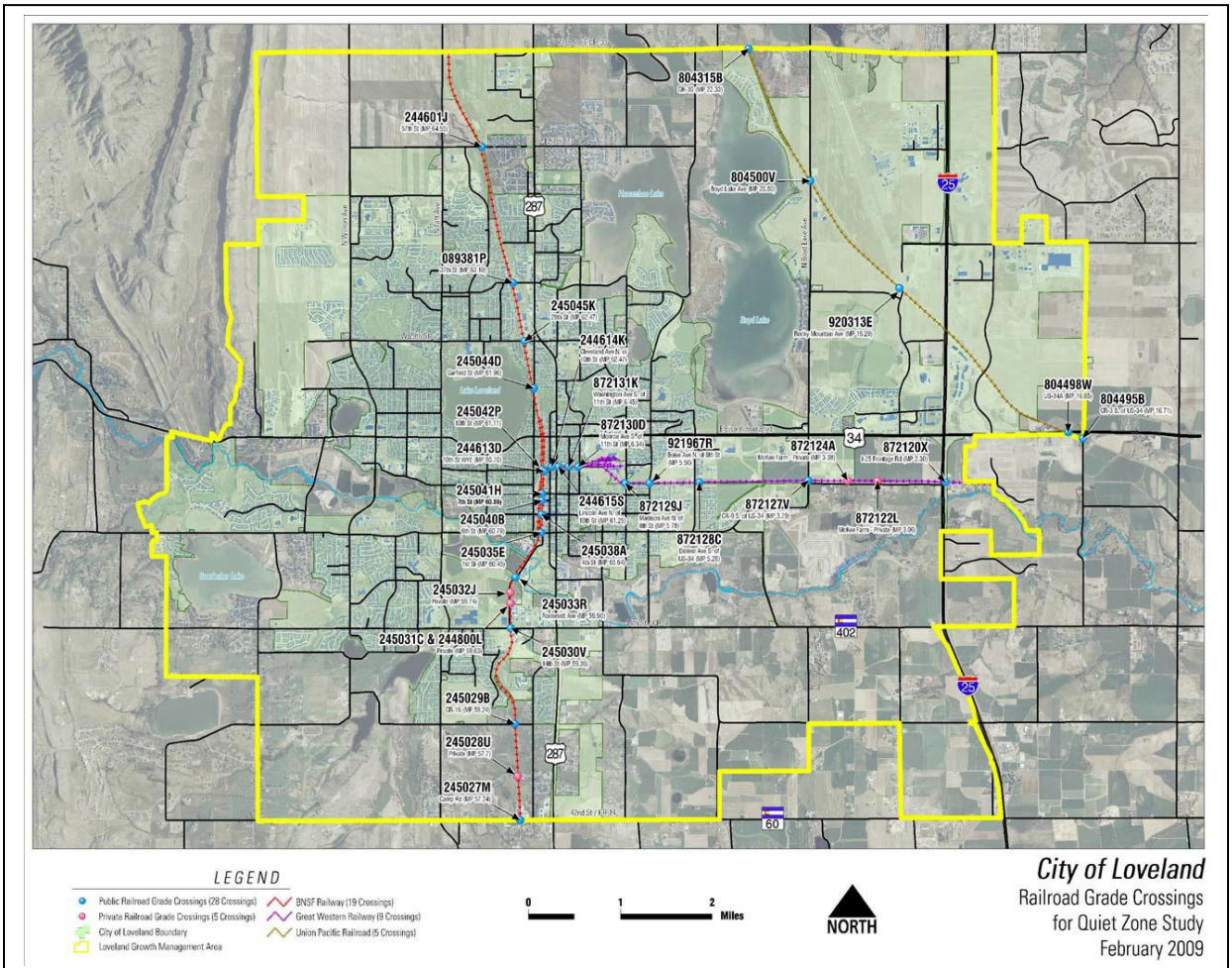


Figure 11: Railways within City of Loveland

The City of Loveland maintains approximately 17.5 miles of paved recreation trail that begins at Wilson Avenue on the west side of the city, follows the Big Thompson River corridor east through town, then travels north through Boyd Lake State Park (Figure 12). The City plans to complete the trail system to encompass the perimeter of the city and link with other local trails to create a regional trail network that ties together the communities of Loveland, Fort Collins, Windsor and Greeley.

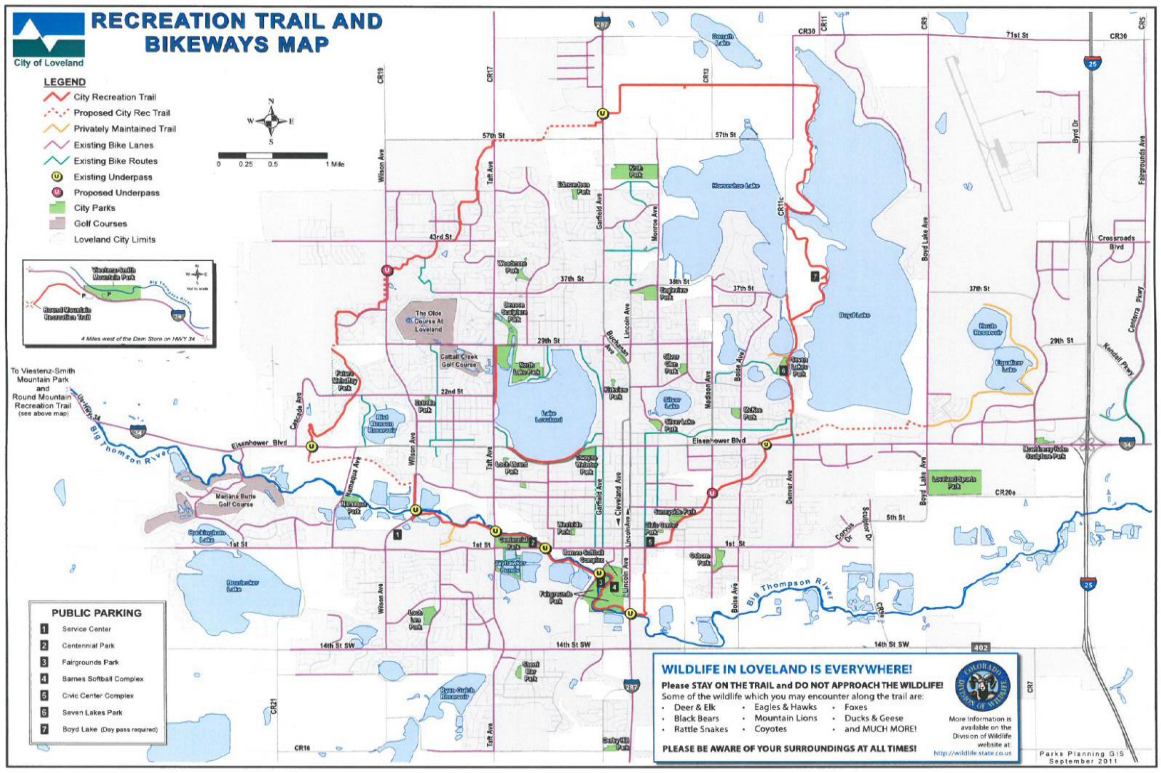


Figure 12: City of Loveland Recreation Trails

The Northern Colorado Regional Airport, identified by the Federal Aviation Administration as "FNL," is a Class 1 general aviation airport located near the eastern edge of the LFRA response area (Figure 13). The airport is jointly owned by the cities of Fort Collins and Loveland and is operated by the Northern Colorado Regional Airport Commission. Since opening in 1964 with one runway, the airport has grown to encompass more than 1,100 acres, an 8,500-foot runway with a parallel taxiway, an instrument landing system, 245 based aircraft, and the capability to support commercial air service.[8] The airport also provides a wide variety of businesses to support the local aviation industry, including avionics sales and service, fuel sales, aircraft maintenance and modification, flight instruction for fixed wing and rotorcraft, and hangar and tie down leasing.

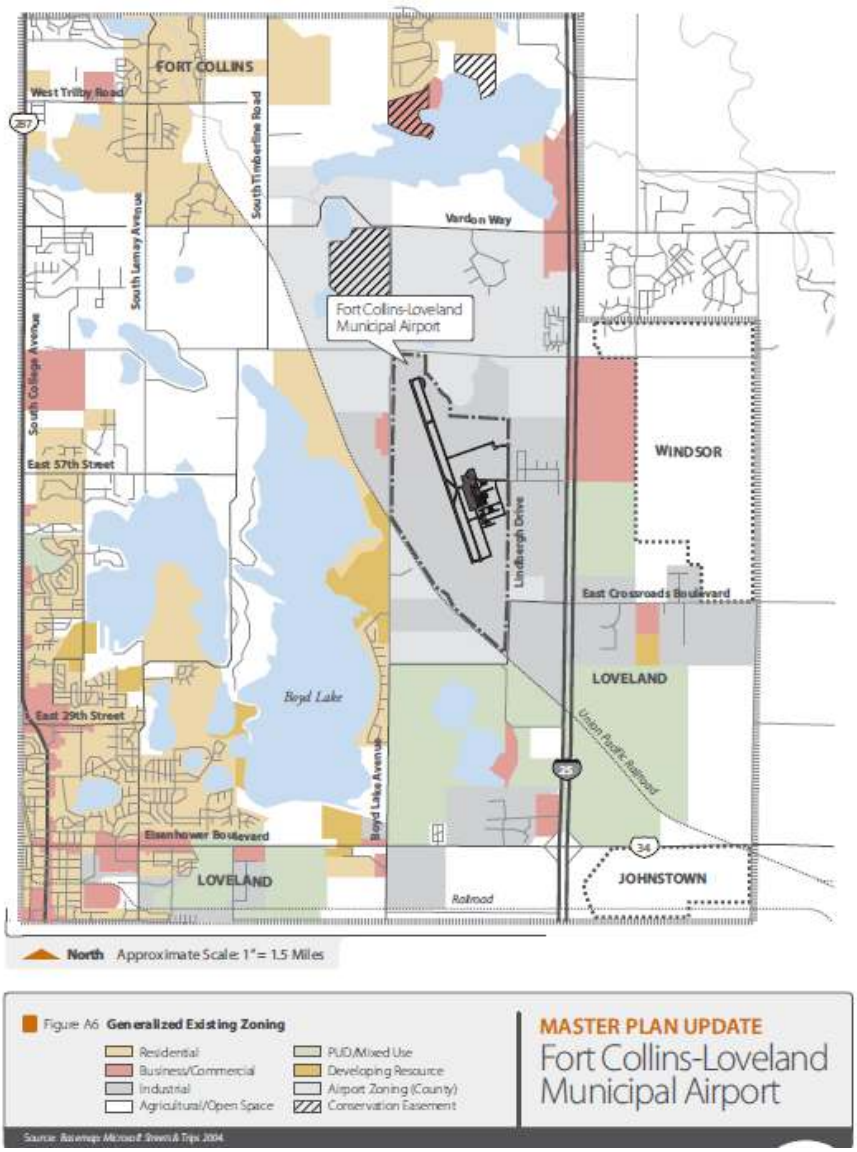


Figure 13: Fort Collins-Loveland Municipal Airport

[8] Source: Fort Collins-Loveland Airport website (www.fortloveair.com)

Allegiant Airlines provided flights between FNL and Las Vegas from 2003 until October 2012. Allegiant's flights to Las Vegas provided service to more than 30,000 passengers annually. In August 2015, Elite Airways began providing commercial air service to Chicago from FNL. In October 2015, the Federal Aviation Administration, in collaboration with the Colorado Aeronautics Division, announced that FNL had been chosen as the first site in the nation to be approved for a virtual air traffic control system that will use advanced sensor technology. Installation on this system began in 2016 and is anticipated to be completed by late 2017 or early 2018. Once installed, this new system will allow improved monitoring of the airspace around FNL by an Air Route Traffic Control Center.[9]

Residential and Commercial Development

Information from the Colorado State Demographer's Officer reports that the Loveland/Fort Collins region should expect to increase population by approximately 180,000 between the years 2010 and 2040. A direct result of this population increase is continued growth in residential dwelling units as well as commercial development (Table 5). The Loveland Chamber of Commerce reports that the number of building permits for single-family homes increased by 72% during 2013. The local realty company, The Group Inc., reports that they expect the need for an additional 70,000 dwelling units by the year 2040.[10] Currently, residential construction is progressing rapidly, with several construction projects underway (Figure 14), including The Brands of Loveland, a 2.3 million square foot development straddling Interstate 25, The Foundry, a redevelopment of several blocks of

Total Building Permit Valuation		
Year	**Non-Residential**	**Residential**
2006	$39,704,112	$9,429,917
2007	$33,508,310	$8,444,695
2008	$22,320,896	$10,220,640
2009	$9,250,342	$4,202,557
2010	$22,753,038	$11,596,951
2011	$23,910,130	$8,998,525
2012	$45,354,853	$13,162,587
2013	$44,300,926	$14,265,953
2014	$41,344,170	$11,481,151
2015	$21,942,877	$7,654,211
Source: City of Loveland Building Division		

Table 5: Loveland Building Permit Valuation

[9] "FNL airport chosen as test site for virtual tower." Reporter-Herald. October 1, 2015.
[10] http://www.villageprofile.com/colorado/loveland/residential-living.html

downtown Loveland, and Rangeview V, a 3,000 acre master-planned community near Medical Center of the Rockies.

The City of Loveland works with Larimer County and neighboring jurisdictions in planning for growth of the communities. Loveland's plans for growth and development are addressed in the City's 2005 Comprehensive Plan. This document is currently under review for the purpose of addressing the many updates needed to make the document current.

The City's Current Planning Division coordinates all development review processes. City staff provides the development community with project guidance and review services in an effort to improve coordination between the various City agencies involved in development. LFRA's Community Safety Division is an active participant in all planning and development processes in both the City, County and Johnstown portions of the response area. This involvement helps to improve citizen outreach while also providing municipal development services staff with opportunities to provide valuable input to the developer prior to a project breaking ground.

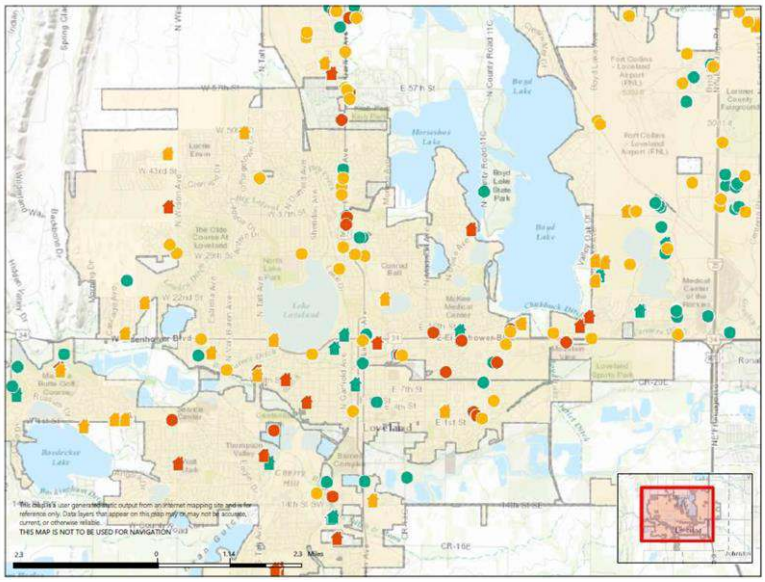
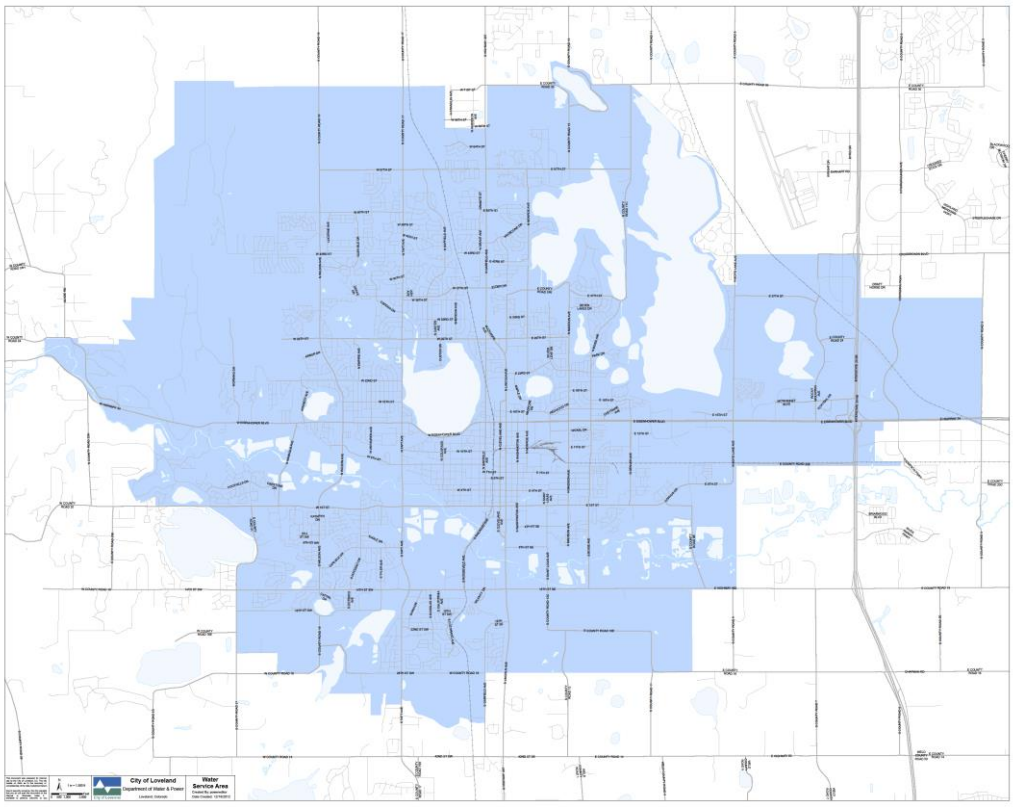


Figure 14: Residential and Commercial Development in Loveland

Water Distribution Systems

Domestic water supply and distribution systems with the LFRA response area are maintained by five (5) entities: City of Loveland, Town of Johnstown, Fort Collins-Loveland Water District, Little Thompson Water District, and North Carter Lake Water District. The City of Loveland Water and Power Department maintains the water supply and distribution system within City limits, delivering treated water to roughly 40,000 addresses (Figure 15).



Current Service Area	32 sq. miles
Water Treatment Plant Capacity	30 MGD
Water Treatment Plant Average – Summer (May-Aug)	19.10 MGD
Water Treatment Plant Average – Winter (Jan-Mar & Dec)	6.38 MGD
Miles of Water Lines	436.98 miles
Number of Hydrants	2,899
Number of Pump Stations	7
Treated Water Storage	20.3 MGD

Figure 15: City of Loveland Water Service Area

The City maintains a water distribution system of approximately 500 miles of pipe, varying in size from four (4) to 36 inches in diameter. Piping within the City system has been constructed of wood stave, cast iron, ductile iron and polyvinyl chloride (PVC). Recently, the City has worked to replace many 12-inch and smaller mains with PVC and larger mains with ductile iron. Supplementing the City's natural water sources are four (4) storage tanks: a four-million-gallon pre-stressed concrete storage tank near the Devil's Backbone, a 100,000 gallon elevated steel water storage tank in Campion, a four-million-gallon steel tank near the intersection of 29th Street and Wilson Avenue, and a five-million-gallon storage tank at Taft Avenue and 42nd Street SW. These four storage tanks were designed to help equalize distribution system pressure, meet peak hour demands, and supply fire hydrants. Most of the City's water distribution system operates by gravity; however, there are four booster pump stations that operate to maintain adequate water pressure to areas of higher elevation.

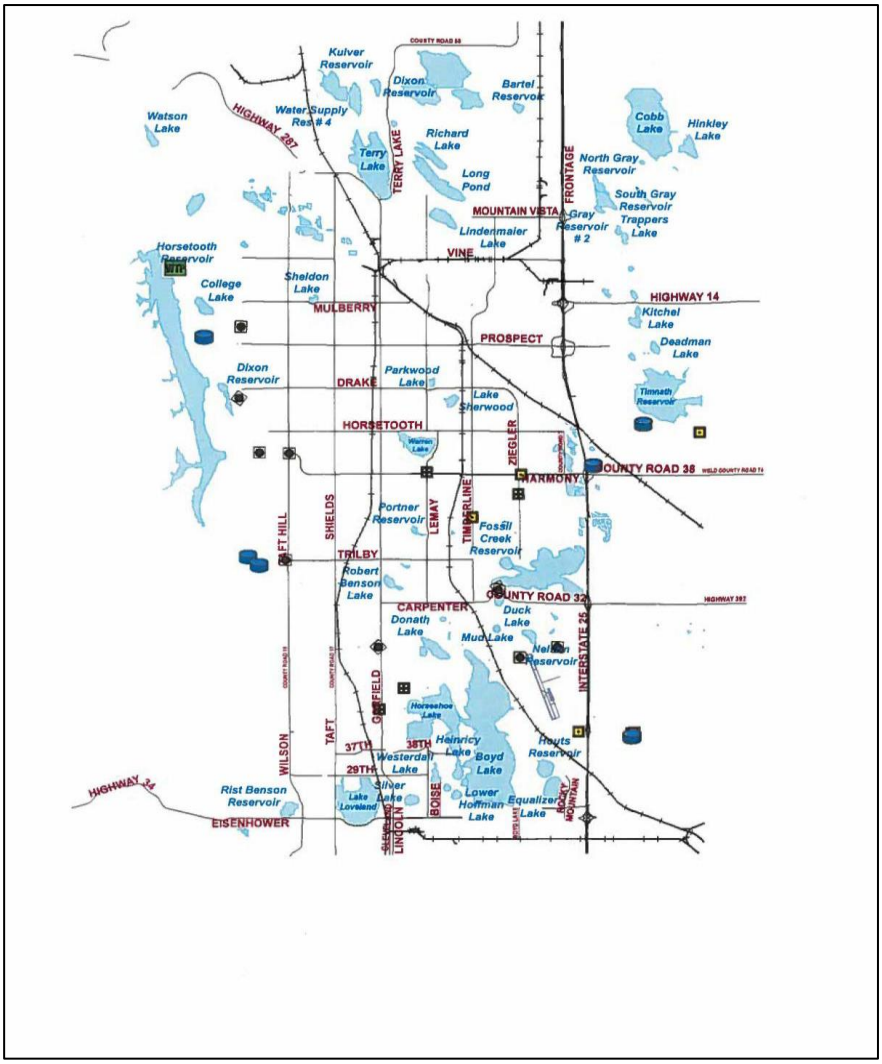


Figure 16: Fort Collins-Loveland Water District Service Area

The Fort Collins-Loveland Water District (FCLWD) provides and maintains a water distribution system to a service area of roughly 60 square miles, serving approximately 16,000 addresses in the northern portion of the LFRA response area (Figure 16). The FCLWD district boundaries are generally Harmony Road to the north, 57th Street to the south, the foothills to the west and the Larimer/Weld County line to the east. The FCLWD water delivery system consists of 26 pressure zones with three

close loop booster pump systems, five (5) pump stations and five (5) storage tanks. FCLWD owns and maintains 451 fire hydrants within the LFRA service area. All hydrants are installed on minimum six (6) inch branch lines and feature a steamer outlet and two 2-½ inch outlets.

The Little Thompson Water District (LTWD) maintains much of the water distribution system in the southern and western portions of the LFRA service area. LTWD covers nearly 300 square miles that is bounded to the north by the City of Loveland, to the south by the Longs Peak Water District, to the west by the foothills and to the east by the City of Greeley (Figure 17). The LTWD distribution system consists of more than 670 miles

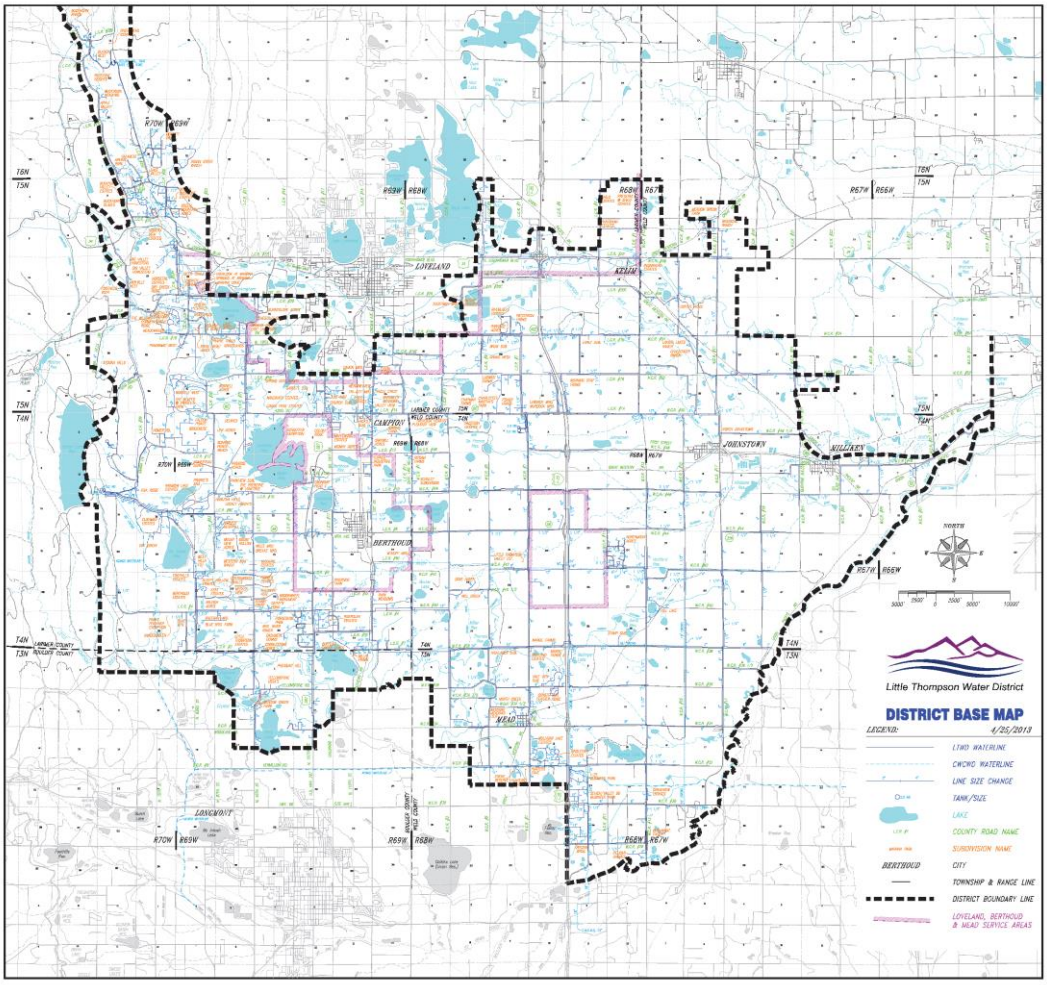


Figure 17: Little Thompson Water District Service Area

of water lines, ranging in size from one (1) inch to 42 inches in diameter. LTWD owns and maintains 16 pressure zones and 403 fire hydrants within the LFRA service area.

The Town of Johnstown water department operates and maintains a distribution system within Town limits, which includes residential and commercial developments within portions of the Loveland Rural Fire Protection District in the area of Interstate 25 and East Eisenhower Boulevard (Figure 18). Approximately one-third of Johnstown's water supply is provided to areas within the LFRA service area.

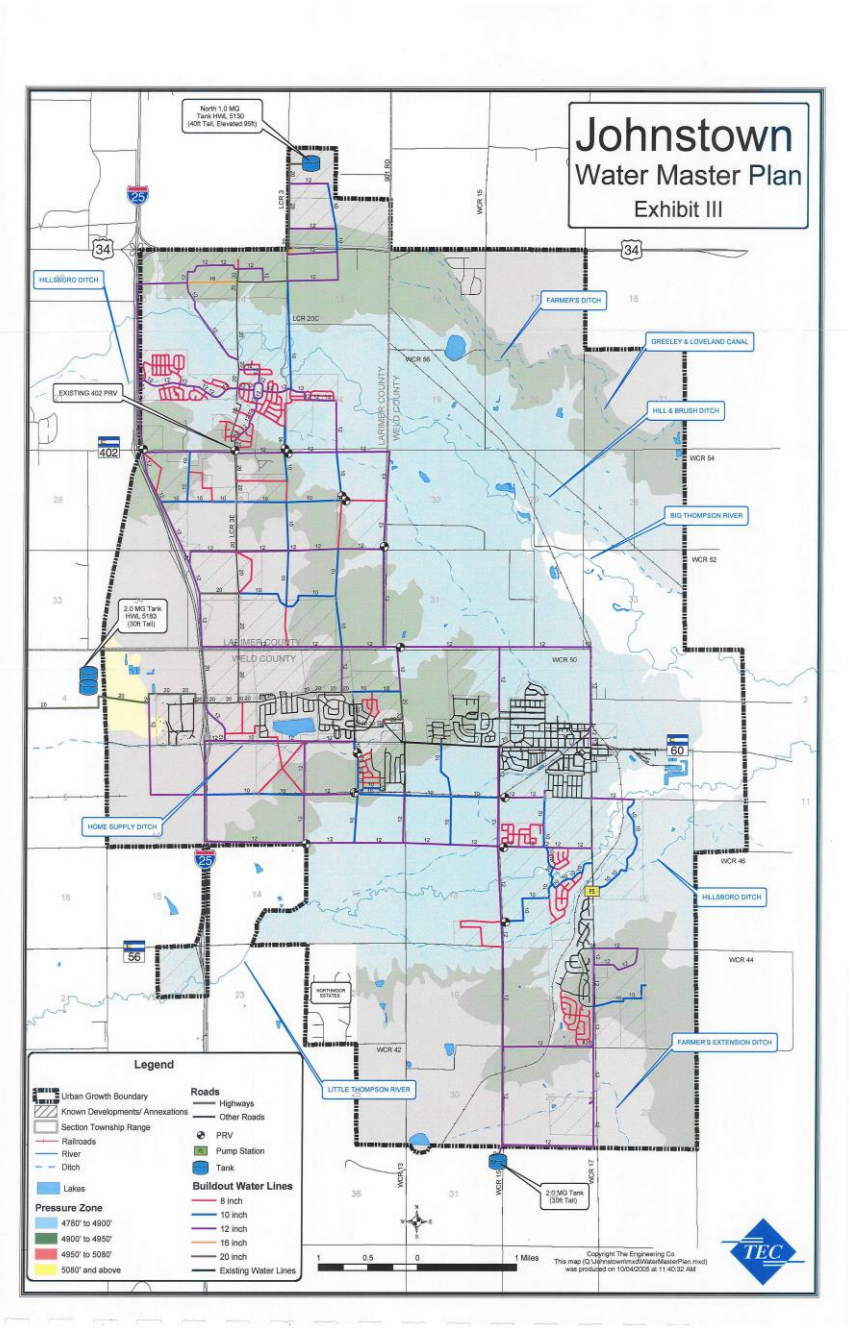


Figure 18: Town of Johnstown Water Service Area

The North Carter Lake Water District (NCWLD) provides domestic water to approximately 145 homes and businesses in proximity to Carter Lake, in the foothills west of Loveland (Figure 19).

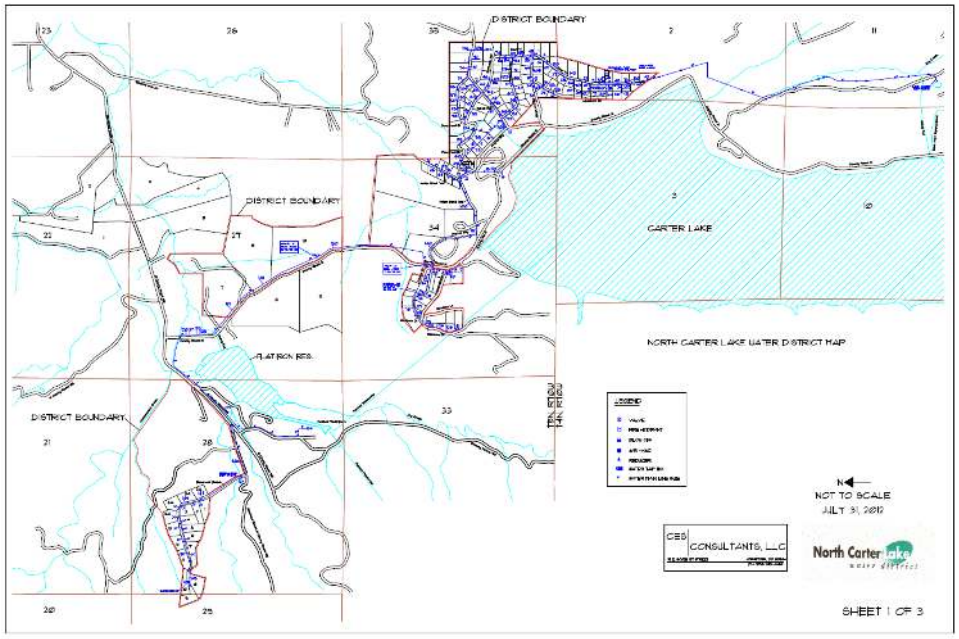


Figure 19: North Carter Lake Water District Map

Chapter 2 – Services Delivered by the Agency

The Loveland Fire Rescue Authority (LFRA) is a career fire department that uses full-time paid firefighters, augmented by reserve firefighters of the Big Thompson Canyon Volunteer Fire Department (BTCVFD) to provide a wide array of emergency and non-emergency services to a response area of approximately 194 square miles. LFRA is a "full-service" fire department that provides all types of emergency services including fire suppression, wildland firefighting, emergency medical services, special operations, tactical fire, and aircraft rescue and firefighting.

Mission, Vision and Values

LFRA is committed to providing the highest quality services to the citizens who are served by the agency. The agency's mission statement is:

"Through commitment, compassion and courage, the mission of the Loveland Fire Rescue Authority is to protect life and property."

Within the mission statement are the agency's core values of Commitment, Compassion and Courage – termed "the 3C's." LFRA personnel promote the mission by focusing efforts on "the 4R's" of Response, Readiness, Resources and Relationships. The timeless values of the 3C's and the 4R's serve as benchmarks by which the quality of the agency's service delivery is measured. These values provide the guiding framework that directs and prioritizes all agency resources. All personnel within the LFRA family embrace the vision of "*Building Enduring Greatness."* Inspired by the Spartan shields, LFRA has developed six "shields" to protect the path to enduring greatness and enable the agency to deliver on the mission and vision in a dynamics business environment (Figure 20). Employees are committed to the concept of continuous improvement

Figure 20: Pathway to Enduring Greatness

and strive to deliver the best possible citizen service to the community with promptness and professionalism. The agency's primary goal is to be recognized by the Loveland community and those in the fire service community as a model of excellence in providing fire protection and emergency services in the most cost-effective manner.[11]

Responsibilities of the Agency

In general, the public fire service saves lives and property from natural and/or human-caused situations and prevents harm through planning and pre-incident planning. Loveland Fire Rescue Authority (LFRA) exists to provide protection, public safety and support to its citizens. A community's fire protection and emergency services system must reflect the needs and desires of the community, and it must be managed and operated within an affordable and efficient financial system. Economic conditions over the past several years have re-emphasized the importance of sound financial stewardship and community involvement in all aspects of planning and operations.

Loveland Fire Rescue Authority (LFRA) is organized into three (3) divisions: Operations, Community Safety, and Administration (Figure 20). Each division is led by a Division Chief-level position. The Big Thompson Canyon Volunteer Fire Department (BTCVFD) is a separate organization within LFRA that assists with service delivery in the Big Thompson Canyon. The BTCVFD Chief is incorporated into LFRA's command structure as a Battalion Chief, reporting to the Operations Division Chief.

The Operations Division responds to all calls for service and provides the following types of service: structural firefighting, wildland and urban interface firefighting, emergency medical services, special operations (water rescue, hazardous materials response, large animal rescue, urban search and rescue, and tactical fire), fire alarm investigation, pre-incident planning and public assistance. The Operations Division also includes training programs to maintain and improve the knowledge, skills and abilities of all members of LFRA.

[11] Loveland Fire Rescue Authority Fire Protection and Emergency Services Strategic Plan, page 17.

The Community Safety Division (CSD) provides both fire prevention and emergency management services. CSD responsibilities include fire code enforcement, new construction plan review, development services, permit administration, fire investigation, disaster preparedness, hazard mitigation, public outreach and records management. The employees within the CSD also work to support the Operations Division with activities to build, educate and sustain a safe and vibrant community.

The LFRA Administration Division provides all business-related functions of the organization including, but not limited to, strategic leadership, financial planning, budgeting, reporting, payroll, accounts payable, accounts receivable, customer service, and support to Boards and Commissions.

Agency Organization

LFRA is organized under a Fire Chief who reports to the LFRA Board of Directors. Beneath the Fire Chief, there is an Administrative Director and two (2) divisions, each supervised by a Division Chief. The Operations Division comprises the largest group of LFRA employees, encompassing all fire suppression personnel. The Operations Division functions on a one battalion system, with a single Battalion Chief on-duty at all times. Assisting the on-duty Battalion Chief is a 40-hour Battalion Chief assigned to coordinate the agency's training programs. Off-duty Battalion Chiefs and Captains provide 24/7 support as an "On-Call Battalion 2." This position covers the system when Battalion 1 is occupied with a high-risk call or a call of extended duration.

Operations Division personnel are divided into three (3) shifts, each working rotating 24-hour shifts to provide coverage 365 days per year. Each shift is staffed with two (2) Captains, five (5) Lieutenants, nine (9) Engineers, one (1) Engineer/Fire Inspection Technician, and six (6) full-time Firefighters. The AARF Engineer is typically on-duty Monday through Friday during normal business hours. If that individual is off-duty, the position is back-filled with off-duty personnel to provide required AARF coverage. The daily minimum staffing level is 23 personnel.

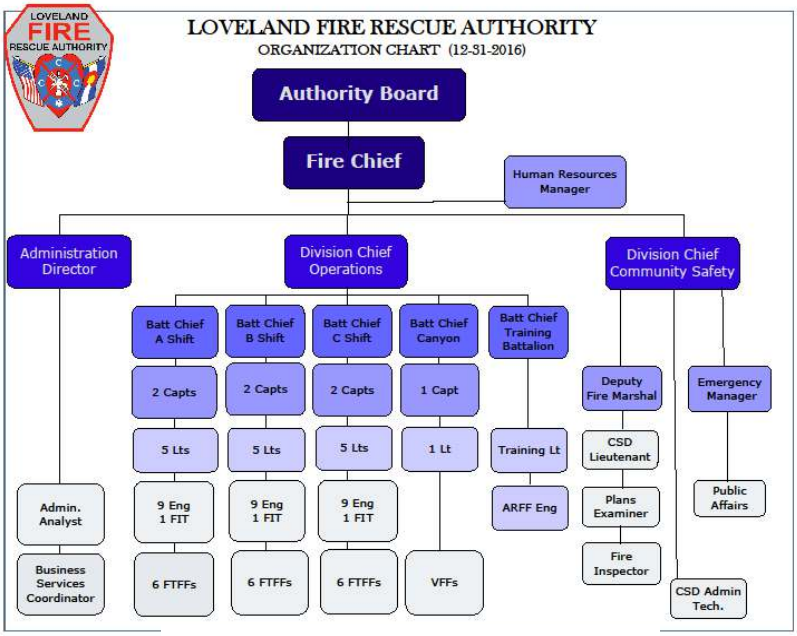


Figure 21: LFRA Organization Chart

Performance Goals and Expectations

The City of Loveland works actively to establish realistic performance measures for the purposes of establishing and evaluating services provided by City divisions and departments. LFRA participates in the City's performance measurement processes, but also seeks to utilize fire service specific tools to assess the quantity and quality of the services provided by LFRA personnel.

Performance measurement and standards comparisons are used to evaluate the services provided by LFRA to the community. Research and data collected by organizations such as the National Fire Protection Association (NFPA), Insurance Services Office (ISO), and International City/County Managers Association (ICMA) are used by fire service agencies throughout the nation to measure the efficiency and effectiveness of services provided. In the 1994 Loveland Fire & Rescue Master Plan, the agency used performance objectives that were based on historic local experience and comparison with established standards.

Community Expectations

The Loveland Fire Authority Review Committee (LFARC) was established in November 2009 to determine the most effective governance model for providing fire and rescue services. LFARC was formed by representatives of Loveland Fire and Rescue, the Loveland Rural Fire Protection District, and Loveland City Council. Through the process of evaluating the governance model, the committee established the expected service levels that would be provided by the organization. In some cases, service levels were determined to be legally mandated by fire codes, federal regulations, national standards, or local/regional standards. LFARC established the following list of services that were expected to be provided by Loveland Fire Rescue Authority:

Essential Fire/Rescue Services:

- Structural firefighting
- Vehicle, Grass and Rubbish Firefighting
- Emergency Medical Services
- Hazardous Materials Operations
- Non-Technical Rescue Calls
- Vehicle Extrication
- Fire Prevention (development review)
- Fire Investigation

Value-Added Services:

- Specialized and Technical Rescue
- Wildland Firefighting Operations
- Tactical Fire Operations (with Loveland Police Department SWAT)
- Fire Prevention (inspection services)
- Community Safety/Emergency Management
- Community Outreach/Education
- Regionalization of Services (cooperation with Front Range Fire Consortium)

The members of the Fire Authority Review Committee were universal in their statement that, regardless of the service being provided, the most important element to be addressed by LFRA was staffing for the Authority. Agency staffing level has a direct influence on both the quantity and quality of any service provided by LFRA. The community served by LFRA expects the agency to provide a skilled response with a sufficient number of personnel to establish initial actions for incident mitigation. LFRA uses the list of essential services to prioritize efforts in personnel training. Value-added services continue to be topics for training, but they are given a lesser priority than essential services.

Current ISO Rating

Established in 1971, the Insurance Services Office (ISO) is the primary source of fire-related insurance risk to municipalities.[12] ISO evaluators visit and evaluate municipal fire service organizations approximately once every five (5) to ten (10) years. ISO performs a comprehensive analysis of the complete fire protection system for the municipality, including the dispatch center, water supply infrastructure, and all aspects of fire service organization and operations. LFRA was evaluated in January 2015 and received an updated public protection classification (PPC) rating from ISO in April 2016. For the purposes of the current rating, ISO evaluated the area designated as the Big Thompson Canyon Volunteer Fire Department (BTCVFD) separately from the rest of the LFRA response area. Effective on April 1 ,2016, the following PPC ratings are in effect for all portions of the LFRA response area:

LFRA FPSA (Fire Protection Service Area: PPC rating of 2 – This rating applies to all areas within five (5) road miles of an LFRA fire station and within 1,000 feet of a fire hydrant.

LFRA FDS (Fire Department Service): PPC rating of 3/10 – This is the area to which LFRA must bring its own water supply, via water tender shuttle operations. All areas within five (5) road miles of an LFRA fire station and beyond 1,000 feet of a

[12] www.verisk.com/iso.html

fire hydrant receive the "3" rating. Locations beyond five (5) road miles of an LFRA fire station are classified as a 10.

BTCVFD FDS (Fire Department Service): PPC rating of 4/10 – This rating applies to the areas primarily served by the Big Thompson Canyon Volunteer Fire Department. All locations within five (5) road miles of Fire Station #8 in Drake receive the "4" rating. Locations beyond five (5) road miles from that fire station are classified as a 10.

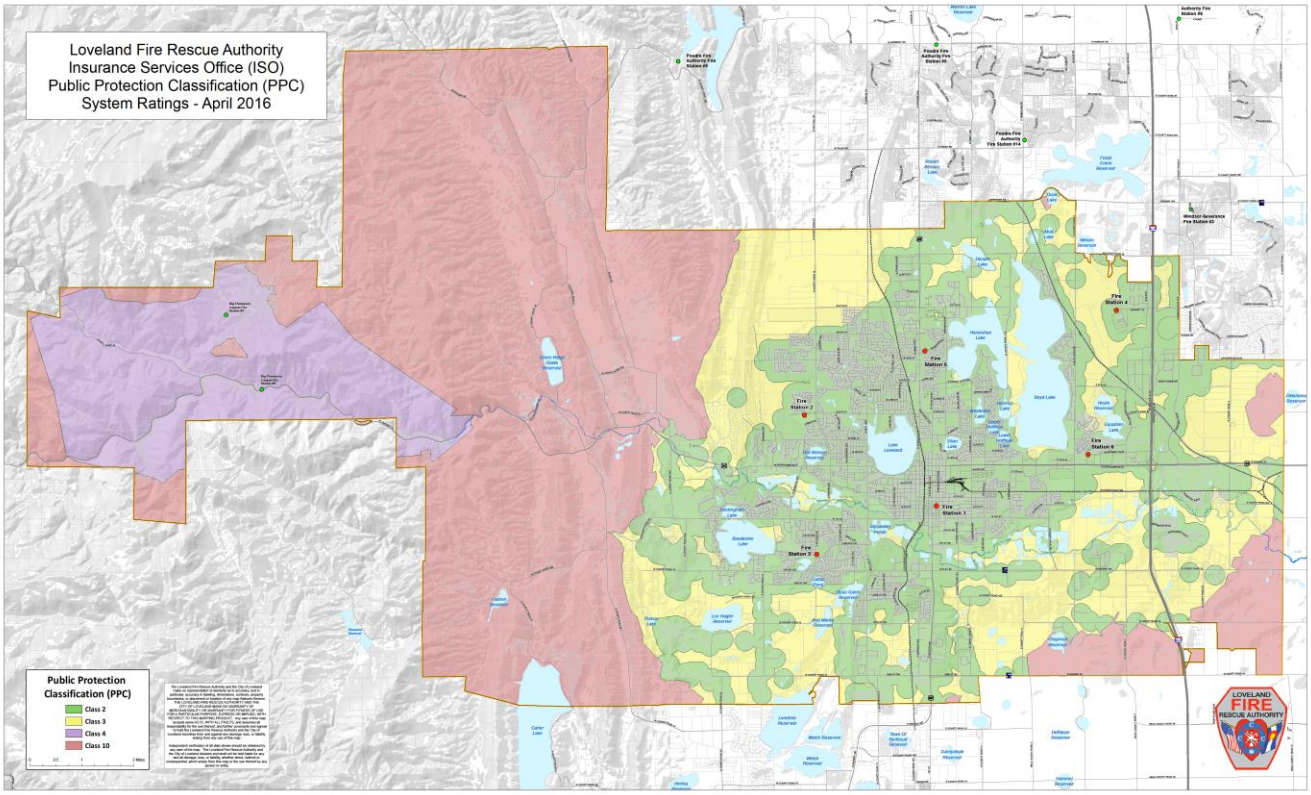


Figure 22: ISO Public Protection Classification Ratings (April 2016)

The agency is currently developing plans for Fire Station #7, which would be located in the western portion of the response area, between the City of Loveland and the Big Thompson Canyon. The addition of this station should expand the agency's ISO PPC rating of 2 to a much larger portion of the overall response area.

Fire Rescue Advisory Commission

LFRA actively and regularly seeks citizen input regarding services provided by the agency. The primary source of this input is from the Fire Rescue Advisory Commission (FRAC). FRAC is a nine (9) member citizen advisory body containing members from both the city and rural portions of the LFRA response area. FRAC meets the second Wednesday of every month in the Fire Administration building, and both the Mayor and the Fire Chief attend all FRAC meetings. The Commission serves as an advisory body to the Board of the Loveland Fire Rescue Authority in the implementation of the fire authority strategic plan for the City and the Authority. The Commission consists of both City and Rural District representatives. FRAC also serves in an advisory capacity for the Fire Chief concerning fire protection, rescue and emergency management issues.

Community Satisfaction Surveys

The City of Loveland actively seeks citizen opinions on City services and amenities, including public safety, with an annual Quality of Life Survey that is distributed to a random sample of City residents. Through its direct involvement with the City, LFRA has participated in the annual Quality of Life Surveys for several years. Table 6 provides a summary of 2010 through 2015 Survey results that refer to LFRA services.

		The City provides quality Fire/Rescue services
2015	**Strongly Agree**	92%
	Agree	
2014	**Strongly Agree**	93%
	Agree	
2013	**Strongly Agree**	90%
	Agree	
2012	**Strongly Agree**	89%
	Agree	
2011	**Strongly Agree**	92%
	Agree	
2010	**Strongly Agree**	95%
	Agree	

Table 6: Summary of Community Satisfaction Surveys (2010-2015)

In addition to the City's Quality of Life survey instrument, LFRA administration randomly seeks input from individuals who receive service from the agency to assess the perceived quality of services rendered. Typically, this input is obtained through telephone

conversation with individuals and/or their families. LFRA also recognizes the importance of alternative methods for seeking public input. The Board of Directors for LFRA consists of elected officials from both the Loveland City Council and the Loveland Rural Fire Protection District.

Performance Goals

Loveland Fire Rescue Authority (LFRA) provides fire protection, rescue and emergency medical services to a large area that includes urban, suburban and rural environments. LFRA strives to provide uniform and consistent services regardless of where an incident may occur. However, it is unrealistic to expect to provide the same level of service relative to response time and deployment capabilities when comparing areas proximal to the urban core of Loveland versus areas in the remote western portions of the response area. To assist the agency in measuring performance in an around the densely populated city of Loveland, LFRA has established an Urban Response Area where performance benchmarks for response time are established and reported (Figure 21) to the Board of Directors. The LFRA Urban Response Area includes approximately 100 square miles and covers the same general area as the City of Loveland Growth Management Area.

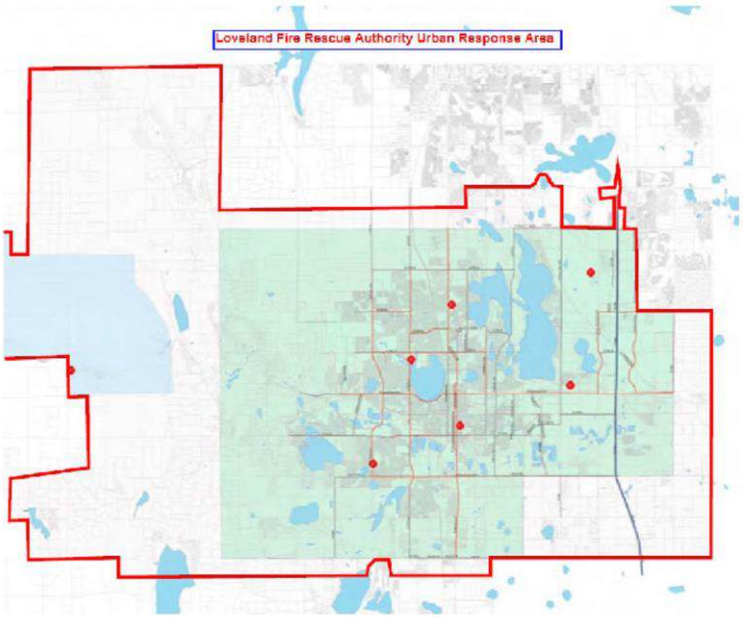


Figure 23: LFRA Urban Response Area

Service Level Indicators

With the development of the 2012 LFRA Strategic Plan, the agency established seven (7) service level indicators that are used to measure affect positive change and assist the organization in its efforts for continuous improvement (Table 7). These indicators have been tracked since 2012 to provide historical comparison to identify trends and explain performance-related variances.

LFRA Significant Seven				
Performance Measure	**2012**	**2013**	**2014**	**2015**
Customer Satisfaction	89%	90%	93%	92%
90th Percentile Response Time in Urban Response Area (goal 5:59 Dispatch to On Scene)	7:25	7:01	7:32	7:42
Fires Confined to Room of Origin	70%	60%	79%	77%
Fire Loss per Capita	$5.67	$23.38	$13.61	$21.66
Property Value Saved vs Lost	$5.29	$2.66	$4.58	$3.87
Business Safety Inspections	242	266	458	193
Costs per Capita	$106.19	$103.19	$116.69	$126.04

Table 7: LFRA Significant Seven Performance Measures

The LFRA Significant Seven Performance Measures were established to provide quantitative feedback that directly reflects the services provided by LFRA. These measures reflect not only LFRA goals, but also the customers' needs, and serve as a basis upon which the agency is able to make decisions about the effective and efficient delivery of service.

LFRA has established three goals that support the agency's prime directive – ***To protect life and property in a safe and effective manner***. These three goals and their associated strategies are:

1. Deploy an effective emergency response to minimize damage and loss.
    a. Deploy appropriate incident-specific resources
    b. Execute a skilled response
2. Minimize and mitigate the risks of an emergency occurrence in the community.
    a. Adopt and reinforce fire codes that enhance safety in the built environment and assist with effective response in the case of an emergency
    b. Build and reinforce public awareness to reduce the probability of an incident
    c. Integrate a community-wide Emergency Preparedness Program for natural or man-made disasters
3. Deliver cost-effective services

Each LFRA program area establishes specific goals and objectives 9 (e.g., service level indicators) to measure and report performance. Progress towards accomplishment of

goals and objectives is reported in program annual status reports as well as the agency's annual report. Service level indicators that are measured and reported include:

- Civilian fire deaths per 100,000 population
- Civilian fire injuries per 100,000 population
- Firefighter deaths
- Firefighter injuries per 100 fires
- Number of fires per 1,000 population
- Fire department intercession before flashover
- Response times
- Direct estimated fire loss per capita
- Direct and indirect loss to a five-year average
- Loss per fire
- Confinement of fires to building or origin
- Minimization of impact of wildland fires
- Control of wildland fires within two (2) hours, 95% of the time
- Control of wildland fires within first 12 hours, 99% of the time
- Maintenance of per capita costs for fire protection
- Maintenance of ISO rating
- Limiting of HazMat incidents to two (2) per 1,000 population
- Maintenance of customer satisfaction information

It is LFRA's intent to align established goals and objectives (e.g., service level indicators) with the agency's Strategic Plan. LFRA uses these service level indicators to monitor performance and to determine necessary change and/or improvement within the organization. Ultimately, by working to address established goals and objectives, LFRA will be able to improve citizen service and enhance firefighter and citizen safety while recognizing the agency's commitment to continuous improvement.

Fire Suppression

LFRA responds to a wide variety of structure fire calls. The most common structure fires in the LFRA response area involve one- and two-family residential structures. However, the agency also responds to a variety of commercial structure fires, including industrial buildings, schools, mercantile occupancies, nursing homes, hospitals, high-rise and/or multi-family residential structures. Additionally, LFRA provides fire suppression services for fires involving mobile property such as passenger vehicles, recreational vehicles, aircraft, boats, rail and road freight transport vehicles.

Figure 24: Ward Building Fire (July 2013)

The five (5) staffed fire stations within the City of Loveland and two (2) in the Big Thompson Canyon are strategically distributed to provide a base of operations from which the agency's apparatus and personnel are operated. Each fire engine is equipped with 750 gallons of water, a 1500 gallon per minute fire pump, more than 3000 feet of supply and attack hose, ground and roof ladders, basic vehicle extrication equipment and a broad assortment of firefighting and salvage tools and equipment. The 100-foot aerial tower is equipped with 400 gallons of water, a 1500 gallon per minute fire pump, more than 2000 feet of supply and attack hose, several ground and roof ladders, two complete sets of hydraulic extrication tools, stabilization equipment and other tools and equipment for firefighting and specialized rescue operations. The heavy rescue is equipped with a large assortment of ground and roof ladders, two complete sets of hydraulic extrication tools, and a wide variety of tools and equipment to support the agency's special operations team. LFRA also operates an air/light rescue unit that is cross-staffed with the aerial tower, several reserve engines and a reserve 100-foot aerial ladder.

Wildland Firefighting

Loveland Fire Rescue Authority (LFRA) provides personnel and equipment for initial attack as well as extended operations on wildland fires. Topography within the LFRA response area ranges from rolling prairie to steep, mountainous terrain and includes a wide variety and diverse wildland-urban interface. To support wildland fire response, LFRA operates a Type 3 fire engine and three Type 6 fire engines that are cross-staffed with front-line fire engines. Two 1800-gallon water tenders are cross-staffed to provide water to areas without a nearby pressurized water source. The BTCVFD provides an additional Type 4 fire engine, two Type 6 fire engines, and an 1800-gallon water tender. All LFRA firefighters maintain certification as wildland firefighters, are issued appropriate personal protective equipment, and maintain National Wildfire Coordinating Group (NWCG) Red Card certification.

Figure 25: High Park Fire Operations

Since 2010, there have been ten (10) significant wildland fires that have occurred in LFRA's response area, including mutual aid and automatic aid areas. LFRA's involvement in wildland-urban interface operations has expanded over the years. In the mid 90's, all members were certified as S130/190. The Bobcat Fire of 2000 reinforced the decision to enhance LFRA's wildland certifications and training, allowing personnel to become qualified as Engine and Squad bosses, as well as eight (8) individuals specializing as sawyers. In early 2000, it became a requirement that every member obtain the S215 wildland urban interface training. Officers at and above the rank of Captain are required to become certified in S290 (Intermediate Wildland Fire Behavior).

Since 2008, LFRA has either participated in or hosted Larimer County WUI exercises and the Wildland Summit. Enhanced certifications and trainings have helped the agency to

develop new relationships while also improving the level of service provided to our citizens. This growth and development lead to the purchase of new gear, expanded in-house training, inclusion of automatic aid and mutual aid partners in training evolutions, purchase of four (4) Type 6 wildland engines, and one (1) Type 3 wildland apparatus. The agency's preparedness efforts also extend to development of a Community Wildfire Protection Plan (CWPP) and Red Zone structural risk assessment.

Emergency Medical Services (EMS)

LFRA is non-transporting agency and provides basic life support (BLS) first response medical care. All operational personnel are required to maintain certification as an Emergency Medical Technician – Basic, through the Colorado Division of Public Health and Environment (CDPHE). All apparatus are outfitted with BLS equipment including automated external defibrillators (AEDs), resuscitation devices and trauma supplies. Advanced life support (ALS) and patient transport is provided by Thompson Valley EMS (TVEMS), which operates five (5) stations within the LFRA response area.

During 2016, LFRA responded to 3,927 EMS incidents and 766 motor vehicle accidents (MVAs), which accounted for approximately 60% of the agency's call volume. The goal of the EMS program is to provide the highest level of patient care to the citizens served. Consequently, the program aims to continuously improve the level training provided to agency personnel and to strengthen the relationship with TVEMS.

Special Operations

In 2005, LFRA consolidated all specialty teams into the Special Operations Team (SOT). The SOT consists of three primary service areas: hazardous materials response, urban search and rescue (USAR), and water rescue. Within these areas are the specialties of hazardous materials technician, hazardous materials specialist (highway, railcar, or radiological), collapse rescue, confined space rescue, rope rescue, trench rescue, large animal rescue, dive rescue and swiftwater rescue. LFRA SOT currently has 44 members spread across all three operational shifts and is supported by a staffed Heavy Rescue

company (Rescue 2). Every SOT team member is encouraged to possess at least one Technician level certification and to become Operations level certified in all disciplines.

Since 2006, LFRA has hosted a Rescue School that provides scenario-based training for all members of SOT. Rescue School provides both classroom and scenario-based training opportunities. It runs as a full team, 5-day training on every even year. On odd years, SOT members participate in monthly and quarterly proficiency training.

In the years since the creation of the Special Operations Team, the team has deployed both within as well as beyond the LFRA response area to numerous incidents that spanned several operational periods: Carter Lake Water Treatment Plant chlorine gas explosion (2007), Longmont Circuits West chemical fire (2007), Georgetown Cabin Creek Xcel Hydroelectric Plant rescue standby (2007), Windsor tornado (2008), Engeman Enterprises ammonia tanks over-pressurized (2008), Big Thompson Task Force Estes Park rescues during flood (2013), Loveland Area Command wide-area search and hazardous materials identification (2013) and the Berthoud Tornado (2015). Other significant incidents over the past 11 years include: East 4th Street building façade collapse, car through apartment building at 45th Street and Garfield Avenue , car into house at 8th Street and Garfield Avenue, rope rescue at Ice Falls in the Big Thompson Canyon, 3:00am pick-off rope rescue in the Big Thompson Canyon, Crosier Mountain Trail rescue, extrication on Storm Mountain access road, dog in a mine shaft, Idlewild Dam nighttime rope rescue, propane tank flare-off at 5th Street and

Figure 26: Rescue Operations during September 2013 Big Thompson Flood

Jefferson Avenue, several clandestine methamphetamine laboratories, several large animal rescues, and a high angle rescue at the Medical Center of the Rockies construction site.

Tactical Fire

The LFRA Tactical Fire team (TacFire) was formed in 2007 when it was identified that the agency needed to improve equipment, training and support for the Loveland Police Department's (LPD) Special Weapons and Tactics (SWAT) team. TacFire began with LFRA providing support to LPD SWAT for forcible entry, high angle access, hazardous materials response and mitigation, fire control, and rescue of injured persons during SWAT operations. The mission of TacFire has evolved to provide highly trained personnel to support SWAT operations in a hostile hazard zone. TacFire personnel participate in approximately 60 hours of annual training, including four (4) 10-hour training days and 20 hours of specialized training at the Fort Carson Military Installation in Colorado Springs. Topics of training include victim and officer rescue from a hostile environment; forcible access with blunt force, explosive, cutting and hot work tools; defensive fire control tactics within a hostile environment; hazardous materials decontamination, categorization and mitigation; defensive control tactics; and weapons systems management. TacFire personnel assist LPD SWAT with mitigating the hazards associated with warrant service, barricaded subject, hostage rescue, active assailant response, hazardous materials, victim/officer rescue, mask fit testing, air monitoring and range safety officer.

Figure 27: SWAT/TacFire Team Training Evolution

Feedback from LPD Command Staff indicates that TacFire is viewed as an integral element of LPD SWAT in many capacities. SWAT Operations efficiency and capabilities have grown as a result of the presence of LFRA TacFire personnel. Additionally, the

increasing need for unified response to active assailant incidents further illustrates the need for coordination between LPD and LFRA in tactical response to hostile events.

Aviation Rescue and Firefighting (ARFF)

The Northern Colorado Regional Airport (FNL) began life in 1963 through an inter-governmental agreement between the cities of Fort Collins and Loveland. This agreement is renewed annually, unless modified or terminated by the mutual consent of both cities. The airport is located in the northeastern portion of the LFRA response area, adjacent to Interstate 25. Both residential and commercial development around FNL have been growing steadily for several years and are predicted to continue strong growth into the future. Loveland Fire Rescue Authority has primary responsibility for responding to any accidents or incidents occurring on airport property. LFRA personnel provide incident command, incident stabilization, hazardous materials mitigation, rescue, fire suppression and the initiation of a mass casualty incident response.

FNL is certified by the Federal Aviation Administration (FAA) as a Class I general aviation airport that can serve scheduled and/or unscheduled operations of large air carrier aircraft as well as small air carrier aircraft. It serves all types of general aviation activity. Allegiant Air operated direct flights between FNL and Las Vegas until October 2012. Elite Airways began operating scheduled service between FNL and Chicago Rockland International Airport in August 2015.

Figure 28: ARFF Initial Attack during Aircraft Crash Drill

Due to low frequency of scheduled commercial service and limited response area, LFRA staff that were permanently assigned to Fire Station #4 were relocated to Station #6 in late 2012 to improve service levels along the busy Highway 34 corridor. In 2016, a full-time Engineer was assigned to Fire Station #4 to manage all ARFF functions, including aircraft standby coverage. Fire

Station #6 apparatus support the ARFF Engineer as needed for service calls on the FNL campus, including in-flight and ground emergencies, as well as aircraft landing and take-off coverage. LFRA continues to train and certify personnel in aviation rescue and firefighting (ARFF) skills, with nine (9) members currently participating in ARFF training. LFRA maintains two (2) ARFF apparatus at Fire Station #4 and provides aircraft standby services with ARFF-certified personnel for scheduled commercial aircraft arrivals and departures.

Community Safety Division

The LFRA Community Safety Division (CSD) provides a wide variety of fire prevention and emergency management services to both LFRA members as well as the citizens within the agency's service area. The Community Safety Division staff consists of a Division Chief/Fire Marshal, Deputy Fire Marshal for Development Services, a Lieutenant who manages the fire investigation and hazardous materials permit programs, a full-time plans reviewer, a Public Affairs Officer, a full-time inspector, a part-time plans reviewer, and an office manager. The Emergency Manager also works within the CSD to improve community resilience to emergencies and disasters through planning, preparedness, and notification. Fire prevention services that are coordinated through the CSD include fire code inspection, new construction plan review, development review, fire origin and cause investigation, permit administration, youth firestarter intervention, and public outreach.

Employees within the CSD support the LFRA Operations Division by providing pre-fire planning resources, coordinating the engine company safety assessment program, communicating water system service issues, supporting property owners and/or occupants during emergency situations, and responding to incidents in secondary apparatus when necessary.

Resource Deployment

LFRA's Operations Division maintains a minimum of 23 on-duty personnel 24 hours per day, 7 days per week, operating out of five (5) staffed fire stations within Loveland city limits, the airport fire station and two (2) stations staffed by the Big Thompson Canyon Volunteer Fire Department. All LFRA apparatus are staffed with a minimum of three (3)

person companies. Front-line apparatus include five (5) engine companies, two (2) truck companies and one (1) Battalion Chief (Table 8). LFRA's Community Safety Division provides the agency's fire prevention and emergency management functions with a staff of eight (8) full-time employees and one (1) part-time employee.

Fire Station #1	**Fire Station #2**	**Fire Station #3**
Engine 1 (first due engine) Battalion 1 Engine 61 Water Tender 1 Ladder 6 HazMat 1 Battalion 2	Engine 2 (first due engine) Rescue 2 (first due truck) FIT 2 Engine 32 / Engine 9 Dive Rescue 2 Rescue Boat on Trailer	Engine 3 (first due engine) Engine 63 Engine 7 SOT UTV on Trailer
Fire Station #4	**Fire Station #5**	**Fire Station #6**
ARFF 41 ARFF 42 ARFF 44	Engine 5 (first due engine) Water Tender 5	Engine 6 (first due engine) Tower 6 (first due truck) Engine 66 Rescue 6
Training Center	**Canyon Stations**	
Engine 4 Mass Decon Trailer Collapse/Trench Rescue Trailer Training UTV on Trailer Mobile Command Vehicle	Engine 8 (first due engine) Water Tender 8 Engine 68 Engine 49 Engine 69 Rescue 9 Utility 8 Rescue 8	

Table 8: LFRA Apparatus Locations

All LFRA resources are dispatched by the Loveland Emergency Communications Center (LECC) through the use of an automated vehicle locating (AVL) system that allows the computer-aided dispatch (CAD) software to automatically assign the closest fire apparatus to each call for service. During 2014, LECC assigned LFRA resources to 7,028 calls for service, or an average of roughly 1,000 calls per apparatus per year. Of those calls, 154 were dispatched as structure fires and 4,067 were emergency medical calls (EMS). Call volume increased in 2015 to 7,499 total incidents, averaging to 1,071 incidents per apparatus. Reported structure fires accounted for 167 calls dispatched, while 4,325 EMS calls were dispatched. Call volume again increased in 2016 to 7,901 total incidents, averaging 1,128 incidents per apparatus. Reported structure fires accounted for 154 calls dispatched, while 4,569 EMS calls were dispatched.

Fire Station Planning Areas

Each LFRA fire station is geographically located to provide first-due coverage to a designated portion of the overall response area (Figure 27). Given the dynamic nature of the modern fire service, LFRA uses an automated vehicle locator (AVL) system to help the LECC send the closest apparatus, regardless of where the incident occurs. However, LFRA continues to use fire station planning areas to assist with assessing first-due coverage and with analyzing apparatus response performance.

LFRA provides 24/7 staffing at five (5) fire stations within Loveland city limits. In addition to the first-due apparatus, each fire station also houses reserve, secondary and/or support apparatus. Fire Station #4 at the airport is staffed by the ARFF Engineer and contains the agency's ARFF apparatus. Fire Stations #8 and #9 are operated and staffed by the Big Thompson Canyon Volunteer Fire Department (BTCVFD), which is managed as an LFRA battalion.

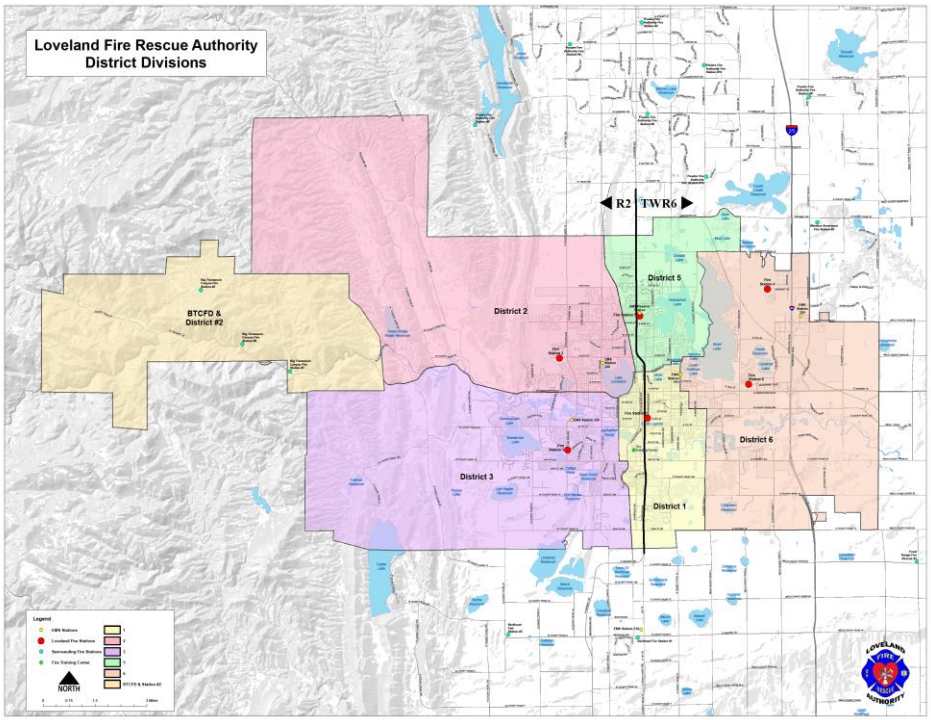


Figure 29: LFRA Fire Station Planning Zones

During the development of the 2012 LFRA Strategic Plan, the agency analyzed fire station locations and call volumes. It was determined that community growth trends had resulted in Fire Station #2 being poorly located. The five (5) minute coverage area for Fire Station #2 excessively overlapped with adjacent coverage areas and left a large portion of the northwest corner of the response area with inadequate apparatus response times. It was determined that a more advantageous station location was approximately one (1) mile west on 29th Street.

LFRA received funding authority to relocate Fire Station #2 to improve district coverage and, during 2014, the new Fire Station #2 was opened as a double-company house.

Fire Station #1

Fire Station #1 is attached to the west end of the Fire Administration Building (FAB), which occupies the building that originally housed the Loveland Police Department (LPD). Engine 1 operates out of the station, covering a planning area of approximately 13 square miles. The station also houses Battalion 1 as well as several secondary, reserve and support apparatus.

When LPD vacated the building to occupy the new Police & Courts Building in February 2002, the City of Loveland renovated the building to house the Public Works Department on the ground floor and LFRA Administration and Community Safety Division on the second floor. During 2014, Public Works vacated the FAB to move into new facilities. In early 2016, the City's Development Services group moved into the ground floor in an effort to streamline the City's new construction and planning processes.

Figure 30: Fire Station #1

Apparatus at Fire Station #1			
Designation	**Apparatus Type**	**Service #**	**Year**
Engine 1	First-due engine company	0112	2010
Battalion 1	First-due Chief Officer	0101	2013
Ladder 6	Reserve aerial apparatus	0202	2000
HazMat 1	Cross-staffed specialty apparatus	0306	2007
Engine 61	Cross-staffed wildland engine	0446	2001

Overview of Risk: The response area protected by Fire Station #1 includes the oldest area of town as well as the most densely populated areas of the city. Many of the older buildings along downtown's 4th Street are non-sprinkled and feature interconnected basements from the early years of City development. A long-term urban renewal project has begun in the downtown area, spearheaded by the City of Loveland Downtown Development Authority. Engine 1 is also first-due to the Good Samaritan complex in the far southern end of the response area, the agency's busiest location for calls for service.

Year	Number of Calls	Percent Change
2012	1,806	N/A
2013	1,848	102.33%
2014	2,069	111.96%
2015	2,114	102.17%
2016	2,189	103.69%

Fire Station #1 Temporal Grid (2012-2016)								
Hour	**Mon**	**Tue**	**Wed**	**Thu**	**Fri**	**Sat**	**Sun**	**Total**
00	30	55	35	45	27	41	59	**292**
01	31	33	38	35	31	39	40	**247**
02	39	30	43	35	17	39	31	**234**
03	34	27	30	34	29	31	37	**222**
04	20	31	40	34	22	37	25	**209**
05	37	44	57	27	33	37	18	**253**
06	62	57	57	64	36	43	39	**358**
07	56	60	70	55	61	56	48	**406**
08	83	75	73	59	79	62	56	**487**
09	99	78	100	84	88	81	68	**598**
10	86	80	99	77	69	79	57	**547**
11	87	113	105	90	84	82	74	**635**
12	95	121	81	91	87	93	70	**638**
13	85	90	68	81	86	102	87	**599**
14	97	109	73	81	74	98	87	**619**
15	81	89	112	94	96	86	76	**634**
16	110	99	121	97	81	106	82	**696**
17	132	100	98	127	98	76	76	**707**
18	97	103	95	103	89	85	68	**640**
19	94	95	109	104	92	114	84	**692**
20	82	76	93	77	80	98	66	**572**
21	63	85	61	62	76	67	78	**492**
22	40	64	71	70	49	65	60	**419**
23	39	43	46	34	52	55	48	**317**
Total	**1,679**	**1,757**	**1,775**	**1,660**	**1,536**	**1,672**	**1,434**	**11,513**

Fire Station #2

As part of the 2012 strategic planning process, LFRA identified that Fire Station #2 was in a poor location that allowed for excessive overlap of response areas with other fire stations. As a result, a new Fire Station #2 was constructed during 2014. Fire Station #2 runs as a double company station, housing both Engine 2 and Rescue 2. The station planning area covers approximately 66 square miles, including the wildland-urban interface areas north of US Highway 34. The station contains the majority of LFRA's special operations apparatus and equipment.

Figure 29: Fire Station #2

Apparatus at Fire Station #2			
Designation	**Apparatus Type**	**Service #**	**Year**
Engine 2	First-due engine company	0110	2005
Rescue 2	First-due truck company	0850	2013
FIT2	Engineer attached to Rescue 2	0607	2007
Dive Rescue 2	Cross-staffed water rescue	0312	2005
Engine 32/ Reserve Engine 9	Cross-staffed wildland engine	0160	2009

Overview of Risk: The response area protected by Fire Station #2 is extremely diverse, ranging from remote wilderness in the western mountains to moderate density suburban neighborhoods around Lake Loveland. Risks within the response area include not only the

wildland-urban interface, but also US Highway 34, the Big Thompson River, Lake Loveland, and several remote wilderness areas. The northwest portion of LFRA's coverage area is experiencing rapid population growth and corresponding residential construction, as the cities of Loveland and Fort Collins continue to grow closer together.

Year	Number of Calls	Percent Change
2012	1,170	N/A
2013	1,321	112.91%
2014	1,435	108.63%
2015	1,531	106.69%
2016	1,521	99.35%

Station 2 Temporal Grid (2012-2016)								
Hour	**Mon**	**Tue**	**Wed**	**Thu**	**Fri**	**Sat**	**Sun**	**Total**
00	21	34	28	22	17	42	37	**201**
01	21	34	18	26	18	26	27	**170**
02	18	19	14	35	20	25	32	**163**
03	16	19	16	6	34	13	26	**132**
04	19	23	21	17	29	22	24	**155**
05	34	19	19	25	17	43	16	**173**
06	33	33	49	30	23	43	35	**246**
07	30	50	62	51	59	40	46	**338**
08	72	69	64	43	59	35	58	**400**
09	68	60	72	70	64	59	47	**440**
10	56	64	64	72	67	58	50	**431**
11	73	74	69	62	84	71	78	**511**
12	72	58	62	79	58	80	53	**462**
13	68	85	54	57	60	49	51	**424**
14	67	63	58	72	51	44	76	**431**
15	56	62	59	71	64	51	44	**407**
16	50	51	67	61	82	65	57	**433**
17	74	69	79	81	68	64	69	**504**
18	71	43	55	70	80	73	67	**459**
19	50	52	57	70	65	69	69	**432**
20	37	53	39	44	52	60	46	**331**
21	38	47	56	39	66	45	62	**353**
22	28	23	24	24	29	37	31	**196**
23	30	25	29	30	39	45	31	**229**
Total	**1,102**	**1,129**	**1,135**	**1,159**	**1,205**	**1,159**	**1,132**	**8,021**

Fire Station #3

Fire Station #3 is the oldest of Loveland's fire stations, having been originally constructed in 1979. Engine 3 operates out of the station, covering a planning area of roughly 65 square miles. Much of this planning area is rural and mountainous, encompassing the agency's wildland-urban interface zone south of US Highway 34. The station houses much of the agency's extra wildland firefighting supplies as well as a reserve fire engine.

Figure 30: Fire Station #3

Apparatus at Fire Station #3			
Designation	**Apparatus Type**	**Service #**	**Year**
Engine 3	First-due engine company	0156	2003
Engine 63	Cross-staffed wildland engine	0201	2013
Engine 7	Reserve fire engine	0109	2004
SOT UTV	Off-road utility vehicle	0905	2014

Overview of Risk: The response area protected by Fire Station #3 is similar to that of Station #2, including remote wilderness in the western mountains to moderate density suburban neighborhoods. Risks within the response area include the wildland-urban interface, US Highway 34, the Big Thompson River, and several remote wilderness areas. A significant risk is Carter Lake, which is a busy outdoor recreation area operated by Larimer County Parks that consists of 1,000 acres of land and a 1,100 surface acre lake. The Rocky Mountain Center for Innovation and Technology (RMCIT), located on the former Agilent Technology campus, is a developing industrial facility of more than 800,000 square feet.

Year	Number of Calls	Percent Change
2012	1,040	N/A
2013	1,050	100.96%
2014	1,127	107.33%
2015	969	85.98%
2016	1,074	110.84%

Station 3 Temporal Grid (2012-2016)								
Hour	**Mon**	**Tue**	**Wed**	**Thu**	**Fri**	**Sat**	**Sun**	**Total**
00	17	25	15	20	27	17	23	**144**
01	14	18	20	18	15	14	19	**118**
02	21	16	17	20	16	21	23	**134**
03	16	15	16	18	10	17	12	**104**
04	15	11	13	12	9	16	19	**95**
05	16	14	16	15	26	24	14	**125**
06	23	22	27	24	25	19	27	**167**
07	33	40	42	38	46	33	21	**253**
08	57	47	46	35	33	27	50	**295**
09	49	48	37	36	30	37	61	**298**
10	60	46	47	47	51	47	38	**336**
11	66	41	54	45	39	38	40	**323**
12	59	62	69	41	44	48	65	**388**
13	57	50	62	53	43	59	65	**389**
14	52	58	55	59	50	68	55	**397**
15	85	84	61	46	56	48	51	**431**
16	67	39	65	51	46	48	46	**362**
17	58	68	71	52	56	50	65	**420**
18	64	50	36	69	50	56	30	**355**
19	39	45	55	65	64	60	49	**377**
20	60	40	37	58	49	47	35	**326**
21	29	20	44	23	59	40	47	**262**
22	28	31	31	27	41	43	28	**229**
23	22	25	29	19	30	35	31	**191**
Total	**1,007**	**915**	**965**	**891**	**915**	**912**	**914**	**6,519**

Fire Station #4

The airport fire station was constructed in 1995 and provided aviation rescue and firefighting (ARFF) coverage as well as a staffed engine company until 2012, when the engine crew was moved to Fire Station #6. Fire Station #4 contains LFRA's ARFF apparatus as well as airport operations personnel and their associated apparatus. The Fire Station #4 planning area has been included in the planning area for Fire Station #6.

Figure 31: Fire Station #4

Apparatus at Fire Station #4			
Designation	**Apparatus Type**	**Service #**	**Year**
ARFF 41	ARFF apparatus	0904	2015
ARFF 42	ARFF apparatus	0903	1993
ARFF 44	ARFF apparatus	0902	1996

Fire Station #5

Fire Station #5 was built in 1998 to improve the agency's ability to provide service to the northern portions of the response area. The station houses Engine 5 and Water Tender 5 and covers a planning area of roughly 14 square miles.

Figure 32: Fire Station #5

Apparatus at Fire Station #5			
Designation	**Apparatus Type**	**Service #**	**Year**
Engine 5	First-due engine company	0111	2008
Water Tender 5	Cross-staffed water tender	0556	1998

Overview of Risk: The response area protected by Fire Station #5 consists primarily of suburban residential neighborhoods and smaller mercantile occupancies; however, there are also several moderate sized industrial operations. Residential growth has been steadily increasing in this region. The greatest risk within this response area is US Highway 287 that connects Loveland with Fort Collins. Another significant risk is Boyd Lake State Park, which is the 5th busiest state park in Colorado, hosting more than 500,000 visitors annually.

Year	Number of Calls	Percent Change
2012	828	N/A
2013	912	110.14%
2014	925	101.43%
2015	1,122	121.30%
2016	1,163	103.65%

Station 5 Temporal Grid (2012-2016)								
Hour	**Mon**	**Tue**	**Wed**	**Thu**	**Fri**	**Sat**	**Sun**	**Total**
00	18	18	23	20	29	15	23	**146**
01	15	12	13	8	30	18	27	**123**
02	9	7	15	21	15	27	25	**119**
03	12	6	17	24	16	15	18	**108**
04	12	18	11	12	10	21	26	**110**
05	20	20	17	19	18	16	19	**129**
06	18	18	40	30	13	22	13	**154**
07	33	26	43	36	38	25	18	**219**
08	47	32	50	49	32	32	31	**273**
09	57	48	33	53	49	39	34	**313**
10	44	48	39	38	45	32	45	**291**
11	38	42	44	67	53	52	58	**354**
12	79	55	47	44	45	60	34	**364**
13	39	50	64	38	36	52	49	**328**
14	50	41	40	47	58	46	37	**319**
15	57	40	42	50	51	40	41	**321**
16	70	62	48	56	49	56	44	**385**
17	48	46	58	50	49	60	48	**359**
18	59	63	59	56	57	54	50	**398**
19	44	37	39	28	40	46	34	**268**
20	31	34	51	38	35	44	39	**272**
21	37	33	34	40	49	46	42	**281**
22	27	30	31	30	34	32	26	**210**
23	32	26	14	23	34	35	31	**195**
Total	**896**	**812**	**872**	**877**	**885**	**885**	**812**	**6,039**

Fire Station #6

Fire Station #6 was originally constructed in 2004 to provide service to the rapidly growing eastern end of the response area. Through the strategic planning process, it was identified that LFRA had an opportunity to improve service delivery and the station was renovated in 2012 to house a second active company. Fire Station #6 now runs as a double company station, housing both Engine 6 and Tower 6. The station also contains reserve, secondary and support apparatus. The station's planning area encompasses approximately 38 square miles.

Figure 33: Fire Station #6

Apparatus at Fire Station #6			
Designation	**Apparatus Type**	**Service #**	**Year**
Engine 6	First-due engine company	0313	2012
Tower 6	First-due truck company	0700	2015
Engine 66	Type 6 wildland engine	0450	2000
Rescue 6	Cross-staffed rescue apparatus	0352	2003

Overview of Risk: The response area protected by Fire Station #6 is fastest growing of all LFRA response areas. The Fort Collins-Loveland Municipal Airport (FNL) is within this response area, as are both US Highway 34 and Interstate 25 (I-25). Mixed use residential and commercial development is operating at a very fast pace along the I-25 corridor. Several new suburban residential neighborhoods are currently being developed throughout the area. In addition to the highways, one of the greatest risks in this station response area is Praxair, a large industrial facility that produces and stores a variety of cryogenic liquids

Year	Number of Calls	Percent Change
2012	1,305	N/A
2013	1,392	106.67%
2014	1,622	116.52%
2015	1,739	107.21%
2016	1,836	105.58%

Fire Station #6 - Temporal Grid (2012-2016)								
Hour	**Mon**	**Tue**	**Wed**	**Thu**	**Fri**	**Sat**	**Sun**	**Total**
00	11	12	11	10	12	18	25	**99**
01	10	8	14	16	7	14	11	**80**
02	11	10	13	13	10	10	11	**78**
03	10	7	7	8	10	9	8	**59**
04	11	7	12	12	9	12	11	**74**
05	14	14	16	13	19	9	5	**90**
06	31	24	27	26	25	13	11	**157**
07	29	26	40	32	27	14	11	**179**
08	39	39	30	50	36	25	27	**246**
09	57	41	37	55	59	32	48	**329**
10	48	39	36	41	60	40	35	**299**
11	78	32	52	62	39	56	38	**357**
12	47	51	39	44	46	64	32	**323**
13	44	42	49	44	52	51	43	**325**
14	64	45	49	60	64	47	39	**368**
15	52	56	48	55	67	49	32	**359**
16	49	50	43	53	74	41	39	**349**
17	30	39	52	62	77	39	33	**332**
18	38	48	33	45	39	49	34	**286**
19	41	34	22	32	42	42	43	**256**
20	33	29	25	27	30	33	27	**204**
21	24	22	30	25	27	40	28	**196**
22	20	16	18	14	17	34	21	**140**
23	10	23	13	16	18	22	10	**112**
Total	**801**	**714**	**716**	**815**	**866**	**763**	**622**	**5,297**

The Big Thompson Canyon Volunteer Fire Department (BTCVFD) provides coverage to a rugged and mountainous area centered on US Highway 34 in the Big Thompson Canyon, which is the primary route of travel between Loveland and Estes Park. Due to the unique geography of the canyon area, all BTCVFD station coverage areas are viewed as one planning area of approximately 31 square miles. The staffed fire stations of LFRA provide automatic aid response into the canyon response area to supplement the volunteer staffing of the BTCVFD.

Fire Station #7

Prior to the Big Thompson flood that occurred in September 2013, Fire Station #7 sat in the small community of Cedar Cove, about midway between the top of the Narrows and County Road 43 in the Big Thompson Canyon. Unfortunately, the entire community was destroyed during the flood, including the fire station. LFRA is currently working on plans for a new Fire Station #7 in the Rural District between the mouth of the Big Thompson Canyon and the City of Loveland.

Figure 34: Former Fire Station #7

Fire Station #8

The Loveland Rural Fire Protection District built Fire Station #8 in 2005 to provide an operational base for the BTCVFD. The station is staffed by BTCVFD volunteers and houses Engine 8, Water Tender 8, and Rescue 8. The building contains a meeting room as well as accommodations to allow for overnight staffing.

Figure 35: Fire Station #8

Apparatus at Fire Station #8			
Designation	**Apparatus Type**	**Service #**	**Year**
Engine 8	First-due engine company	0157	1992
Water Tender 8	Cross-staffed water tender	0554	1996
Engine 68	Cross-staffed wildland engine	0448	2001
Utility 8	Cross-staffed rescue vehicle	0614	2007
Rescue 8	Cross-staffed rescue vehicle	0610	2001

Fire Station #9

The BTCVFD membership constructed a new Fire Station #9 in the Cedar Park community on top of Storm Mountain. The original station was built in 1979 and finally received electricity in 1987. The new station was placed in service in February 2016. The station is staffed by BTCVFD volunteers and members of the Storm Mountain Emergency Response Team (SMERT). It houses several wildland fire engines as well as a US Forest Service 6x6 fire engine.

Figure 36: Fire Station #9

Apparatus at Fire Station #9			
Designation	**Apparatus Type**	**Service #**	**Year**
Engine 49	Forest Service 6x6 fire engine	0553	1968
Engine 69	Type 6 wildland engine	0458	1983
Rescue 9	Jeep-based support vehicle	0457	1983

Year	Number of Calls	Percent Change
2012	99	N/A
2013	99	0%
2014	101	102.02%
2015	119	117.82%
2016	146	122.69%

Overview of Risk: The response area protected by the Big Thompson Canyon Volunteer Fire Department (BTCVFD) encompasses a large area that is mostly remote mountainous terrain. Two of the greatest risks are US Highway 34 between Loveland and Estes Park, and the Big Thompson River. Residential development is scattered throughout all areas, with limited small-scale mercantile occupancies along US Highway 34. The Big Thompson River has experienced two (2) significant flood events, including a flash flood that took place on the night of July 31, 1976 that killed 143 people and a multi-day flood event during early September 2013 that destroyed much of the roadway through the canyon and killed one person. A rebuilding project began in late 2016 that is anticipated to span at least five (5) years and will involve restricted vehicle access to US Highway 34 through the canyon.

Big Thompson Canyon Temporal Grid (2012-2016)								
Hour	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Total
00			3		1	1	1	6
01				1				1
02		1	1		1	1	1	5
03		2	1	2			3	8
04	1	1	1	1		3		7
05		1		1	1		3	6
06	1	1	1	1	3	1		8
07	2	4	3	4	2	2	3	20
08	4	2	4	3	2	2	5	22
09	3	2	2	4	1	2	3	17
10	7	2	1	2	1	7	3	23
11	4	3	4	2	2	3	2	20
12	4	5	4	5	3	5	6	32
13	4	4	6	4	2	6	3	29
14	1	7	5	3	2	4	8	30
15	5	4	1	4	4	5	5	28
16	2	1	3	5	2	8	4	25
17	2	6	5	3	2	3	6	27
18	3	2	4	6	4	8	2	29
19	2		2	7	5	2	5	23
20	2	9	3	1	4		2	21
21	1	4	2	1	3	2	1	14
22	1			1	3	2	2	9
23	1		1	2	1	2	1	8
Total	50	61	57	63	49	69	69	418

Chapter 3 – Community Risk Assessment

In order to better understand the risks present within the community, Loveland Fire Rescue Authority (LFRA) analyzed the frequency of occurrence for various calls for service. Historical call information helps the agency to better understand the probability of an incident occurring, which helps the agency to analyze staffing and deployment strategies.

Incident History

To paint an accurate picture of incident occurrence and to help LFRA improve understanding of incident trends, four (4) years of agency call volume was analyzed according to frequency of occurrence, station area, incident category type, and incident location. A basic analysis of call volume revealed that LFRA's overall call volume has increased by nearly 20% since 2011 (Figure 35 & Table 9).

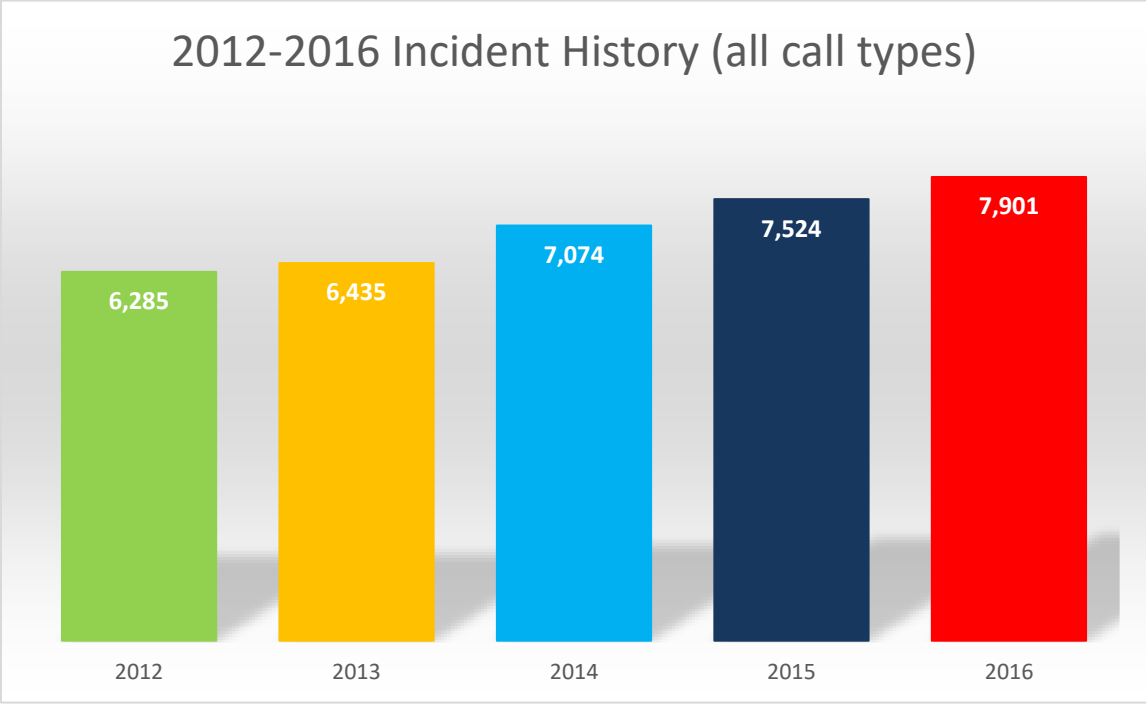


Figure 37: 2012-2016 Incident History

LFRA Incident Type History (all call types)						
2012-2016						
NFIRS Series	2012	2013	2014	2015	2016	% change (2012-2016)
100 - Fire	183	152	165	174	201	109.83%
200 - Explosion	7	11	2	16	8	N/A
300 - Rescue and EMS	3590	3797	4288	4649	4750	132.23%
400 - Hazardous Condition	488	323	314	317	342	70.08%
500 - Service Call	402	396	515	675	716	178.11%
600 - Good Intent	974	987	989	937	1118	114.78%
700 - False Alarm	634	746	713	715	758	119.56%
800 - Severe Weather	4	19	14	7	1	N/A
900 - Special Incident	2	5	10	11	8	N/A
	6284	6436	7010	7501	7901	125.73%

Table 9: LFRA Incident Type History (2012-2016)

During the same time period of time during which call history was analyzed, LFRA made several changes to help improve the agency's ability to respond to the ever-increasing call volume. A first-due engine company was moved from Fire Station #4 to Fire Station #6 to allow for improved ability to respond to incidents in the rapidly growing eastern portion of the response area. This move improved LFRA response to both the growing Highway 34 commercial corridor as well as to Interstate 25. Also, minimum staffing was increased from two (2) to three (3) paid personnel per apparatus in 2013 and a fifth first-due engine was staffed in 2014. Additionally, LFRA discontinued automatic response to EMS calls categorized as Alpha and/or Bravo medicals unless specifically requested by Thompson Valley EMS personnel. Finally, Fire Station #2 was re-located to improve response area coverage.

Seven (7) generalized incident categories were analyzed for frequency of occurrence for the calendar years 2012 through 2016. Similar to the analysis presented above, this analysis revealed that most incident types increased in frequency from 2012 to 2016, with the exception of the hazardous conditions incident type. The decrease in structure fire responses is actually slightly less than the national decrease in structure fires of 19.5% from 2002 through 2011, as reported by the United States Fire Administration

(USFA).[13] The decrease in airport calls was directly correlated to the loss of commercial air service in October 2012. The call type that showed the greatest increase during the observed time period was emergency medical service (EMS) calls (Figure 36).

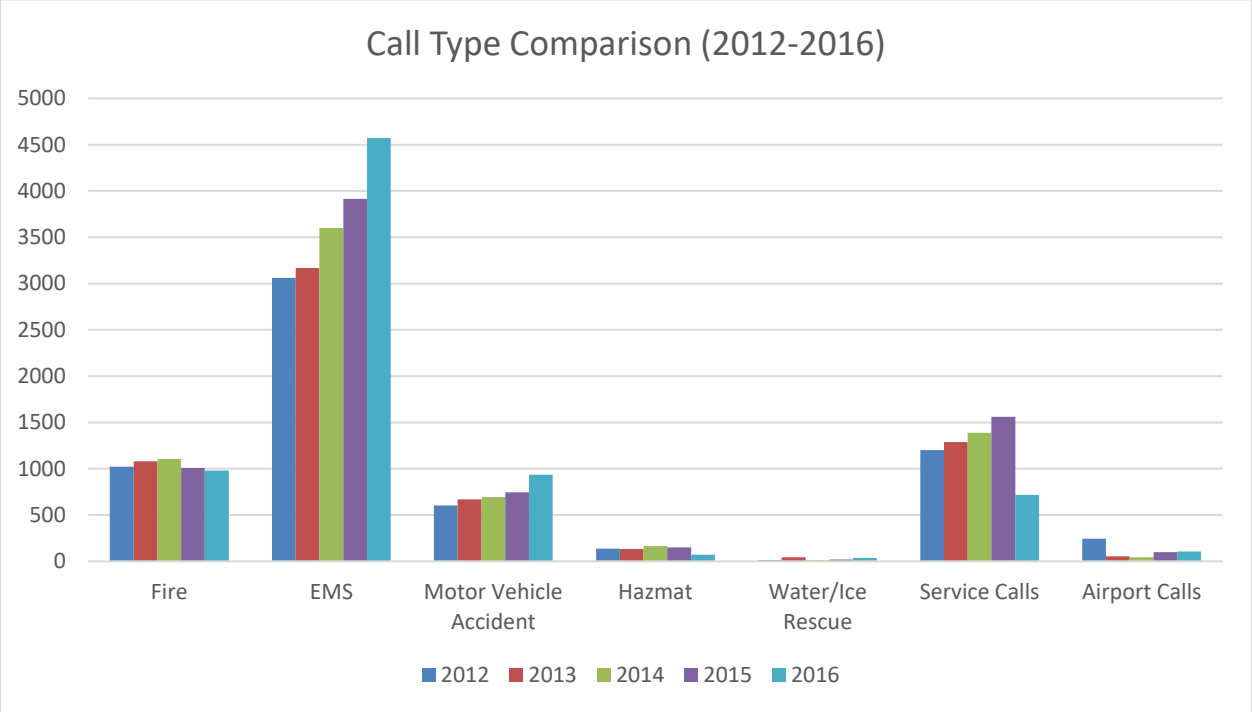


Figure 38: Call Type Comparison

[13] Trends in fires, deaths, injuries and dollar loss (www.usfa.fema.gov/data/statistics)

The analyses detailed above continued with a more thorough review of call volumes to help LFRA determine the most common times (month, day, and hour) for occurrence of calls. The following figures provide a visual representation of incident history by day of week, hour of call and month of call for the time period from January 1, 2012, through December 31, 2016.

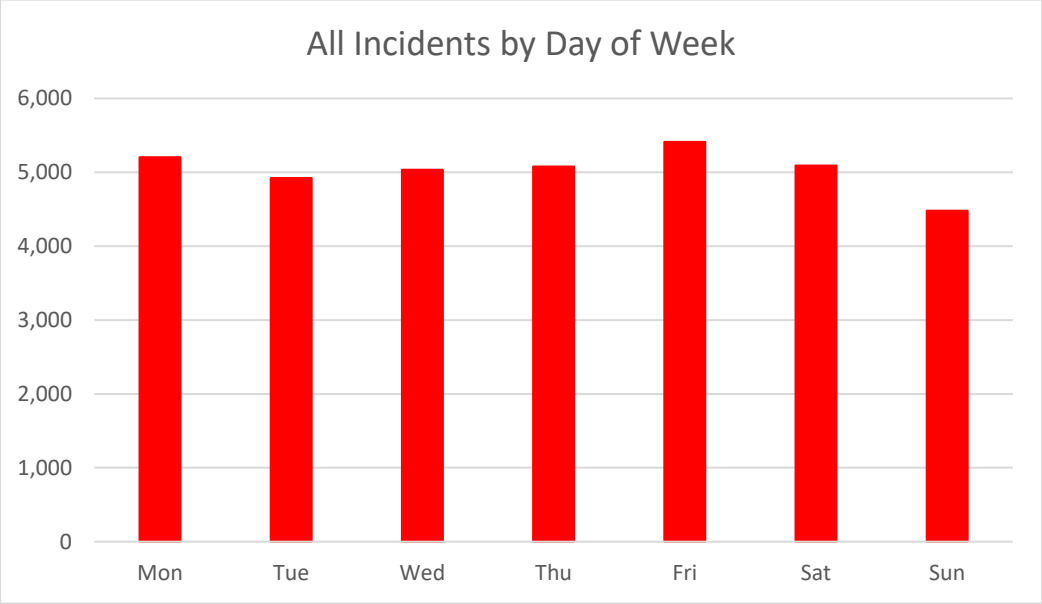


Figure 39: Unit Responses by Day of Week (2012-2016)

As indicated above, LFRA apparatus are busiest on Friday, followed closely by Monday. Sunday is the day with the fewest calls for service (Figure 37). To further improve understanding of when LFRA apparatus are called for service, incident records were analyzed for the time of day that the call was received. Records indicate that LFRA apparatus are busiest between the hours of 9:00am through 5:00pm, which correlates to the "typical" workday for most employees. The busiest time periods for calls are 11:00am to 12:00pm (2,450 calls), 12:00pm to 1:00pm (2,453 calls), and 5:00pm to 5:59 pm (2,567 calls). Conversely, the slowest time period for calls to occur was between 10:00pm and 7:00am (Figure 38).

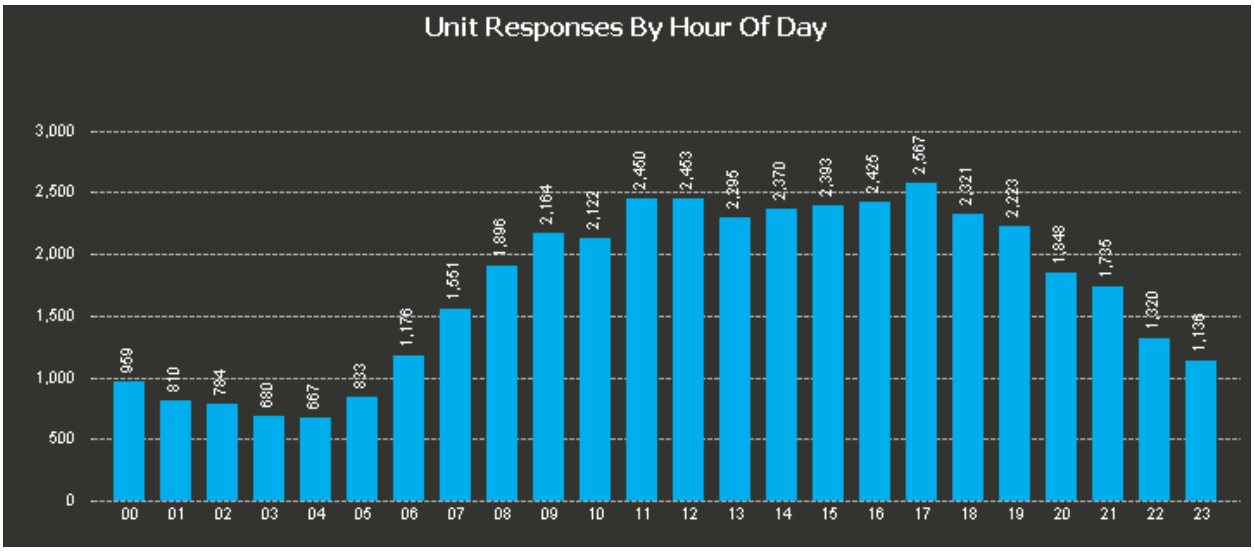


Figure 40: Unit Responses by Hour of Day (2012-2016)

The analysis of calls by month revealed that call volume decreases during the months of February and April, with very little statistical difference throughout the remainder of the year (Figure 39). Call volume by month ranged from a low of 2,581 calls in February to a high of 3,081 calls in June, with 3,080 calls in both July and December. In general, the slowest months are January through April, with call volume remaining steadily high for the remainder of the year.

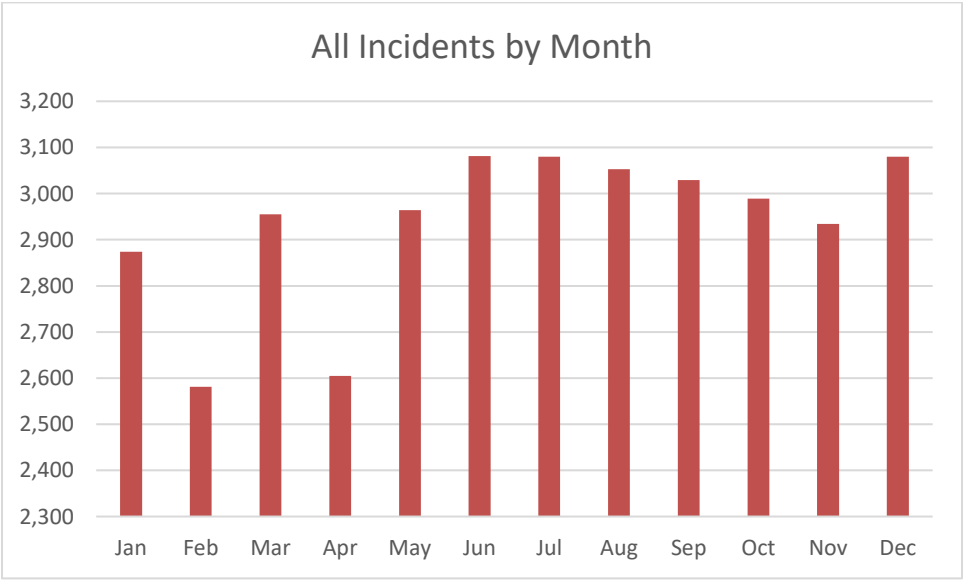


Figure 41: Unit Responses by Month (2012-2016)

Incident Types

Incident type was analyzed for the time period of January 1, 2012, through December 31, 2016, to determine the most frequently occurring call types throughout the agency's response area. Figure 40 displays incident types according to three (3) general categories – Fire, Non-Fire and EMS. As shown in this figure, 59% of LFRA's call volume is comprised of EMS incidents while fire-related incidents account for less than 3% of the agency's call volume. Figure 41 displays a more detailed breakdown of non-fire incidents, viewing all incidents according to each of the nine (9) primary classifications used in the National Fire Incident Reporting System (NFIRS). Table 10 displays the data upon which both of these figures are based.

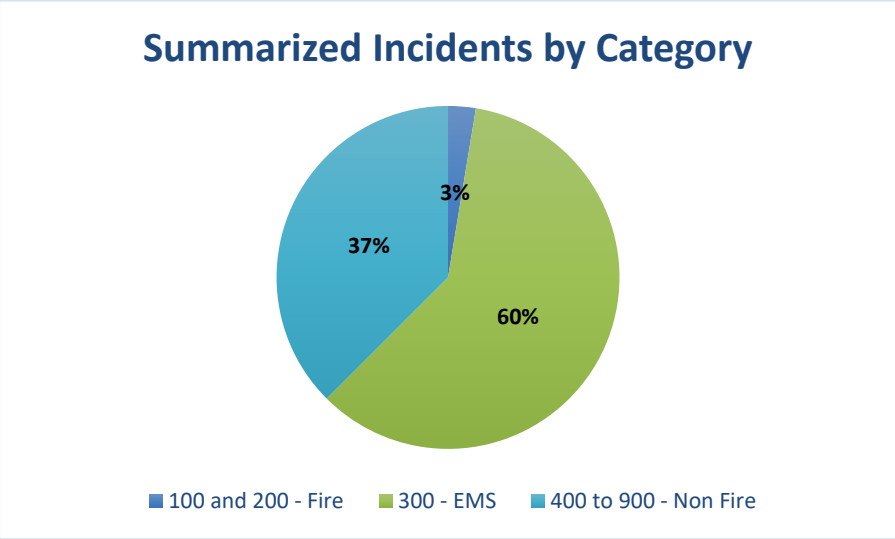


Figure 43: Summarized Incident Categories (2012-2016)

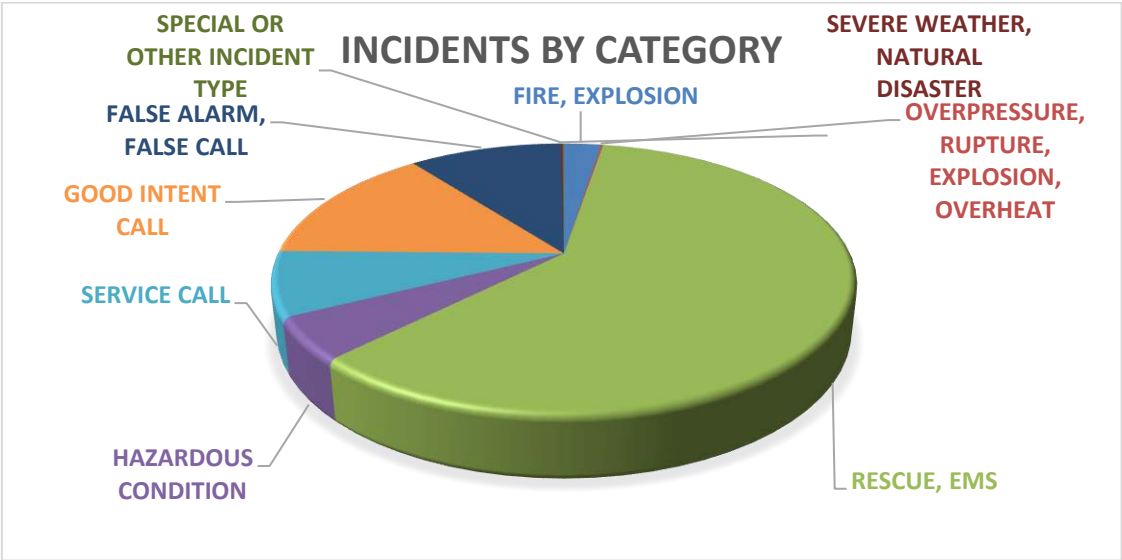


Figure 42: Detailed Incidents by Type (2012-2016)

Incident Category	Incidents	% of total
FIRE, EXPLOSION	875	2.48%
OVERPRESSURE, RUPTURE, EXPLOSION, OVERHEAT	44	0.12%
Fire-Related Incident Subtotal	**919**	**2.60%**
RESCUE, EMS	**21,098**	**59.89%**
HAZARDOUS CONDITION	1,791	5.08%
SERVICE CALL	2,716	7.71%
GOOD INTENT CALL	5,034	14.29%
FALSE ALARM, FALSE CALL	3,587	10.18%
SEVERE WEATHER, NATURAL DISASTER	45	0.13%
SPECIAL OR OTHER INCIDENT TYPE	35	0.10%
Non-Fire Related Incident Subtotal	**13,208**	**37.51%**

Table 10: Incidents by Category (2012-2016)

Not only do citizens expect their local government to be aware of hazards and risks that may occur from natural and/or man-made occurrences within their jurisdiction, but also, those citizens expect the government to respond to and mitigate the circumstances that result from those occurrences. Loveland Fire Rescue Authority (LFRA) works with a variety of regional partners to understand the hazards and risks present in the LFRA response area and establishes plans and procedures to prepare agency personnel to develop and implement effective solutions to a wide variety of circumstances. The first section of this chapter addresses regional hazards, such as those created by weather or transportation systems. As a cooperator in the development of the Northern Colorado Hazard Mitigation Plan, LFRA has been able to assess various hazards that are representative of the entire jurisdiction. Understanding the risks associated with these hazards has allowed the agency to understand the consequences of such hazards and to develop general response programs to allow for effective response and mitigation.

Following the section on regional hazards, this chapter includes an examination of risks specific to response-based categories. These include fire suppression, emergency medical services (EMS), technical rescue, hazardous materials, and wildland fire. These risks have been analyzed within the context of planning zones to allow LFRA to better define location and frequency characteristics associated with each risk. This analysis allows the agency to correlate risks with resource allocation (distribution and concentration) throughout the response area. LFRA has worked diligently since 2010 to quantify the risks

present within the LFRA response area and to align resources with those risks. It is through the proper alignment of resources with risk that the agency has developed response plans that allow for effective emergency scene management while providing for improved citizen and firefighter safety.

Risk Level Classifications

In general, the fire service recognizes that there are three (3) incident priorities that should be applied to all incidents and employee actions.

Life Safety: Provide for citizen and firefighter safety

Incident Stabilization: Mitigate the incident circumstances

Property Conservation: Reduce property loss due to the incident

The public expects fire service professionals to evaluate and understand the risks inherent with hazard zone activities. Historically, most fire service agencies have attempted to categorize risk levels as High, Medium and Low.

High Risk: We may risk our lives a lot, within a structured plan, to save savable lives and property.

Moderate Risk: We may risk our lives a little, within a structure plan, to save savable property.

Low Risk: We will not risk our lives at all to save lives or property that is already lost.

In 2015, LFRA determined that the categorization of risk as high/medium/low was unclear and oftentimes left the firefighter wondering if their actions truly correlated with the stated risk level. To help clarify risk and the corresponding actions that should be expected, LFRA established an improved risk profile system. This risk profile is used by the incident commander to evaluate risk versus gain prior to assigning personnel to a hazard zone. Any time that an established incident benchmark is reached, the risk profile is re-evaluated by all personnel operating on the incident scene and the appropriate risk profile is broadcast by the incident commander over the fireground tactical radio channel. All personnel actions taken on

scene are expected to align with the risk profile established for that phase of the incident response. LFRA personnel are expected to apply the risk profile and incident priorities to all incidents when developing an incident action plan.

Life Risk: Incident circumstances indicate that civilian and/or firefighter lives may be saved by aggressive action applied within a structured plan.

Property Risk: Incident circumstances indicate that no civilian and/or firefighter lives should be risked because of a non-survivable hazard zone.

Risks by Response Category

In 2016, Loveland Fire Rescue Authority (LFRA) responded to 7,901 calls for service. LFRA analyzes the different types of calls to which the agency responds in order to build and improve understanding of the community's exposure to the risks associated with each incident category. Figure 42 provides a visual summary of the incidents that occurred in 2016, differentiated by NFIRS category.

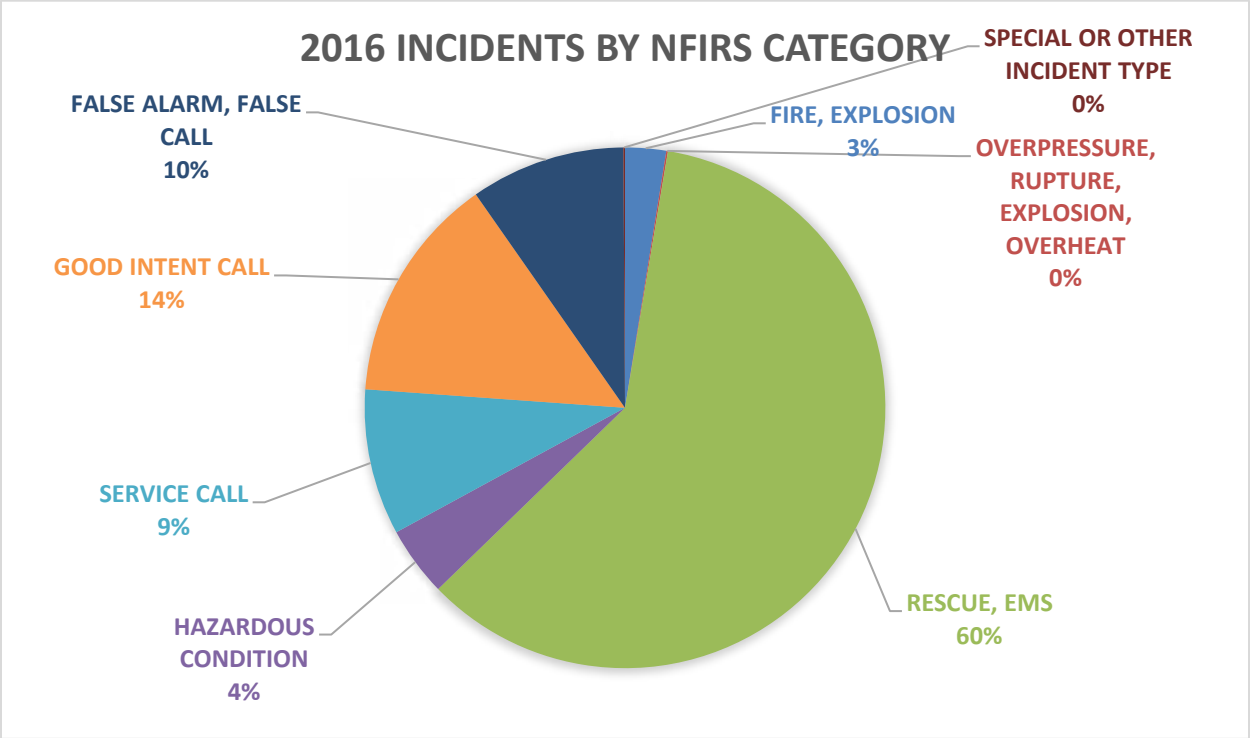


Figure 44: 2016 Incidents by NFIRS Category

Fire-Related Risk

As stated in the LFRA Strategic Plan, the primary purpose of local government is to provide for citizen safety (page 7). Public fire protection is the function of local government that is provided solely by Loveland Fire Rescue Authority. Fire-related risks within LFRA's response area include structure fires, vehicle fires, wildland fires, and other types of fire. The agency examined past history of fire-related incidents and evaluated both the probability of an incident occurring as well as the risks presented to both firefighters and the public from these incidents (Table 11).

	RISK/CONSEQUENCE TO FIREFIGHTERS AND PUBLIC **Low → Moderate → High**		
PROBABILITY OF OCCURRENCE **High → Low**	Vehicles Dumpsters/Trash Containers Grass/Wildland Fires within City Limits	One- and Two-Family Homes Grass/Wildland Fires in Eastern Areas	Grass/Wildland Fires in the Western Area Grass/Wildland Fires on Highways
	Out-Buildings Other Types of Fires	Sprinkled Commercial and/or High-Rise Buildings Sprinkled Multi-Family Buildings	Non-Sprinkled Commercial and/or High-Rise Buildings Non-Sprinkled Multi-Family Buildings

Table 11: Fire-Related Risk Probability vs. Consequence Comparison

An assumption that could be inferred from the previous table is that the number of personnel and apparatus assigned to a given incident should be partially dictated by the potential risk/consequence to either firefighters or the public. Based on this assumption, LFRA's apparatus response plans are based on the anticipate risk from the incident. The agency's structure fire response plan for certain "high risk" buildings (e.g., non-sprinkled

commercial, high-rise and/or multi-family) is being evaluated for the possible inclusion of additional resources.

Structure Fire Risk

One of the primary missions for Loveland Fire Rescue Authority (LFRA) is response to and suppression of structure fires. This call type accounts for roughly three percent of the agency's overall call volume (Figures 40-42). The 2012 Strategic Plan indicates that the agency's first alarm assignment of three (3) engines companies, two (2) truck companies and a Battalion Chief can be expected to extinguish a fire in a building or fire-separated area of up to 5,000 square feet (page 26). LFRA adheres to the general description of "moderate risk" that is explained in the Commission on Fire Accreditation International (CFAI) Fire & Emergency Service Self-Assessment Manual (FESSAM), whereby this type of structure contains "…areas of average size, where the risk of life loss or damage to property…is usually limited to the occupants…" (page 52). The most common example of a moderate risk structure fire is a one- or two-family residential home.

	Structure Fires by Station Planning Area					
Station Area	**2012**	**2013**	**2014**	**2015**	**2016**	**Total**
1	11	22	21	19	18	**91**
2	5	8	9	19	11	**52**
3	9	7	11	7	11	**45**
5	14	9	13	12	14	**62**
6	5	7	4	9	5	**30**
Canyon	0	1	2	6	9	**18**

Table 12: Structure Fires by Station Planning Area

LFRA is currently working to establish an objective means for evaluating structure fire risk in commercial buildings. Emergency Technologies, Inc (ETI), the agency's records management system, does not have a built-in means for scoring and/or categorizing fire-related risk associated with a building or occupancy. The agency is currently working with ETI in an effort to develop processes within their system that would allow for using pre-fire planning information to develop a calculated risk score for a building.

Structure Fire Maximum/Greatest Risk by Station Planning Area

Early in 2015, the LFRA officer corps participated in a subjective survey of the various risks within their fire station planning area. The following list displays the

structure in each fire station planning area that represents the greatest life safety risk if that building were to become involved in fire. All occupancies were selected based on a combination of factors, including input from all of LFRA's fire officers:

1. Information contained within the agency's records management system was analyzed to determine the historical occurrence of structure fires by address.
2. A survey of the agency's officers to capture institutional knowledge and address firefighting tactics unique to the structure.
3. Presence/absence of fixed fire suppression systems.
4. Current use and occupant load of the structure.

Planning Area	Occupancy Name	Occupancy Address
Fire Station 1	Big Thompson Manor #1	224 N. Monroe Ave.
Fire Station 2	Heritage Apartments	2897 Greenland Dr.
Fire Station 3	Sarah Milner Elementary School	743 Jocelyn Dr.
Fire Station 5	Creekside Apartments	105 E. 37th St.
Fire Station 6	Best Western Plus Crossroads Inn	5542 E. Highway 34
Big Thompson Canyon	Sylvan Dale Guest Ranch	2939 N. County Road 31D

Table 13: Highest Structure Fire Risk by Fire Station Planning Zone

Vehicle Fire Risk

The category of vehicle fires includes any mobile conveyance that is primarily intended to carry persons and/or cargo. This includes automobiles, recreational vehicles, semi-trucks, aircraft and boats. Vehicle fires occur with the same general frequency as structure fires, but generally pose less risk to firefighters and the public than a structure fire. Generally, fires involving passenger vehicles can be effectively handled by a single fire engine. However, if a large vehicle (e.g., bus, semi-tractor trailer, RV, etc.) is on fire, or if a vehicle fire is threatening a nearby structure, it generates a response plan that is the same as a structure fire.

Vehicle Fires by Station Planning Area						
Station Area	**2012**	**2013**	**2014**	**2015**	**2016**	**Total**
1	7	7	7	4	9	**34**
2	3	2	4	8	2	**19**
3	5	5	7	2	4	**23**
5	5	6	3	4	7	**25**
6	11	5	4	6	14	**40**
Canyon	0	1	1	0	0	**2**

Table 14: Vehicle Fires by Station Planning Area

Wildland Fire Risk

Wildland fires occur during all months of the year; however, they tend to occur more frequently during the summer months when temperatures are higher. These fires burn homes, damage infrastructure and natural resources, kill and injure firefighters and the public, and impact wildlife and local economies as well as the global environment.[14] The number and severity of these fires increases due to population increases in the wildland-urban interface area. As the urban population increases and City limits expand, the incidents should be expected to increase in frequency, too. Risks commonly associated with wildland fires include physical injury to the public and emergency responders, hazardous material release into the atmosphere, reduction in water quality in water shed and "run off" areas, and firefighting aircraft accidents. In the past two decades, several hundred wildfires have burned throughout Larimer County, with an annual average of more than 2,200 acres burned. The most significant wildland fire in the region's history was the High Park Fire, which started in the foothills west of Fort Collins during the summer of 2012.

Grass/Wildland Fires by Station Planning Area						
Station Area	**2012**	**2013**	**2014**	**2015**	**2016**	**Total**
1	12	6	5	12	12	**47**
2	4	4	4	5	13	**30**
3	19	10	5	15	20	**69**
5	9	2	10	1	6	**28**
6	11	16	16	21	18	**82**
Canyon	8	3	3	20	20	**54**

Table 15: Grass/Wildland Fires by Station Planning Area

[14] Grand Challenges for Disaster Reduction – Wildland Fire, National Science and Technology Council's Subcommittee on Disaster Reduction.

LFRA views grass and wildland fires from four (4) different perspectives based on the different risks posed to firefighters and the public from each. The western foothills and mountains present the most rugged terrain with a large portion of federal forests. These fires present the greatest risk in terms of wildland-urban interface fires. The eastern plains/grasslands pose a very different risk from the mountainous region because of the different fuel types that are predominant in each area. In between these two areas are wildland fuels within the urban portions of the response area. Within this risk category, wildland fires adjacent to major highways (e.g., Interstate 25, Highway 34, and Highway 287) present tremendous risk to firefighters because of the volume and speed of highway traffic. Fire behavior differs based on the fuels, weather and topography. The initial arriving fire officer performs an initial assessment of the incident that addresses fuels involved and topography influences, as well as weather influences on current and anticipated fire behavior. Additionally, LFRA personnel monitor fire weather forecasts daily from two (2) different forecast zones, as published by the National Oceanic and Atmospheric Agency (NOAA) website.[15] Fire weather zone 238 is in the eastern plains and zone 215 occupies the western portion of the response area.

A significant wildland fire in the LFRA response area could impact schools, fire stations, government installations, research facilities, watershed areas, and water supplies. The fire stations that could be impacted the most by a wildland fire include those located in the Big Thompson Canyon (Fire Stations 8 and 9). Fires in the wildland-urban interface areas could result in significant property loss to a variety of structures and the temporary loss of certain utilities and infrastructure. Abnormally dry seasons increase the severity of wildland fires as does the current growth trend in these areas. Smaller grass and brush fires could have a minimal impact on Loveland's critical facilities.

LFRA works actively with all adjacent wildland firefighting partners (e.g., Poudre Fire Authority, Larimer County Emergency Services, Berthoud Fire Department, Estes Valley Fire Protection District, etc.) to ensure that all agencies operate from the same

[15] www.crh.noaa.gov/bou/?n=firewx (zones 215 and 238)

perspective in terms of training and equipment. LFRA also works closely with wildland fire professionals from the Colorado Division of Fire Prevention and Control and the United States Forest Service to maintain a state of readiness at all times. LFRA personnel have been working for several years to complete Red Zone assessments of homes and neighborhoods in the wildland-urban interface. The information from these Red Zone assessments is entered into a centralized database that calculates a numerical risk score for each property and could be used by LFRA personnel to help prioritize structure protection activities in the event of a wildland fire.

Other Types of Fire-Related Incidents

In addition to structure, vehicle and wildland fire incidents, LFRA responds to other types of fire-related calls for service, including trash/dumpster fires and gas leaks. If any call information indicates that a fire is threatening a structure, it is dispatched as a structure fire assignment. Typically, most of these other incident types can be mitigated by the first-due engine company, staffed with three (3) personnel; however, LFRA has established response plans that include multiple apparatus based on anticipated need. Additional resources are available at the request of the first arriving incident commander.

Emergency Medical Services (EMS) Risks

LFRA provides basic life support (BLS) emergency medical service. In recognizing the importance of providing a skilled response to all calls for service, all Operations Division personnel maintain certification as Emergency Medical Technician–Basic (EMT-B). Thompson Valley EMS (TVEMS) provides all advanced life support (ALS) and ambulance transport throughout the LFRA response area. TVEMS ambulances are staffed with at least one EMT-Paramedic and one EMT-B. EMS calls account for approximately 60% of the agency's annual call volume (Table 9).

EMS Risk Level Classification

Demographic factors that influence EMS service demand include areas with increased population density, percent of population that is over 65 years of age, and a generally increasing population from a growing community. The Loveland Emergency Communications Center (LECC) is the dispatch center for both LFRA and TVEMS. LECC uses an emergency

medical dispatching (EMD) system that allows the dispatchers to obtain information to categorize calls for service according to the level of severity. The intent of the emergency medical dispatch system is to assign resources based on anticipated severity of the incident. The following table provides a summary of the different emergency medical dispatch priorities and the corresponding apparatus response plans (Table 16).

CALL PRIORITY	DESCRIPTION	LFRA	TVEMS
Alpha or Omega	Non-life threatening Non-emergency	1 engine, only if requested	1 ambulance No lights & siren
Bravo	Non-life threatening Emergency	1 engine, only if requested	1 ambulance Lights & siren
Charlie or Delta	Life threatening emergency	1 engine Lights & siren	1 ambulance *Shift supervisor Lights & siren
Echo	Critical emergency	1 engine *Battalion Chief Lights & siren	1 ambulance Shift supervisor Lights & siren
Mass Casualty	Life threatening emergency Multiple patients	2 engines 2 trucks Battalion Chief Lights & siren	2 ambulances Shift supervisor Training Captain Lights & siren
** Indicates that the position has discretion to respond, if deemed necessary*			

Table 16: EMD Priorities and Response Plans

An incident classified as an Echo medical is deemed to be the greatest severity, with reports that the patient is not breathing and/or has no pulse. The following figure reflects the number of Echo medical incidents to which LFRA apparatus responded between January 1, 2012, and December 31, 2016 (Figure 42). One of the primary goals of LFRA's EMS program is to improve survivability from sudden cardiac arrest, which is a leading cause of death in the United States, killing more than 325,000 people each year.[16] The Sudden Cardiac Arrest Association reports that more than 90% of sudden cardiac arrest victims die due to lack of immediate cardiopulmonary resuscitation and use of an automated external defibrillator

[16] Sudden Cardiac Arrest Association (www.suddencardiacarrest.org)

(AED). The American Heart Association recommends that all emergency vehicles that respond to possible cardiac-related emergencies be equipped with a defibrillator.[17] To meet the need for defibrillation, LFRA equips all first-due apparatus (engines and trucks) with AEDs in an effort to maximize survival rates for citizens who experience out-of-hospital cardiac arrest.

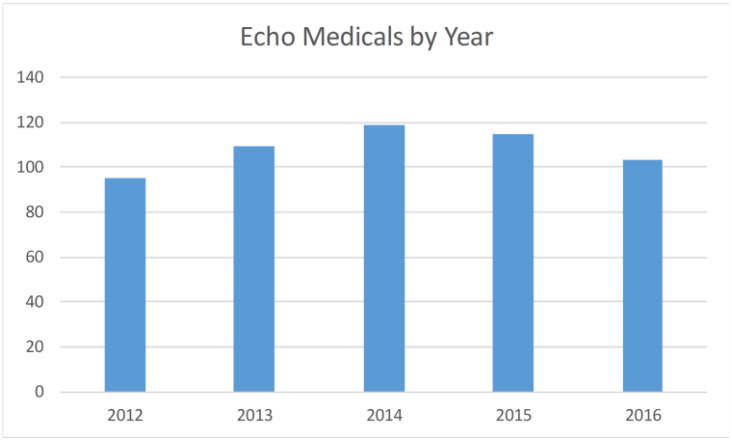


Figure 45: Echo Medical Incidents (2012-2016)

Mass Casualty Incidents

A mass casualty incident (MCI), as defined in the Northern Colorado Mass Casualty Emergency Operations Plan, is a multi-casualty incident with the capability of overwhelming the initial responding resources. An MCI can be viewed in terms of the complexity of the incident, as displayed below (Table 17).[18]

MCI Level	# of Casualties	MCI Description
MCI – 0	2 – 5 (at least 1 critical)	Mini MCI
MCI – I	6 – 15	Expanded Medical Emergency
MCI – II	16 – 50	Major Medical Emergency
MCI – III	51 or more	Medical Disaster

Table 17: Mass Casualty Incident Categories

MCI's can result from a wide variety of causes; however, three of the most common causes are motor vehicle accidents, active assailant incidents, and infectious disease outbreaks.

- Motor Vehicle Accidents: Typically, motor vehicle accidents tend to involve one to two vehicles; however, it is not uncommon for these incidents to involve a greater number of vehicles or to involve high-occupancy vehicles. The risk posed by motor vehicle accidents to both the public and firefighters increases based on

[17] American Heart Association (www.heart.org – defibrillation)
[18] Northern Colorado Mass Casualty Emergency Operations Plan, version 5.0, Oct 13, 2016. Page 9.

the speed of motor vehicle, such as those accidents that occur on Interstate 25, US Highway 34 and US Highway 287. During 2016, LFRA personnel responded to 937 motor vehicle accidents, as compared to only 604 in 2012.

- Active Assailant Incidents: An active assailant incident is one in which one or more persons uses some type of weapon to inflict harm upon other persons. The type of active assailant incident that tends to get the greatest amount of media attention is the incident that occurs on a school campus, but these incidents can occur at any location. Sadly, this type of incident appears to be increasing throughout the United States. During 2015, LFRA entered into an inter-governmental agreement with TVEMS and the Loveland Police Department to establish standard operating guidelines for response to active assailant incidents. All three agencies participated in full-scale exercises to test the effectiveness of the guidelines during both 2015 and 2016.
- Infectious Disease Outbreak: Ebola, H1N1, West Nile and other infectious disease outbreaks have the capability for effecting a large portion of the population. Fortunately, the frequency of outbreaks is relatively low and the scope tends to remain correspondingly small. The LFRA Office of Emergency Management works closely with neighboring jurisdictions, as well as the State of Colorado, to monitor possible outbreaks and to plan for a coordinated mitigation of any outbreaks that do occur.

EMS Risk Level Summary

EMS calls are LFRA's most common type of call for service, and the call volume can reasonably be expected to continue increasing as population increases. Factors such as population density, age of the population, and transportation networks have a direct influence on the frequency and potential severity of an EMS incident. In assessing EMS risk, the agency viewed EMS incidents in terms of frequency of occurrence (probability) versus the potential for injury/loss (severity). Specific types of medical emergencies were not evaluated because the emergency medical dispatch procedures allow for classification of incident by severity.

	Potential for Injury / Loss Low → High	
PROBABILITY OF OCCURRENCE High ↑ Low	Alpha Medical Bravo Medical	Charlie/Delta Medical
	Lift Assist / Omega Medical	Echo Medical Mass Casualty Incident Active Assailant Incident

Non-Fire, Non-EMS Risks

The category of non-fire, non-EMS risks is very broad and includes all other incident types to which LFRA responds. Incidents within this category include technical rescue, hazardous materials, aviation rescue and firefighting, and domestic preparedness. This category includes approximately 39% of LFRA's annual call volume.

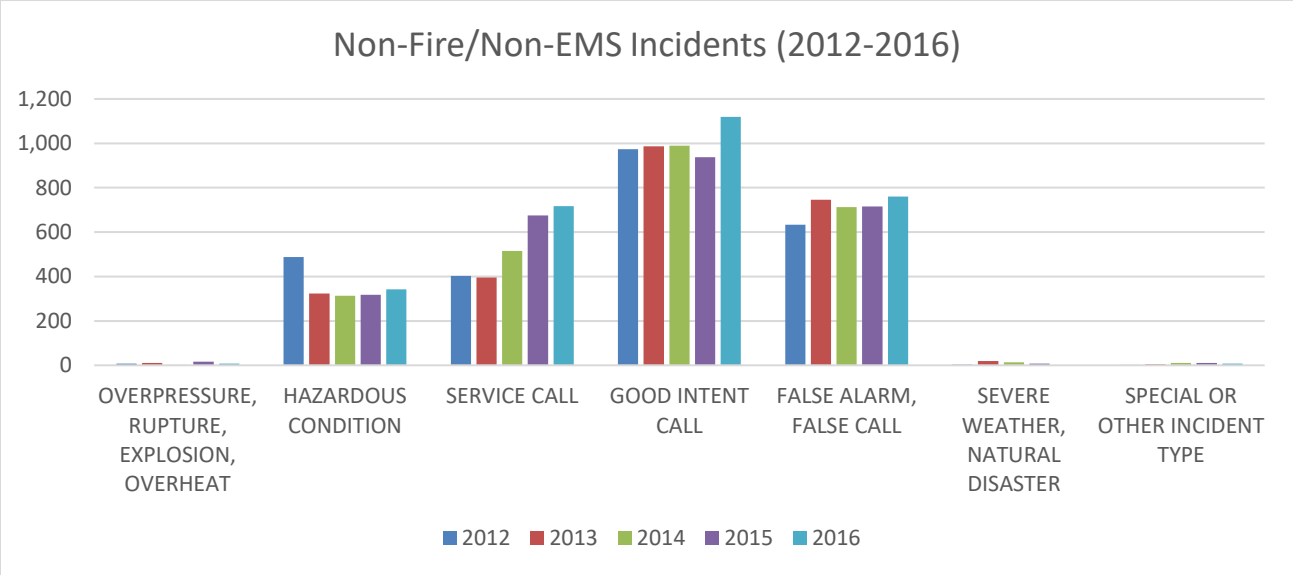


Figure 46: Non-Fire/Non-EMS Incidents (2012-2016)

INCIDENT CATEGORY	2012	2013	2014	2015	2016
Over-pressure, Rupture, Explosion, Overheat	7	11	2	16	8
Hazardous Condition	488	323	314	317	342
Service Call	402	396	515	675	717
Good Intent Call	974	986	989	937	1119
False Alarm, False Call	634	746	713	715	760
Severe Weather, Natural Disaster	4	19	14	7	0
Special or Other Incident Type	2	5	10	11	8
REPORT TOTALS	**2,511**	**2,486**	**2,557**	**2,678**	**2,954**

Data Table Supporting Figure 46

Technical Rescue Risks

The area of technical rescue encompasses several disciplines, including vehicle extrication, water/ice rescue, structural collapse/USAR, trench rescue, rope rescue, and large animal rescue. Vehicle extrication is a skill that is maintained by all members of the Operations Division. The Special Operations Team (SOT) consists of 44 members who are trained in Operations-level, Technician-level and Specialist-level within the various disciplines of technical rescue. SOT members include not only LFRA employees, but also members from Thompson Valley EMS, Berthoud Fire Protection District, and Windsor-Severance Fire Rescue. LFRA has 26 personnel currently participating in SOT.

The Special Operations Team (SOT) was created in 2005 by merging together three specialized teams (Dive Team, Hazardous Materials Team (HazMat), and Rope Team) under a unified leadership structure. The consolidation of these individual teams was implemented to take advantage of the cross-training that already existed between the different specialties. The SOT consists of three primary areas: Hazardous Materials Response, Urban Search & Rescue (USAR), and Water Rescue. Within these areas are the rescue specialties of: HazMat Technician, HazMat Specialist (Highway, Railcar, or Radiological), Collapse Rescue, Confined Space Rescue, Rope Rescue, Trench Rescue, Large Animal Rescue, Dive Rescue, and Swiftwater Rescue. Every SOT member is encouraged to possess at least one Technician level certification and is expected to become Operations level proficient in all other disciplines. The LFRA Standards of Cover is intended to describe and define the operations level for all technical rescue disciplines.

LFRA SOT hosts Rescue School, which is a full team, five-day, training that is coordinated every other year (on the even years) and provides SOT members a variety of

scenario-based sessions to hone their craft. During the odd years, monthly and quarterly trainings have been coordinated to provide opportunities to maintain proficiency in skill sets at an appropriate level for all SOT disciplines.

INCIDENT TYPE	2012	2013	2014	2015	2016
Search for Person on Land	0	5	0	3	0
Water/Ice Search and Rescue	10	12	9	14	10
Swift Water Rescue	1	16	1	2	1
Vehicle Extrication	17	11	10	13	19
Extrication from Machinery	0	3	2	3	0
Elevator Rescue	4	3	8	5	12
Trench/Below-Grade Rescue	1	0	2	0	1
Confined Space Rescue	0	1	2	0	0
Structural Collapse	0	1	2	3	0
High-Angle Rescue	2	4	1	0	0
Other Types of Technical Rescue Standby	2	0	6	4	4
Animal Rescue	5	7	4	10	9
ANNUAL TOTALS	**42**	**63**	**47**	**57**	**56**

Table 18: Technical Rescue Incidents (2012-2016)

Vehicle Extrication

Vehicle extrication can be defined as the systematic process of removing a vehicle from around a person, when that vehicle has been involved in a motor vehicle accident and doors and windows are not able to function as designed. With the high vehicle speeds on Interstate 25 and US Highways 34 and 287, the potential need for vehicle extrication exists with every motor vehicle accident to which LFRA responds (Table 19). As a direct result of the high frequency of motor vehicle accidents, all members of the Operations Division are trained to perform vehicle extrication.

	2012	2013	2014	2015	2016
Station 1	114	125	130	175	159
Station 2	44	59	52	107	133
Station 3	57	59	88	55	68
Station 5	105	95	107	120	150
Station 6	155	201	254	277	425
Canyon	32	27	20	33	29
Total	**507**	**566**	**651**	**767**	**964**
LPD Total	**1951**	**2122**	**2280**	**2391**	**2526**

Table 19: MVA History (2012-2016)

Colorado State Patrol (CSP) responds to approximately 30% of the motor vehicles on Colorado roadways. Accident statistics from CSP (Table 20)[19] indicate that the frequency of accidents is on a steadily increasing trend. Loveland Police Department (LPD) is the law enforcement agency with primary responsibility for responding to an investigating motor vehicle accidents within Loveland city limits. Incident statistics from LPD (Table 19) reflect that LFRA responds to approximately 30% of the motor vehicles accidents that are investigated by LPD officers. Based on historical trends, it is anticipated that motor vehicle accidents, including those that require extrication, will continue to increase annually.

CY 2011 - CY 2014 Fatal and Injury Crashes (investigated by CSP Troopers) Primary Causal Factors									
CY 2014 Rank	Cause of Crash	CY 2011		CY 2012		CY 2013		CY 2014	
		Number of Crashes	Percent of Total	Number of Crashes	Percent of Total	Number of Crashes	Percent of Total	Number of Crashes	Percent of Total
1	Inattentive to Driving	683	20.0%	755	21.1%	710	19.8%	732	19.7%
2	Exceeding Safe/Legal Speed	667	19.5%	634	17.7%	708	19.7%	638	17.2%
3	DUI/DUID Caused	546	16.0%	506	14.1%	480	13.4%	513	13.8%
4	Lane Violation	372	10.9%	420	11.7%	392	10.9%	474	12.8%
5	Failed to Yield Right of Way	196	5.7%	227	6.3%	227	6.3%	246	6.6%
	All others	957	28.0%	1,039	29.0%	1,074	29.9%	1,109	29.9%
Total Fatal and Injury Crashes		3,421	100.0%	3,581	100.0%	3,591	100.0%	3,712	100.0%

Table 20: Colorado State Patrol Accident Causes (2011-2014)

Water/Ice Rescue

Water and ice-related rescue incidents occur throughout all portions of the LFRA response area. As of 2014, the LFRA SOT membership includes 10 public safety divers and 15 swiftwater rescue technicians. These members are evenly distributed across the three operational shifts. All members of the Operations Division are trained and certified to perform surface ice rescue. Water and ice rescue incidents can occur in bodies of water (e.g., lakes and ponds), containers of water (e.g., swimming pools), and moving water (e.g., streams, canals and rivers). The Centers for Disease Control (CDC) reports that drowning is a leading cause of unintentional death worldwide, with the highest rates among children.[20]

[19] Colorado State Patrol: Crash Trends – www.colorado.gov/pacific/csp/crash-trends
[20] Drowning – United States, 2005-2009. Centers for Disease Control. May 18, 2012. www.cdc.gov

Incident Category	Incident Type	All Incidents	First-In Units Only	Unit Responses
FIRE	134 - WATER VEHICLE FIRE	1	1	6
	Total	**1**	**1**	**6**
RESCUE, EMS	300 - RESCUE, EMS INCIDENT, OTHER	1	1	6
	311 - MEDICAL ASSIST, ASSIST EMS CREW	2	2	7
	321 - EMS CALL, EXCLUDING VEHICLE ACCIDENT WITH INJURY	8	8	27
	322 - MOTOR VEHICLE ACCIDENT WITH INJURIES	8	8	49
	324 - MOTOR VEHICLE ACCIDENT WITH NO INJURIES.	6	6	36
	340 - SEARCH FOR LOST PERSON, OTHER	1	1	5
	342 - SEARCH FOR PERSON IN WATER	3	3	18
	350 – EXTRICATION, RESCUE, OTHER	2	2	12
	356 - HIGH-ANGLE RESCUE	1	1	3
	360 - WATER & ICE-RELATED RESCUE, OTHER	22	22	146
	361 - SWIMMING/RECREATIONAL WATER AREAS RESCUE	11	11	76
	362 - ICE RESCUE	1	1	7
	363 - SWIFT WATER RESCUE	14	14	77
	365 - WATERCRAFT RESCUE	13	13	79
	381 - RESCUE OR EMS STANDBY	1	1	7
	Total	**94**	**94**	**555**
HAZARDOUS CONDITION	463 - VEHICLE ACCIDENT, GENERAL CLEANUP	3	3	20
	Total	**3**	**3**	**20**
SERVICE CALL	500 - SERVICE CALL, OTHER	1	1	1
	510 - PERSON IN DISTRESS, OTHER	1	1	7
	520 - WATER PROBLEM, OTHER	1	1	5
	540 - ANIMAL PROBLEM, OTHER	1	1	7
	541 - ANIMAL PROBLEM	1	1	6
	542 - ANIMAL RESCUE	1	1	5
	551 - ASSIST POLICE OR OTHER GOVERNMENTAL AGENCY	7	7	39
	553 - PUBLIC SERVICE	2	2	8
	Total	**15**	**15**	**78**
GOOD INTENT CALL	600 - GOOD INTENT CALL, OTHER	4	4	24
	611 - DISPATCHED & CANCELED EN ROUTE	43	3	228
	622 - NO INCIDENT FOUND ON ARRIVAL AT DISPATCH ADDRESS	10	9	65
	Total	**57**	**16**	**317**
FALSE ALARM, FALSE CALL	700 - FALSE ALARM OR FALSE CALL, OTHER	2	2	13
	Total	**2**	**2**	**13**
SPECIAL OR OTHER INCIDENT TYPE	900 - SPECIAL TYPE OF INCIDENT, OTHER	1	1	1
	Total	**1**	**1**	**1**
	Report Totals	**173**	**132**	**990**

Table 21: Incidents Dispatched as Dive Rescue (2012-2016)

The Big Thompson River, which runs diagonally from west to east through the entire LFRA response area (Figure 5), has experienced significant flooding events three (3) times since 1976. Several members of the SOT responded into the Big Thompson Canyon

during the September 2013 Big Thompson Flood and performed numerous technical rescues during their multi-day operational response. The LFRA response area contains numerous streams, lakes, ponds and irrigation canals, including two large public recreation lakes: Boyd Lake State Park and Carter Lake. There are also numerous public and private swimming pools within LFRA's response area. Second to motor vehicle accidents, water and ice rescue incidents are the most common technical rescue incident that occurs within the LFRA response area (Table 21).

Structural Collapse/USAR

The primary risk for structural collapse is associated with new construction; however, it is also possible that structural collapse could occur as a result of weather influences (e.g., excessive accumulation of snow, flooding, high winds, etc.) or from other human causes (e.g., vehicle impact with a structure). Structural collapse incidents are very low frequency, high risk incidents. Table 22 displays all calls for service that were dispatched as possible structural collapse and the corresponding situation found and reported between January 1, 2012, and December 31, 2016.

Incident Category	Incident Type	All Incidents	First-In Units Only	Unit Responses
RESCUE, EMS	322 - MOTOR VEHICLE ACCIDENT WITH INJURIES	1	1	6
	324 – MOTOR VEHICLE ACCIDENT WITH NO INJURIES	7	7	38
	Total	**8**	**8**	**44**
HAZARDOUS CONDITION	461 - BUILDING OR STRUCTURE WEAKENED OR COLLAPSED	2	2	12
	463 - VEHICLE ACCIDENT, GENERAL CLEANUP	1	1	5
	Total	**3**	**3**	**17**
SERVICE CALL	510 - PERSON IN DISTRESS, OTHER	1	1	3
	520 - WATER PROBLEM, OTHER	1	1	6
	552 – POLICE MATTER	1	1	6
	Total	**3**	**3**	**15**
	Report Totals	**14**	**14**	**76**

Table 22: Incidents Dispatched as Structural Collapse (2012 - 2016)

Trench Rescue

Trench rescue is primarily associated with work sites that are being developed for infrastructure, such as water, sewer, and electrical service. As with structural collapse, trench rescue incidents are very low frequency, high risk incidents. Table 23 displays all calls for service that were dispatched as possible trench rescue incidents and the

corresponding situation found and reported between January 1, 2011, and December 31, 2015.

Incident Category	Incident Type	All Incidents	First-In Units Only	Unit Responses
RESCUE, EMS	350 - EXTRICATION, RESCUE, OTHER	1	1	6
	354 - TRENCH/BELOW-GRADE RESCUE	2	2	16
	Total	**3**	**3**	**22**
SERVICE CALL	541 - ANIMAL PROBLEM	3	3	9
	542 - ANIMAL RESCUE	10	10	45
	553 - PUBLIC SERVICE	1	1	1
	Total	**14**	**14**	**55**
GOOD INTENT CALL	611 - DISPATCHED & CANCELED EN ROUTE	3	1	11
	Total	**3**	**1**	**11**
FALSE ALARM, FALSE CALL	700 - FALSE ALARM OR FALSE CALL, OTHER	1	1	5
	Total	**1**	**1**	**5**
	Report Totals	**21**	**19**	**93**

Table 23: Incidents Dispatched as Trench Rescue (2012 - 2016)

Rope Rescue

All first due apparatus are equipped with equipment to allow personnel to perform low-angle rope rescues. The technical rescue discipline of rope rescue is concerned with those incidents that require high-angle rope rescue techniques. This incident type is a very low frequency, high risk incident. Table 24 displays all calls for service that were dispatched as possible rope rescue incidents and the corresponding situation found and reported between January 1, 2012, and December 31, 2016.

Incident Category	Incident Type	All Incidents	First-In Units Only	Unit Responses
RESCUE, EMS	300 - RESCUE, EMS INCIDENT, OTHER	1	1	5
	311 - MEDICAL ASSIST, ASSIST EMS CREW	1	1	5
	321 - EMS CALL, EXCLUDING VEHICLE ACCIDENT WITH INJURY	1	1	7
	322 - MOTOR VEHICLE ACCIDENT WITH INJURIES	3	3	15
	324 - MOTOR VEHICLE ACCIDENT WITH NO INJURIES.	1	1	6
	350 - EXTRICATION, RESCUE, OTHER	2	2	12
	352 – EXTRICATION OF VICTIM(S) FROM VEHICLE	1	1	8
	356 - HIGH-ANGLE RESCUE	3	3	19
	Total	**13**	**13**	**77**
HAZARDOUS CONDITION	463 – VEHICLE ACCIDENT, GENERAL CLEANUP	1	1	6
	Total	**1**	**1**	**6**
GOOD INTENT CALL	611 - DISPATCHED & CANCELED EN ROUTE	2	0	12
	Total	**2**	**0**	**12**
	Report Totals	**16**	**14**	**95**

Table 24: Rope Rescue Incidents (2012 - 2016)

Large Animal Rescue

In the aftermath of 2005's Hurricane Katrina, the abandonment of many thousands of pets and other animals brought the matter of animal welfare to national attention. On October 6, 2006, President George W. Bush signed into law the Pets Evacuation and Transportation Standards (PETS) Act as an amendment to the Stafford Act. The PETS Act was an initiative from the U.S. House of Representatives that required states seeking FEMA assistance to accommodate pets and service animals in their plans for evacuating residents facing disasters.

In the process that established the PETS Act, it was noted that over 85% of animal owners said that they would risk their lives to save their pets. Historically, the rescue and medical treatment of animals was assigned to local Animal Control Officers, who are trained in the handling of small wild animals and household pets. Wildlife officers are trained in the handling of wildlife. Based on the previous statement that animal owners will put their lives at risk to rescue their animals, LFRA identified a gap in the rescue and medical treatment of all large animals and livestock. The life safety risk to the owner is the driving force behind a response by local fire and rescue services.

In 2008, Loveland Fire Rescue Authority (LFRA) formed the Technical Emergency Animal Rescue (TEAR) Team. The TEAR Team consists of veterinarians trained and experienced in handling large animal, other appropriate local emergency response agencies, and several members of LFRA's Special Operations Team (SOT). The TEAR Team is available for deployment to LFRA, Poudre Fire Authority (PFA) and the Greeley Fire Department (GFD). The intent of the TEAR Team is to provide assistance and service to animal victims of disaster, as well as for other animal-related services that may benefit from such cooperative efforts. Currently, two (2) members of LFRA's SOT are trained Technician level by the Technical Large Animal Emergency Rescue (TLAER) group. All members of LFRA are trained to the Awareness level and all LFRA SOT members are trained to the Operations level. The agency's two large animal rescue technicians have been at the forefront of developing specialized equipment and one is currently serving as a national instructor for TLAER.

LFRA's TEAR Team maintains an updated dispatch resource list that includes not only the participating veterinarians, but also contact lists for Larimer County Animal Control, Colorado Division of Wildlife, Larimer County Horseman's Association, and several other volunteer service organizations. All of the cooperating resources cross-trained with LFRA's SOT and meet emergency management training requirements for incident management. The TEAR Team has been active on several regional disasters, including the Windsor Tornado of 2008, the High Park Fire of 2012, and the Big Thompson Floods of 2013. TEAR Team members have also responded to several smaller scale incidents, including animals stuck in mud or ice and animals trapped in excavation sites.

During and after the Windsor Tornado of 2008, local emergency managers, animal control officers, and fire departments in Larimer County bonded together to design an emergency disaster plan for animals in the county, as guided by the PETS Act. It took several years to organize and finalize the design and orchestration of this plan, but it was put to a successful test during the High Park Fire of 2012. Since then, the plan has been finalized and adopted by all participating agencies, and was used successfully with the floods of 2013. The plan was finalized in 2015, when the Larimer County Disaster Animal Response Team (DART) was formed. To date, all participating members have been trained and the team is available to respond to future needs throughout the county. Larimer County is one of only three (3) counties in Colorado that has a DART team and full disaster plan in place.

In 2014, the National Fire Protection Association (NFPA) amended Standard 1670: Standard on Operations and Training for Technical Search and Rescue Incidents, to include Animal Technical Rescue as an additional requirement of technical rescue service providers. The research and training conducted by LFRA's large animal rescue technicians was included in the process of developing this change.

Incident Category	Incident Type	All Incidents	First-In Units Only	Unit Responses
SERVICE CALL	540 - ANIMAL PROBLEM, OTHER	7	7	17
	541 - ANIMAL PROBLEM	12	12	27
	542 - ANIMAL RESCUE	30	30	87
	Total	**49**	**49**	**131**

Table 25: Animal Rescue Incidents (2012 - 2016)

Technical Rescue Risk Summary

All technical rescue incidents present unique and challenging circumstances that must be mitigated by responders using highly specialized equipment. As mentioned previously, all members of the LFRA Special Operations Team (SOT) are encouraged to become certified to the operations level at all SOT disciplines. The response plan for all technical rescue incidents is intended to "front-load" the incident with a sufficient number of resources to initiate an effective response. In general, every technical rescue incident response will include the two (2) closest engine companies, Tower 6, Heavy Rescue 2, and Battalion 1. Dive Rescue 2 is added to the response plan for water-based incidents to provide the equipment that is supplied on that apparatus.

Incident Type	2012	2013	2014	2015	2016	Total	% of Total
Motor Vehicle Extrication	39	38	45	57	57	**236**	**44.70%**
Water/Ice Rescue	27	41	25	42	51	**186**	**35.23%**
Structural Collapse Rescue	0	2	4	2	16	**24**	**4.55%**
Trench Rescue	4	5	7	2	2	**20**	**3.79%**
Rope Rescue	7	1	3	2	3	**16**	**3.03%**
Large Animal Rescue	13	8	6	10	9	**46**	**8.71%**
TOTAL	**90**	**95**	**90**	**115**	**138**	**528**	**100%**

Table 26: Technical Rescue Summary (2012-2016)

Hazardous Materials Risks

A hazardous material is "any item or agent (biological, chemical, radiological, and/or physical) which has the potential to cause harm to humans, animals, or the environment, either by itself or through interaction with other factors."[21] There are a wide variety of hazardous materials that are in use, or pass through, the LFRA response area on a daily basis. LFRA has established various processes and plans to identify sources of hazardous materials, mitigate the risks they may pose, and respond to incidents involving known or suspected hazardous materials.

[21] Institute of Hazardous Materials Management. Retrieved from www.ihmm.org on 10/28/2015.

LFRA is the designated emergency response authority (DERA) for the City of Loveland, while Larimer County Sheriff's Office (LCSO) is the DERA for the unincorporated areas of the LFRA response area. All LFRA Operations Division personnel are required to maintain Hazardous Materials Operations certification or higher. All LFRA engines and support services apparatus carry equipment to allow them to mitigate small-scale hazardous materials incidents, such as fuel spills of less than 10 gallons. The initial assignment for a report of any hazardous materials incident more significant than that consists of the two (2) closest engines, Heavy Rescue 2, HazMat 1, and the on-duty Battalion Chief. The response plan also includes an automated pre-alert for the agency's Special Operations Team (SOT), which includes 20 individuals certified as Hazardous Materials Technicians and Specialists. The agency staffs at least ten (10) members of SOT on-duty for each shift, but there is not currently a minimum staffing requirement for hazardous materials technicians per shift.

Transportation Routes

Transportation routes are the location where hazardous materials should always be anticipated to be present, from fluids in automobiles to commodities in transport. Examples include roads, highways, rail lines, and pipelines. An incident involving hazardous materials on a transportation route can be defined as any occurrence that results in the uncontrolled release of hazardous materials on a transportation route. Regulations from the United States Department of Transportation (USDOT) define more than 18,000 hazardous materials. Population groups likely to be seriously affected are within the most densely populated five-mile radius around a transportation route along which the hazardous material is being transported.

Interstate 25 (I-25) is the state of Colorado's designated route for transport of nuclear waste. The interstate is also the primary north-to-south travel corridor through the state. Other major highways within the LFRA response area include US Highway 34, which travels east-to-west through the center of the city, and US Highway 287, which travels north-to-south through the center of the city. Other designated hazardous materials transport routes includes State Highways 402 and 60, which cross the southern portion of the LFRA response area (Figure 45). The Colorado Department of Transportation (CDOT) is

the entity with primary responsibility for monitoring and enforcing regulations for hazardous materials transportation on all of Colorado's roads.

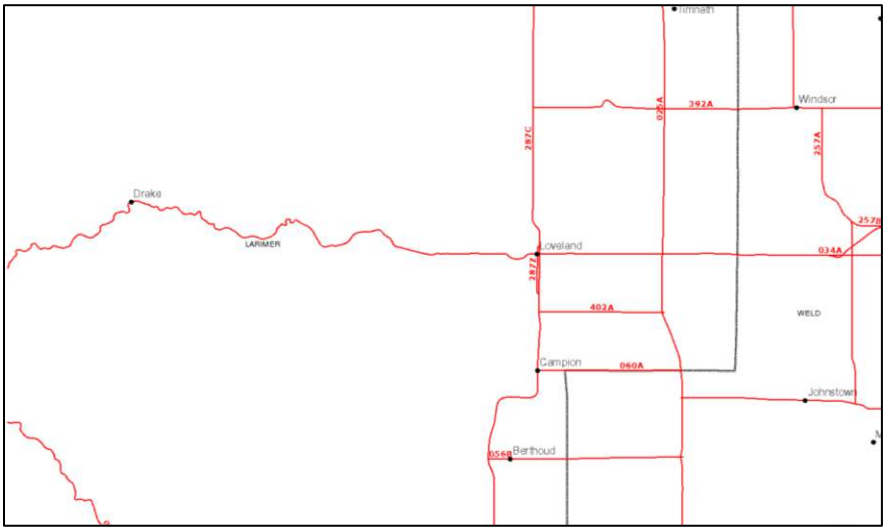


Figure 47: Hazardous Materials Transportation Routes[22]

In addition to roadways, rail is another location where hazardous materials are transported through the LFRA response area. Great Western, Burlington Northern Santa Fe, and Union Pacific all provide rail service to the Larimer County communities (Figure 46). Approximately 22 trains travel through LFRA jurisdiction in a 24-hour period, with various rail spurs that allow for direct delivery to several facilities. Information supplied by the three rail providers indicates that significant quantities of hazardous materials are transported on these rail routes (Table 27). Historically, LFRA has responded to derailments and collisions with auto/truck traffic in the past. The majority of these incidents have been small-scale; however, a single hazardous materials accident could result in the loss of many lives and cause millions of dollars in property damage.

[22] Colorado Department of Transportation On-Line Transportation Information System (http://dtdapps.coloradodot.info/otis)

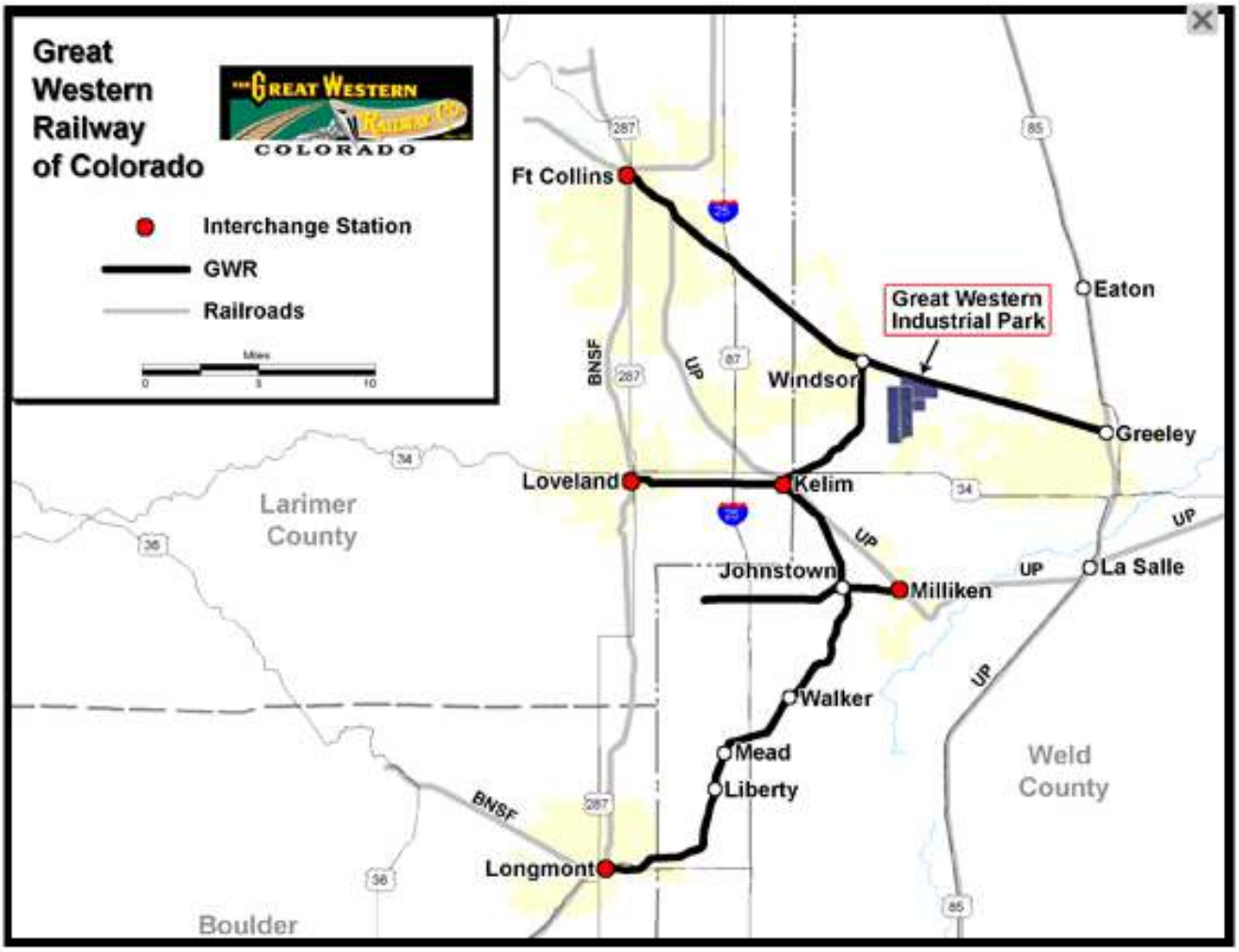


Figure 48: Railways within LFRA Response Area

Product Description	BNSF		Union Pacific		OmniTrax		TOTAL CARS
	Residue Cars	Loaded Cars	Residue Cars	Loaded Cars	Residue Cars	Loaded Cars	
Class 1: Explosives	0	0	0	0	0	0	**0**
Class 2: Gases	324	233	0	0	0	0	**557**
Class 3: Flammable and Combustible Liquids	4920	679	5930	6561	0	1688	**19778**
Class 4: Flammable Solids, Spontaneously Combustible and Dangerous When Wet	27	4	0	0	0	0	**31**
Class 5: Oxidizers and Organic Peroxides	41	24	0	0	0	0	**65**
Class 6: Poison/Toxic	25	8	0	0	0	0	**33**
Class 7: Radioactive	0	0	0	0	0	0	**0**
Class 8: Corrosive	188	288	13	12	0	52	**553**
Class 9 : Miscellaneous Dangerous Goods	3439	445	0	0	1	0	**3885**
TOTALS	**8964**	**1681**	**5943**	**6573**	**1**	**1740**	**24902**

Table 27: Annual HazMat by Rail through LFRA Response Area

Fixed Facilities

A fixed facility hazardous materials incident can be defined as any established location that has an uncontrolled release of hazardous materials that is capable of posing risk to life, health, and/or safety. Areas at risk include any location where hazardous materials are used, manufactured, processed or stored, including all hazardous waste treatment, storage and disposal sites. Another potential source for fixed facility hazardous materials incidents are oil and natural gas transmission pipelines. All of these locations can be found throughout all portions of the LFRA response area.

Businesses within the LFRA response area that use, store, transport through fixed systems and/or produce hazardous materials range from dry cleaning facilities to agricultural co-op's to industrial manufacturing plants. LFRA's Community Safety Division administers a hazardous materials permit program which monitors these businesses throughout the response area. Every business that uses any hazardous material that meets permit requirements established within the adopted International Fire Code is required to maintain an operations and use permit issued by LFRA after successful completion of an annual site inspection by a Fire Inspector. All permits and inspections are recorded in the

agency's records management system and are available to review by all members of the agency. Additionally, the agency's Heavy Rescue company works cooperatively with the Community Safety Division to update agency pre-plans. Although the number of hazardous materials incidents is generally few in number and negligible in magnitude, every incident has the potential to become catastrophic based upon the types and amounts of products present.

Hazardous Materials Risk Summary

Hazardous materials incidents are relatively infrequent occurrences for LFRA (Figure 47). Every incident will present a different set of circumstances that must be mitigated by responders using highly specialized equipment. LFRA uses a three-tiered approach to mitigate any hazardous materials incident: Prevention through the CSD's hazardous materials permit program, Hazardous Materials Operations expertise for every member, and Hazardous Materials Technician and Specialist availability through the Special Operations Team. The response plan for a potential hazardous materials incident will "front-load" the incident with a sufficient number of resources to initiate an effective response.

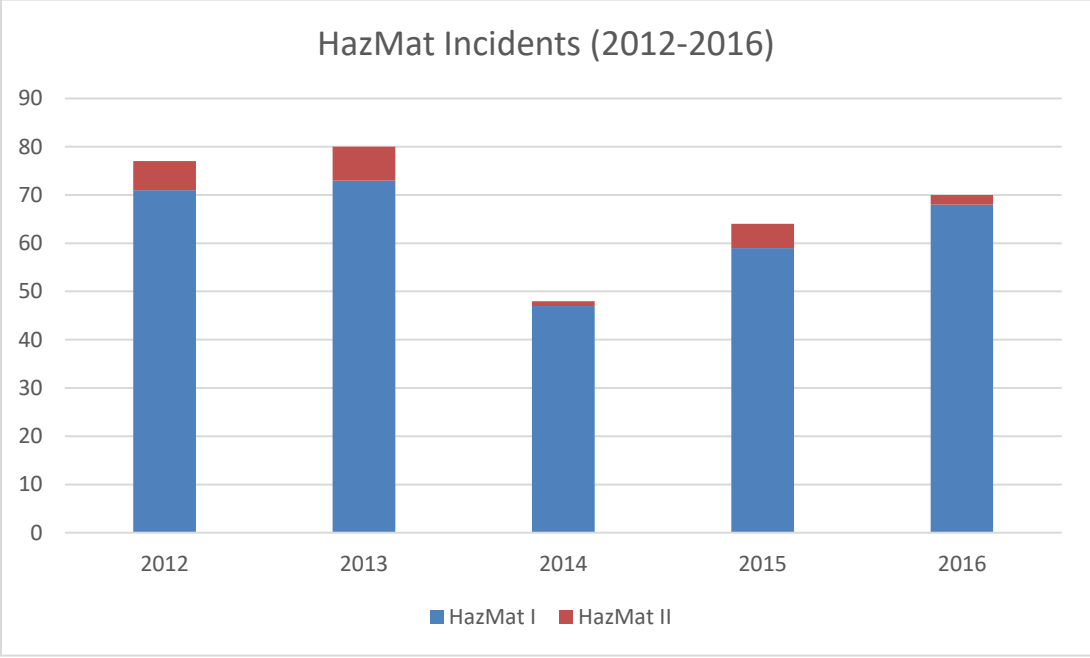


Figure 49: Hazardous Materials Incident Responses (2012-2016)

Aviation Rescue and Firefighting (ARFF) Risks

The Northern Colorado Regional Airport (FNL) is located along the northeastern boundary of the City of Loveland, adjacent to the City of Fort Collins to the north and the Town of Windsor to the east. The airport sits in an area that has been experiencing significant commercial and residential growth for the past several year and is forecasted to remain as one of Colorado's high growth areas. Construction on FNL began in 1964 and the facility is managed through an intergovernmental agreement (IGA) between the cities of Fort Collins and Loveland. The IGA specifies that both cities will jointly operate the airport by sharing in all management and policy-making decisions authority. This agreement is renewed annually, unless it is modified or terminated by the mutual consent of both cities.

FNL is classified by the Federal Aviation Administration (FAA) as a Class 1 airport that is certified to serve scheduled operations of large air carrier aircraft and can also serve unscheduled passenger operations or either large or small aircraft. Loveland Fire Rescue Authority (LFRA) has maintained an Aviation Rescue and Firefighting (ARFF) program since 1991, when commercial commuter services, Continental Express and United Express, began scheduling passenger service through FNL. Initially, ARFF coverage was provided by on-duty crews at one of the three existing fire stations. In 1994, LFRA was able to build and staff Fire Station #4 on the airport property. This station served a dual purpose of providing ARFF coverage as well as responding to calls for service within a specified response area. The two commercial carriers discontinued their scheduled services in 1997 and it did not return until July 2003, when Allegiant Airlines began providing scheduled flights to Las Vegas. Allegiant discontinued their service in October 2012. At approximately the same time, analysis of call volume and five (5) road mile response capabilities from all fire stations led LFRA to the decision to move all personnel and equipment from Fire Station #4 to Fire Station #6 and the creation of the agency's first double-company fire station. After that move, ARFF coverage has been provided by ARFF-certified employees either on-duty or off-duty. In 2016, LFRA hired a full-time Engineer to manage and oversee the agency's aircraft rescue and firefighting (ARFF) program from Fire Station #4.

In August 2015, Elite Airways began operating scheduled service between FNL and Chicago Rockland International Airport. In October 2015, FNL was selected by the FAA as

the official test facility for a new virtual air traffic control system. The new system, which is being funded by the Colorado Aviation Fund, which is supported by aviation fuel taxes collected by the Colorado Department of Transportation, Division of Aeronautics. The new system will use ground-based video and aircraft ground detection technology to provide data to off-airport air traffic controllers.[23] The new control systems will be installed in 2016, with the system testing expected to begin in the spring. It is anticipated that this new air traffic control technology will lure additional commercial carriers to FNL. In anticipation of this expected growth, LFRA is currently working with FNL leadership to fund a permanent ARFF position beginning in 2016. Additional positions may be funded if commercial activity increases demonstrate increased personnel needs.

Currently, the Loveland Emergency Communications Center evaluates aviation-related calls for service and classifies them into four (4) possible response categories (Table 28).

Incident Category	General Description	FAA Required Actions
Alert 1	Ground Emergency	ARFF personnel will standby in station ready for immediate response.
Alert 2	In-Flight Emergency	ARFF personnel will respond to pre-determined location on airport property.
Alert 3	Aircraft Crash or Imminent Fire	ARFF personnel will respond to the scene of the emergency to initiate action.
Alert 4	Aircraft Accident or Fire Off Airport Property	LFRA personnel will respond to the scene of the emergency to initiate action.

Table 28: ARFF Incident Categories

Aircraft Rescue and Firefighting (ARFF) Risk Summary

Loveland Fire Rescue Authority (LFRA) remains committed to providing ARFF coverage for the Northern Colorado Regional Airport (FNL). In late 2015, the agency took possession of a new ARFF apparatus to help improve response performance for ARFF incidents. With the recent changes in scheduled commercial carrier operations to the

[23] AirTrafficManagement.net: Virtual Control Tower for Fort Collins-Loveland.

airport, LFRA is re-evaluating personnel requirements to meet the expected demand. In 2016, the agency assigned a full-time Engineer to manage the ARFF program. ARFF incidents can be categorized as low frequency, high risk incidents (Figure 48). The agency must continue to plan accordingly to provide a sufficient number of trained and certified personnel to meet FAA requirements and provide for citizen and firefighter safety.

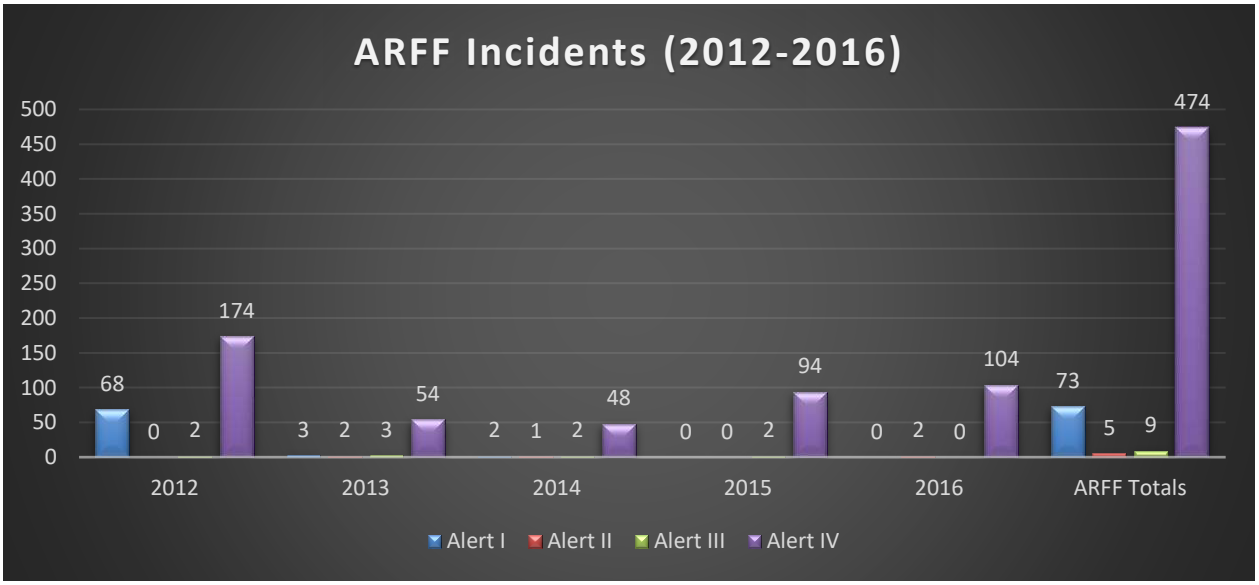


Figure 50: ARFF Incidents (2012-2016)

Domestic Preparedness

Loveland Fire Rescue Authority (LFRA) views weather-related risks and human-caused risks from a regional perspective. These risks may be found within any planning zone in the LFRA response area and may occur at any time. LFRA's Office of Emergency Management has worked with other municipal organizations in the Larimer County region to develop the Northern Colorado Regional Hazard Mitigation Plan for the purpose of improving understanding of these risks. The primary purpose behind this understanding is to assist the affiliated organizations, including LFRA, with being prepared for natural and man-made hazards to reduce risk and prevent loss. The 2009 and 2016 Multi-Jurisdictional Hazard Mitigation Plans were a primary reference document for the completion of this Community Risk and Emergency Services Assessment document.

Severe Winds

Severe winds can occur at any time, in any location and with little or no advanced warning (Table 29). In general, damage is most often limited, but there is potential for catastrophic damage to facilities and/or infrastructure. The duration and maximum wind speeds have previously resulted in serious property damage and personal injury. As a direct result of these extreme winds, the northern Colorado region has experienced widespread utility outages, downed and/or arcing power lines, debris blocking streets, personal injuries and structure fires.

DATE	LOCATION	WIND SPEED	DESCRIPTION / DETAILS
Jun 2008	Larimer County	74 knots	Strong winds damaged several boats at the Carter Lake marina, knocked down branches and trees in Loveland resulting in downed power lines and damaged vehicles and homes.
Jan 2007	Larimer County	77 knots	High winds and recent snow resulted in whiteout conditions and several highway closures.
Nov 2006	Larimer County	80 knots	Strong winds were experienced in the foothills of Larimer County.
Nov 2005	Fort Collins	61 knots	Strong winds downed a tree near a home daycare facility, destroyed a large tent on the CSU campus, and left approx. 500 homes and businesses without power for one to two hours. One semi-trailer was knocked over on Highway 287 north of Fort Collins.
Jul 2005	Loveland	50 knots	Strong winds occurred near Boyd Lake, capsizing a boat and killing two occupants and injuring four others.
Apr 2005	Masonville	56 knots	Strong winds downed power lines.
Dec 2004	Larimer County	88 knots	Damaging downslope winds with gusts approaching 100 mph along the Front Range.
Nov 2003	Larimer County	89 knots	Strong downslope winds developed along the Front Range. Damaging winds downed power lines and caused two fires.

Table 29: History of Regional Severe Wind Events[24]

Possible consequences from severe winds may include property damage, electrical service disruption, and destruction of landscaping, roofing materials and other building components. Associated hazards include fires from arcing power lines, debris in the streets disrupting transportation routes, and localized or widespread loss of power. It is also possible for large commercial vehicles to be overturned due to high winds.

[24] National Weather Service statistics – http://www.nws.noaa.gov/om/hazstats

Winter Storms

Winter storms vary significantly in size, strength, intensity, duration, and impact on the community. The effects of winter storms depend on temperature extremes, wind and wind chill temperatures, and snowfall. Winter storms may also include blizzards and ice storms, although ice storms are relatively infrequent in this dry climate. Blizzards are associated with considerable snowfall accompanied by winds of 35 mph or more. Typically, winter storms are short-lived but the snowfall may remain for several days. Winter storms can impact the community in a short period of time by disrupting transportation systems, causing utility outages, and delaying emergency response. At-risk populations include the elderly, the homeless, and individuals using medical equipment or with daily medical needs. Structural damage may occur, but is most often the result of tree limbs falling due to heavy snow loads.

Hail Storms

Hail consists of spherical balls of ice that fall from thunderstorms. Hail stones form as the result of small frozen raindrops being continuously recycled through multiple updrafts and downdrafts. Once the accumulated layers of ice become so heavy they can no longer be suspended by wind, they fall to the ground as hail. Large hail stones can fall at speeds faster than 100 mph. Hail causes nearly $1 billion in damage to property and crops annually throughout the United States. Hail storms are generally localized and have limited impact since most injuries require first aid only. However, hail storms can potentially shut down critical facilities and services for long periods of time and may severely damage or destroy property. Hail events have no defined geographic boundary. Because it cannot be predicted where hail will fall, all people, buildings, critical facilities, and infrastructure should be considered at risk from hail storms.

Lightning

Lightning is the discharge of atmospheric electricity from a thunderstorm. In an instant, the lightning flash superheats the surrounding air to a temperature of nearly 50,000 °F. Nearby air expands and vibrates, forming sound that is heard as thunder. There are more than 40 million cloud-to-ground lightning flashes annually in the continental

United States.[25] The National Lightning Safety Institute currently ranks Colorado as the third most dangerous state for lightning-related injury and/or death. Larimer County is one of only two counties in the state that are rated as high risk for lightning injury and/or death. There have been seven (7) fatalities and 53 injuries from lightning in Larimer County since 1980.[26] Secondary effects from lightning strikes include fires, utility interruption, and property damage.

> July 2008 – Lightning struck the CSU campus, injuring one person and killing another. The injured person later died as a result of his injuries.
>
> July 2008 – A lightning strike in Rocky Mountain National Park injured three (3) hikers.
>
> July 2007 – A jogger was struck by lightning and killed in the Devil's Backbone area of Larimer County.
>
> July 2005 – Lightning struck the public swimming beach at Boyd Lake State Park in Larimer County. Twelve people were transported to local hospitals for treatment of injuries.

Tornado[27]

Tornados are nature's most violent storms. They appear as a rotating, funnel-shaped cloud that extends to the ground from a thunderstorm. Winds associated with a tornado can reach speeds up to 300 miles per hour (Table 30). The path of damage created by a tornado can be greater than a mile wide and 50 miles long. It is possible for a tornado to develop so quickly that little to no advanced warning is possible. Risks associated with tornados include hazardous material release, fire, building collapse, loss of utilities, loss of communication systems, and flying debris. In May of 2008, an EF3 tornado that originated south of Greeley ravaged its way north and west, skirting Greeley and devastating the nearby town of Windsor. The tornado continued on that track, crossing Interstate 25 just north of Fort Collins, where it knocked down a number of utility poles and damaged a number of homes. More recently, an EF3 tornado struck the Berthoud area on June 4, 2015,

[25] State of Colorado Natural Hazards Mitigation Plan – Lightning, page 76.
[26] "3 Hot Spots for Lighting Fatalities in Colorado." Chris Spears, CBS Denver. June 22, 2014.
[27] Retrieved from www.Ready.gov/Tornadoes

destroying several homes and out-buildings a few miles southwest of Loveland. This tornado was reported as being 200 yards wide and tracked five (5) miles to the west-northwest for nearly 15 minutes.[28]

Rating	Winds	Damage
EF 0	65 – 85 mph	Minor
EF 1	86 – 110 mph	Moderate
EF 2	111 – 135 mph	Considerable
EF 3	136 – 165 mph	Severe
EF 4	166 – 200 mph	Extreme
EF 5	Over 200 mph	Catastrophic

Table 30: Enhanced Fujita Tornado Rating Scale

Drought

Colorado, a semi-arid state, is constantly at risk for drought. A number of hazards are associated with drought, the greatest of which is an increased fire danger in the wildland/urban interface and in open space areas. Severe drought could also deplete water sources in the areas where natural water sources are used for firefighting purposes. Drought situations can last for several years and take many years to recover. All residents, commercial facilities, industry and agricultural businesses are affected by drought conditions.

Earthquake

Earthquakes are caused by the sudden movement along faults. Earthquakes are relatively uncommon in Colorado; however, geological research indicates that there are faults capable of producing earthquakes throughout Larimer County. These studies indicate that there are about 90 faults in Colorado that moved during the last 1.6 million years and should be considered potentially active.[29] Colorado experienced a magnitude 6.5 earthquake on November 7, 1882. The location of this earthquake appeared to be in the Northern Front Range west of Fort Collins.[30] Seismologists predict that Colorado will again

[28] Retrieved from CBS Denver website (www.denver.cbslocal.com)
[29] Colorado Earthquake Information, Prepared by the Earthquake Subcommittee, Colorado Natural Hazards Mitigation Council, November 15, 1999.
[30] http://www.dola.state.co.us/oem/PublicInformation/pio1.htm

experience a magnitude 6.5 earthquake at some unknown point in the future. The potential property damage and loss of life from an earthquake could be tremendous. Hazards that are commonly associated with an earthquake include fires, hazardous material releases, delayed building collapse, flooding and extreme risks to emergency responders.

Flooding

A flood can be defined as an overflow or inundation from a river or other body of water that causes or threatens damage. Fort Collins, Loveland and Larimer County have all been affected by flooding (Table 31). In the Larimer County region, flooding is usually the result of severe weather events. Floods may develop from severe summer storms due to heavy rains. Floods may also occur when the ground is frozen and/or saturated with moisture and cannot absorb any further moisture. The source of saturation in the region is usually attributed to heavy rainfall over extended periods of time. This hazard is considered by most municipalities to be the greatest natural disaster risk in the region. Numerous floods in the history of the region have resulted in loss of life and substantial property-related dollar losses. LFRA works with the City of Loveland and Larimer County to monitor current or anticipated flood events and to plan for future events.

LOCATION	DATE	DAMAGE	DESCRIPTION
Northern Colorado	September 2013	1 local death $800 Million	A slow moving cold front stalled over northern Colorado resulting in several days of heavy rains. Flooding from all affected river basins spread across more than 200 square miles in 17 counties. The City of Loveland was cut in half when floodwaters from the Big Thompson River crossed every north-south road from the foothills east into Weld County.
Front Range Foothills	05-01-1999	$200,000 +	Heavy snow occurred in the foothills above 7,000 feet with a steady period of moderate rainfall below this elevation. As a result, the normal runoff was accelerated, causing the Cache La Poudre, the Big Thompson and the South Platte Rivers to jump their banks. Several rural roads were either closed due the floodwaters or washed out completely. Substantial lowland and agricultural flooding was also reported.
Fort Collins	07-28-1997	5 deaths $190 million	More than eight inches of rainfall was measured in southwest Fort Collins during the evening hours as a series of storms dumped heavy rain. Debris blocked a culvert which flowed into Spring Creek adjacent to a mobile home park. A 10-15 foot wall of water surged through two mobile home parks, destroying 108 homes and damaging 481 others, and severely damaging 86 homes. The high water also derailed 4 railroad cars. The Colorado State University campus was flooded, with the library being the hardest hit.
Fort Collins, Larimer County	06-02-1997	$500,000	Heavy rain and large hail from thunderstorms moving across eastern Larimer County caused extensive flooding and flash flooding problems throughout the afternoon and evening hours. Rainfall totals ranged from 2 to 5 inches. Flash floods washed out several roads and highways. Five bridges were damaged by floodwaters and several sections of the highway were destroyed.
Drake/Loveland	07-31-1976	145 deaths $40 million	Heavy overnight rainfall came without warning to this area of Colorado. Within a few hours, a severe flash flood swept down the Big Thompson Canyon, causing one of the greatest natural disasters in the history of the state.[31]

Table 31: History of Regional Flood Events

[31] Disaster Response to a Flash Flood, Berling, Robert L., U.S. Bureau of Reclamation.

In 1987, the City of Loveland adopted the Floodplain Building Code and Floodplain Regulations. These two documents encompass the contents and requirements of the National Flood Insurance Program and are updated and revised annually. The City continues to make improvements to their Flood Management Plan and all departments and divisions of City government, including LFRA, participate in planning efforts to improve flood preparedness (Figure 49).

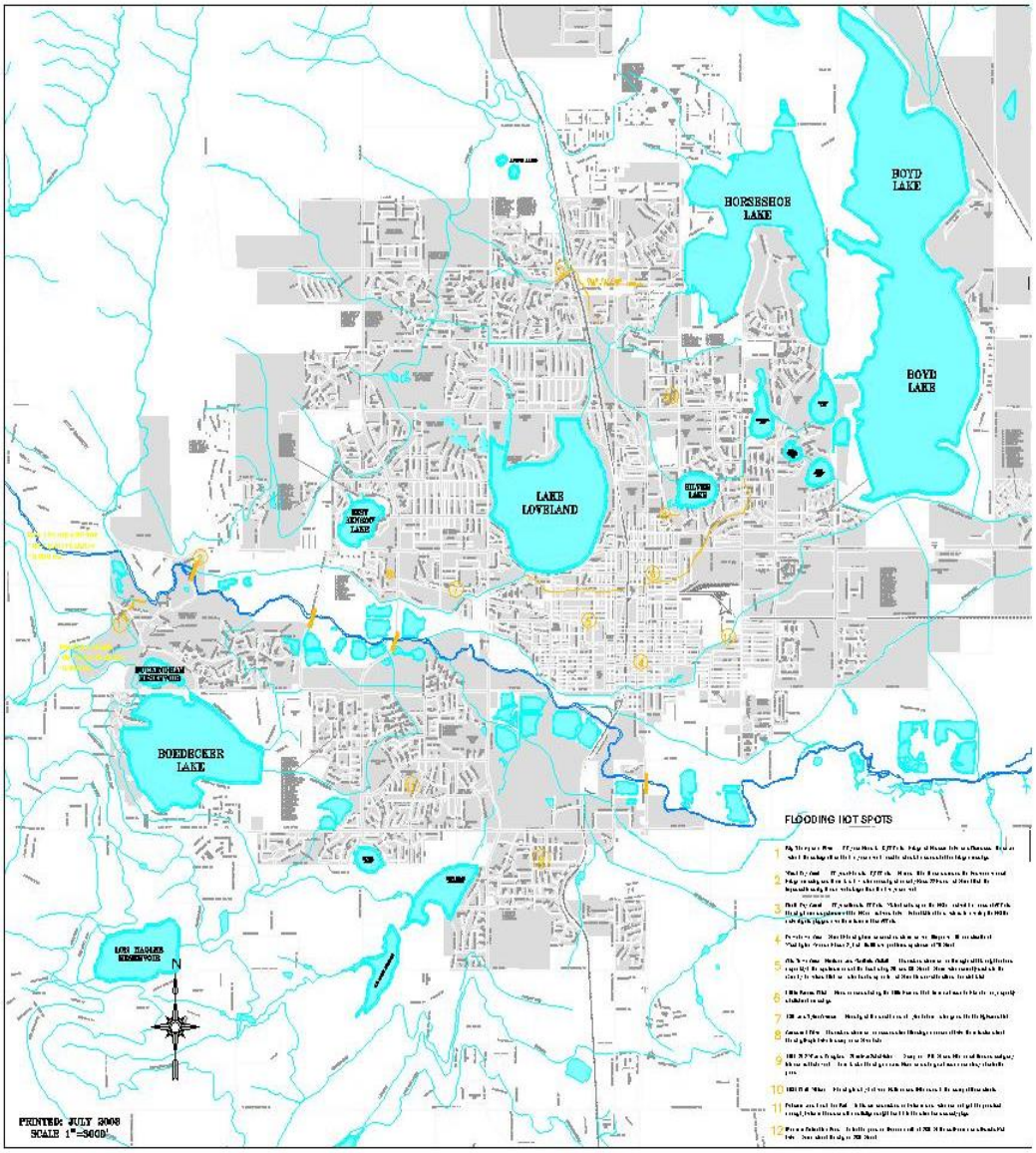


Figure 51: City of Loveland Flooding Hot Spots

Based on the flood events that occurred in September 2013, the City of Loveland has improved their understanding of the effects of major flooding on city infrastructure and critical facilities. Major flooding was observed to impact various city facilities, both private and public educational facilities, parks and open space areas, and some residential areas of the community. Most utilities in Loveland are buried underground; however, flooding caused damage to the water supply from the City of Loveland Water Treatment Plant.

Civil Disturbance

A civil disturbance is a broad term that is typically used by law enforcement agencies to describe the illegal actions of a group of people. A civil disturbance is generally intended to be a demonstration to the public and the government, but can escalate into general chaos. Civil disorder may be spontaneous, such as when a group suddenly erupts into violence, or it may be planned, such as a demonstration or protest intentionally interfering with another individual or group lawful business. Examples of civil disturbances may include non-permitted parades, sit-ins, riots, or sabotage.

Potential targets for civil unrest may include universities, industry, government offices, research laboratories, medical facilities and downtown congested areas. The diverse population of the region combined with the presence of numerous research facilities, industrial developments, universities, and the region's proximity to the Denver metropolitan area, lends itself towards the increased potential for civil disturbance.

Terrorism

The global environment has changed dramatically since the events of September 11, 2001, to increase risk of terrorist acts. As a result, local emergency response agencies must be prepared to respond to and effectively mitigate any emergency situation that results from terrorist activities. Terrorism is defined in the USA Patriot Act[32] as "activities that (A) involve acts dangerous to human life that are a violation of the criminal laws of the U.S. or of any state, that (B) appear to be intended (i) to intimidate or coerce a civilian population,

[32] U.S. Department of Justice: The USA Patriot Act (www.justice.gov/archive/II/highlights.htm)

(ii) to influence the policy of a government by intimidation or coercion, or (iii) to affect the conduct of a government by mass destruction, assassination, or kidnapping, and (C) occur primarily within the territorial jurisdiction of the United States." Terrorism may be either domestic or international depending on its origin, base, and the objectives of the terrorist. It usually involves a criminal act, often symbolic in nature and intended to influence an audience beyond the immediate victims. Although political violence has existed in the country since the American Revolution, new forms of politically motivated terrorism are emerging.

The legal definition of a ''Weapon of Mass Destruction'' is from Title 18 of the United States Code, Part I, Chapter 113B, Section 2332 (A) any destructive device as defined in section 921 of this title; "…(B) any weapon that is designed or intended to cause death or serious bodily injury through the release, dissemination, or impact of toxic or poisonous chemicals, or their precursors; (C) any weapon involving a disease organism; or (D) any weapon that is designed to release radiation or radioactivity at a level dangerous to human life."[33]

While there is not an established history of terrorist activities within the northern Colorado region, it is vital for emergency responders to be prepared. A cursory review of terrorist activities throughout the country indicate that any event has the capacity to quickly overwhelm the local emergency response system due to the magnitude of the incident. Some of the associated risks with terrorism include explosions, building collapse, hazardous materials release, structure fire, loss of power, blocked roadways and delayed emergency response.

In the mid-1980's, a state research laboratory north of Fort Collins was a victim of arson. It was believed to be the work of an animal rights group. In the early 2000's, there were several burglary incidents with the release of research animals at local laboratories. Animal rights groups are believed to be responsible for these activities. Local events involving vandalism, arson, and burglary have occurred and terrorist groups have taken

[33] Federal Bureau of Investigation (www.fbi.gov/about-us/investigate/terrorism/wmd/wmd-faqs)

credit. With the diversity of the population, universities, state and federal government facilities and technology-based industry in the Larimer County area, the likelihood of a terrorist incident is increased.

Dam Failure

Article 56 of the 1977 Additional Protocol I to the Geneva Conventions defines dams as “installations containing dangerous forces" due to the massive impact that would result from their destruction. Dam failures are comparatively rare, but can cause immense damage and loss of life when they occur. In studying risks associated with dam failure, it is most important to assess the potential loss of life and downstream property damage that may result, as compared to any physical characteristics of the dams themselves. There are many reasons and/or potential causes for dam failure, such as terrorism, earthquake, rapid erosion, etc.

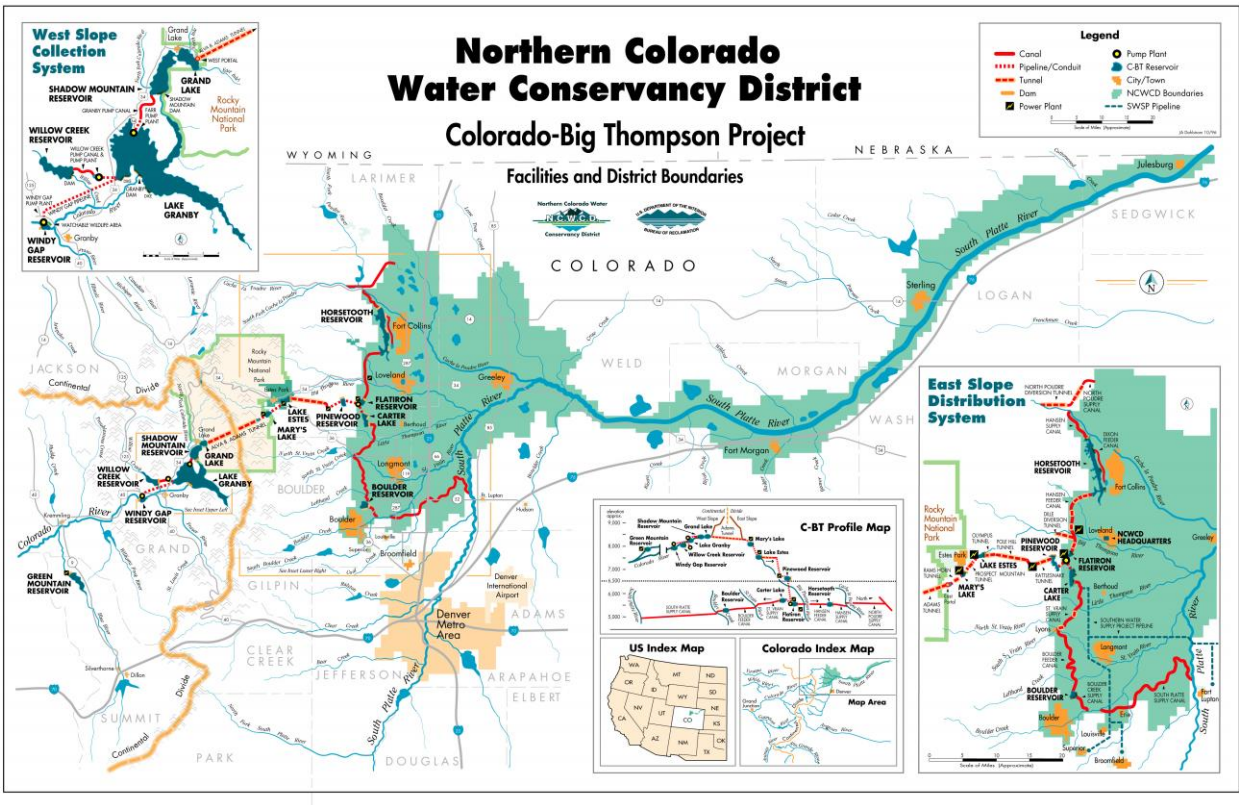


Figure 52: Colorado-Big Thompson Project

Pinewood Reservoir, Flatiron Reservoir, and Carter Lake are located in the foothills immediately west of Loveland and within the LFRA response area. These water storage facilities are part of the Colorado-Big Thompson Project (Figure 50). The Colorado-Big Thompson Project (C-BT) is operated by the U.S. Bureau of Reclamation and Northern Colorado Water Conservancy District. The C-BT is the largest trans-mountain water diversion project in Colorado. Built between 1938 and 1957, the C-BT Project provides supplemental water to 30 cities and towns. The water is used to help irrigate approximately 693,000 acres of northeastern Colorado farmland. Twelve reservoirs, 35 miles of tunnels, 95 miles of canals and 700 miles of transmission lines comprise this complex collection, distribution and power system. The C-BT system spans 150 miles east to west and 65 from north to south.34 The project is of vital importance to the communities of Larimer County, Fort Collins and Loveland, as well as to most of northeastern Colorado.

The three (3) dams that form Carter Lake are classified by the U.S. Bureau of Reclamation (BOR) as high-threat dams due to the high volume of water that they normally hold and the downstream population density. The BOR has performed extensive flood studies for all major dams in the northern Colorado region. Results of these studies show extensive damage to all areas downstream from the effective dam. The dams at Carter Lake have recently undergone major renovation. Should dam failure occur, most flooding will occur in areas that are already within the established 100 year flood plain. Buildings that are near but not currently in the 100 year flood plain could also be impacted. Specific information on the flood studies is controlled by and can be obtained from U.S. Department of Interior - U.S. Bureau of Reclamation, Great Plains Region, Billings, Montana. Copies are maintained by the Larimer County Office of Emergency Management, Loveland Office of Emergency Management, and the Colorado Division of Emergency Management.

34 http://www.ncwcd.org/project_features/cbt_main.asp

Chapter 4 – Standards of Cover

Factors driving Loveland Fire Rescue Authority's response performance are regularly examined and analyzed to help the agency develop data-driven methodologies to understand the agency's ability to respond to current and anticipated calls for service. Historical incident data is an excellent source of information for determining the probability of future incidents and for projecting trends in incident occurrence. LFRA analyzes incidents by distribution within the overall community, property/occupancy use, type of incident, and time of occurrence.

Relationship between Outcome and Response Time

LFRA's response performance goal is to deploy an effective and efficient emergency response to minimize loss of life and property damage. Two key areas for discussion are time to flashover and cardiac arrest survivability. In terms of fire suppression operations, a sufficient number of personnel must arrive on scene with the appropriate resources and within an appropriate time frame to accomplish the critical tasks necessary to extinguish the fire. While every fire demonstrates different circumstances, fire behavior can, and should be, anticipated. A key point in the growth of any fire is the transition to flashover, which is the time at which all available fuel packages within the entire fire area simultaneously reach their ignition temperature. This produces a hostile fire event, with extreme heat, rapid free burning, extremely high pressure, and tremendous smoke production, which nobody can survive (Figure 51). Fire modeling experiments conducted as part of the Report on Residential Fireground Field Experiments (NIST, 2010) indicated that a fire environment can be expected to become untenable for human survival within approximately ten (10) minutes, simply based on atmospheric concentrations of carbon monoxide and carbon dioxide.[35] Response and on-scene performance goals are established to give resources the opportunity to intercede in the fire event as early as possible.

[35] Report on Residential Fireground Field Experiments. National Institute of Standards and Technology. April 2010, page 43.

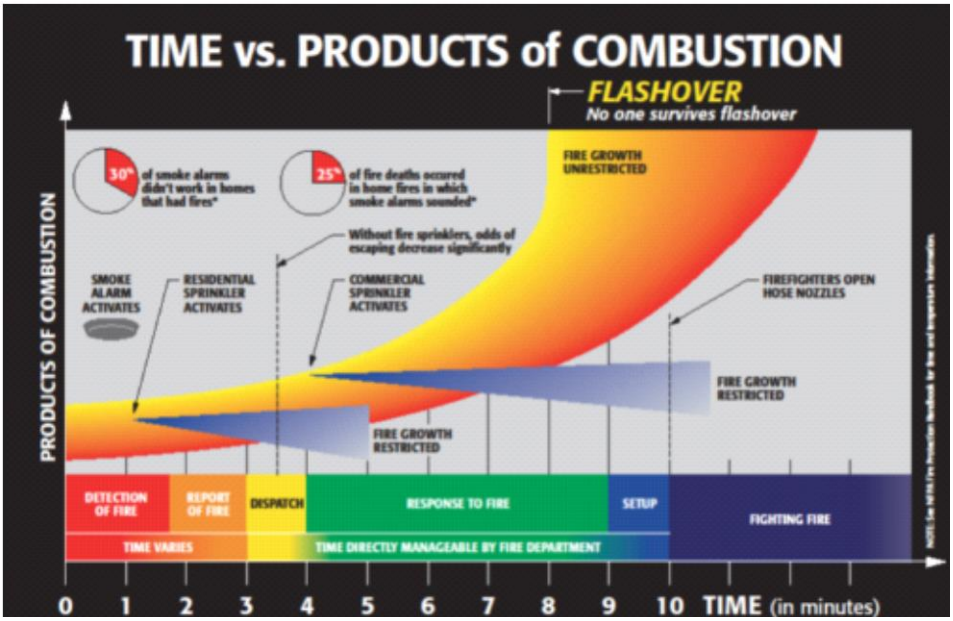


Figure 53: Time versus Products of Combustion

Figure 51 displays the typical fire growth curve in comparison to those portions of the overall incident timeline that can be controlled or otherwise influenced by the fire service agency. It can be inferred that an increased response time leads to decreased success in containing a fire to room or area of origin. Similarly, increased response time has a negative effect on patient survival from cardiac arrest. In both cases, it is necessary for the agency to have a timely response to the incident while also implementing a skilled response for there to be the greatest opportunity for success.

Cascade of Events

Through the various analytical tools available to LFRA, the agency is able to accurately calculate and report resource utilization and analyze performance in relation to specific call type reported, incident type found and/or geographic region. In order to accurately report LFRA's response performance, it is first necessary to establish a common understanding of the processes and time calculations involved in this analysis. Viewed graphically, these various time periods are often referred to as a "cascade of events," meaning that each event happens in sequence with the other events (Figure 52).

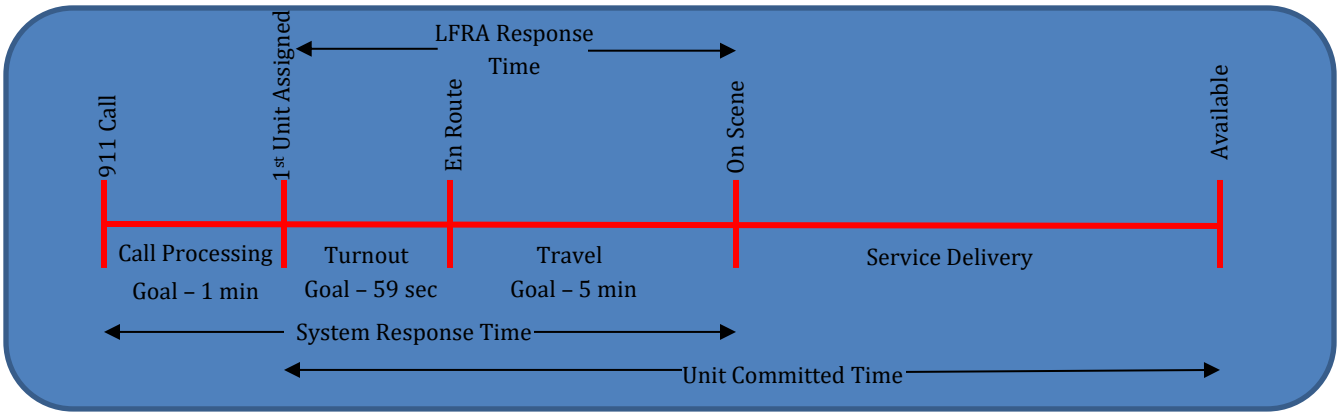


Figure 54: Cascade of Events

Alarm Handling Time: Also referred to as "Call Processing Time." This is the time period that is used by the Loveland Emergency Communications Center (LECC) to receive a 911 call and assign appropriate units. CAD time stamps utilized include Phone Pickup and 1st Unit Assigned. This time period specifically measures the time it takes for the LECC to receive a 911 call, gather information, create an incident, and assign at least one (1) LFRA apparatus to the incident.

> *Possible sources of discrepancy: Previous measurement of this time period stopped when an incident was placed in the "Pending Queue" by the Dispatcher. However, after this happened, the Dispatcher continued to gather information until there was sufficient information available to assign an apparatus to the incident. Thus, the time previously reported was an inaccurate representation of the time taken to handle an incoming 911 call.*

Turnout Time: The time period between when an apparatus is assigned to an incident and when that apparatus goes EnRoute to the incident, as captured by the apparatus Officer pushing the "Responding" button on the laptop or notifying Dispatch via radio. CAD time stamps utilized include Assigned and EnRoute. This time period measures the time it takes for a crew to receive notification of an assignment, report to their assigned apparatus, don the appropriate personal protective equipment, and mount the apparatus. Some individuals may refer to this time period as "Reflex Time." This term should be avoided because it has many different definitions.

Possible sources of discrepancy: The Loveland Emergency Communications Center employs a station/apparatus alerting system that is compatible with LFRA as well as several other emergency response agencies. The system employs a variety of tones that alert those stations and/or apparatus that are assigned to a given incident. Based on the technology applied to these tones, each incident will have a time lag between the time that the Dispatcher assigns each apparatus to an incident and when each apparatus receives the tones indicating that they have been assigned to that incident. Thus, the calculated Turnout Time for each apparatus will include some variable amount of time that cannot be accurately calculated.

Additionally, because Turnout Time includes several activities that must be performed, that time will be extended for larger fire stations. Extended turnout times could also be encountered if the personnel are exercising, involved in a training activity, using the restroom, or are otherwise engaged in some activity other than waiting for an incident to occur.

Travel Time: The time it takes for an apparatus to arrive on the scene of a reported incident. CAD time stamps utilized include individual apparatus EnRoute to Arrived. As with Turnout Time, this time period can be calculated for each apparatus assigned to an incident. LFRA measures the Travel Time for the First-Due Apparatus as well as the Travel Time for the remainder of the effective response force to arrive on scene.

Possible sources of discrepancy: This time period is one of the easiest to calculate because of what it measures; however, two variables have a profound impact on the length of time it takes for an apparatus to travel to the scene of an incident. First, the volume of traffic on the road that is traveled by the apparatus will have an obvious effect on travel time. The greater the volume of traffic, the longer it will take to get to the incident. The second variable is the actual distance the apparatus must travel. This variable is discussed further below, in the Urban Response Area section of this document.

LFRA Response Time: It is possible to measure two different types of Response Time. The first is the time period under direct control of LFRA (Turnout Time plus Travel Time). This

time period is defined as LFRA Response Time, which is the time period between when an apparatus is alerted of an incident to when that apparatus arrives on scene. Some systems refer to this term as "Reflex Time." As mentioned in the Turnout Time discussion above, there may be several different definitions of the term "Reflex Time."

System Response Time: This time period measures the capability of the entire emergency response system, from the time a 911 call is received to when the first apparatus arrives on scene. Thus, this time period starts at the CAD time stamp of Call Pickup and ends when the first apparatus arrives on scene. As with previous discussions, some systems refer to this time period as "Reflex Time," so LFRA should avoid use of that term.

Fire Station Alerting System Improvements

The fire station alerting system that LFRA has been using for the past several years is based on technologies that are beyond their service life and the devices are no longer able to be repaired. During the final two months of 2015, LFRA began phasing in a major improvement to the agency's fire station alerting system. When the new Fire Station #2 was constructed, it included the Phoenix G2 Station Alerting System. This product provides a state of the art computer-based alerting system that is helping to reduce turnout times for Engine 2 and Rescue 2. The agency was able to obtain funding to expand this installation to all of the remaining staffed fire stations (e.g., Stations 1, 3, 5 and 6). Key elements of the Phoenix G2 Station Alerting System include:

- Computer-based notification system that integrates audio and visual alerting devices.
- Refined audio notification systems that support firefighter health and safety.
- Message boards located in apparatus bays to allow responders to monitor their turnout times.
- Enhanced doorbell notifications for each station doorbell.
- Modular design that allows for future system enhancements, as needed by the agency. Examples could include automatic overhead door opening devices.
- Access to computer-based maintenance and troubleshooting.
- Secondary/redundant alerting system that is mobile phone (iOS) based.

- Company-specific alerting infrastructure for Phase 2 of the project.
- Internet-based alerting infrastructure for Phase 2 of the project.

The agency is in the application phase for an Assistance to Firefighters Grant (AFG) that would provide funding to maximize the system's capabilities in Phase 2. This enhancement would allow the dispatch process to become automated based on data input from the Loveland Emergency Communications Center (LECC) dispatchers while they are speaking with a 911 caller. Automation of the dispatch process will greatly reduce alarm processing and turnout time, resulting in improved response times and greater opportunities for successful operations on scene. It will also have an added benefit of waking only the company(ies) assigned to any call for service, thus improving firefighter health and safety by increasing opportunities for uninterrupted sleep for those apparatus not assigned to the incident.

Resource Distribution

Distribution refers to the number of resources located throughout the response area. In other words, distribution looks at the locations of fire stations to provide personnel and equipment for initial response to calls for service. In an ideal situation, every fire station would be located so as to equally distribute call volume among all stations. Unfortunately, that is rarely a possibility. Truthfully, fire station location is generally driven by growth of the community. The same can be said for LFRA's fire station locations, with one exception. As mentioned previously, Fire Station #2 was relocated to its present location based on incident response analysis that showed its previous location was inefficient in terms of overlap with adjacent fire station planning areas.

Fire station planning areas are used by LFRA to assist in addressing coverage areas based on a calculated five (5) minute response time from the station location (Figure 55). LFRA does not use fire station planning areas as assigned response areas unless the apparatus is in quarters. Instead, LFRA uses an automated vehicle location (AVL) system that allows the dispatch system to assign the closest appropriate apparatus to a given situation type. This AVL system improves response performance during hours when apparatus are mobile in the LFRA response area, rather than stationary in their quarters.

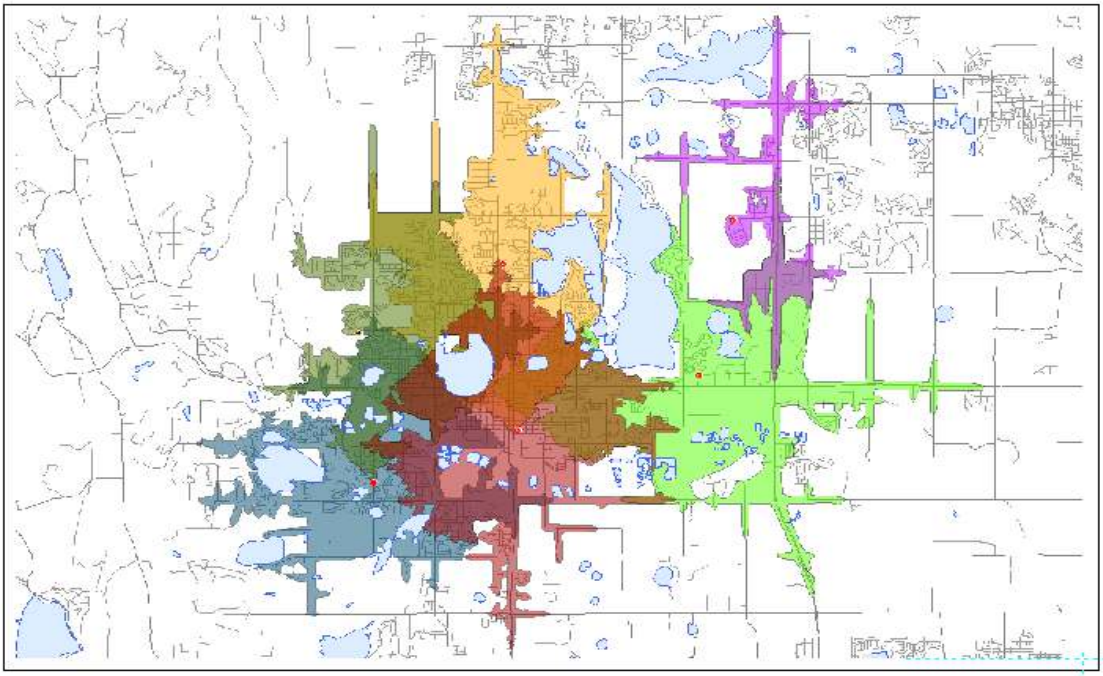


Figure 55: Five (5) Minute Drive Time from LFRA Fire Stations

Resource Concentration

The concentration of resources examines the placement of multiple resources in proximity to support establishing an effective response force (ERF) on an emergency scene within an established timeframe. In other words, LFRA must place a sufficient number of resources in strategic locations throughout the response area so that enough resources can arrive on scene quickly enough to mitigate the circumstances of any given incident. Larger and more complex incidents require a larger ERF, while smaller or simpler incidents require a correspondingly smaller ERF. Thus, it can be inferred that a greater amount of time will be necessary to assemble the requisite personnel and equipment for a larger and more complex incident than for a smaller and simpler incident. The agency compared the overlapping five-minute drive times for all fire stations with the nine minute drive time for all Thompson Valley EMS stations (Figure 56).

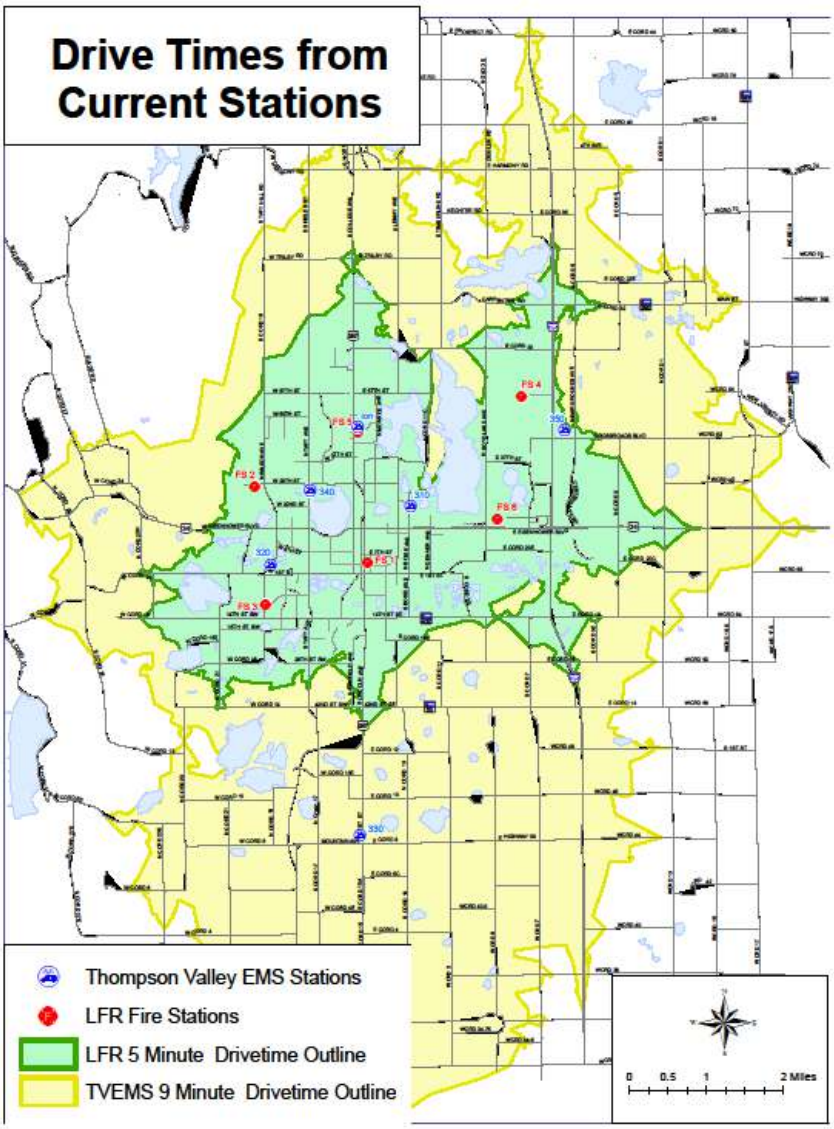


Figure 56: Five (5) and Nine (9) Minute Drive Times from LFRA and TVEMS Stations

Critical Task Analysis

When a citizen calls 911, they expect a skilled response by a sufficient number of personnel to effectively mitigate the circumstances of their emergency. Loveland Fire Rescue Authority (LFRA) has established several response plans that are intended to provide that skilled response to a wide variety of emergency and non-emergency calls for service. In developing those response plans, LFRA has performed a critical task analysis to develop an understanding of the amount of work that each member should reasonably be expected to

perform on any given incident. The analysis of these critical tasks improves agency awareness about the adequacy of current staffing levels, aid agreements, and other resources in terms of their ability to provide a sufficient number of personnel and equipment to an emergency scene in a timely manner to effectively mitigate the circumstances of that incident.

Critical tasks can be defined as those tasks that must be performed to successfully mitigate the circumstances of the incident. Critical tasks are based upon risk assessment summaries, agency policies and procedures, accepted industry standards, National Fire Protection Association guidelines, and expert counsel. The analysis of these tasks and the numbers of personnel needed to complete them serves as the basis and rationale for establishing a risk-specific effective response force (ERF). In other words, the critical task analysis provides data that allows LFRA to determine the appropriate apparatus response plan to effectively control the circumstances of each incident type. It is important to note that LFRA understands that some situations will necessitate dependence on neighboring agencies to provide personnel and equipment through automatic-aid and/or mutual-aid agreements. Where applicable, this has been built into the Effective Response Force determination.

LFRA began researching time to task completion with the live fire training that was conducted after construction was completed on the agency's live fire training facility in the Fall of 2009. Since 2009, the agency has continued to monitor company proficiency through both live fire training scenarios as well as Company Qualifications Testing (CQTs). Through comparison of 2009 critical task analysis times with those from 2015 and 2016, the agency has noted a substantial improvement in the outcome measurement of victim rescue and primary search complete benchmarks times (Table 32).

Action/Benchmark	90th Percentile (2009)	90th percentile (2015)	90th Percentile (2016)
1st Line Down	**2:23**	**3:30**	**2:23**
Initial 360 Survey	Not Measured	2:05	2:00
Risk Profile Aired	Not Measured	Not Measured	2:36
Door Control	Not Measured	Not Measured	4:24
1st Line Inside	**5:18**	**6:11**	**4:48**
2nd Line Down (dry)	9:02	8:13	6:22
Water Supply Established	10:10	9:00	9:25
Fire Located	10:21	9:40	9:51
Entry to Fire Located	**3:03**	**5:37**	**5:31**
Fire Controlled	11:13	13:44	12:31
Entry to Fire Controlled	**5:55**	**9:40**	**8:24**
Horizontal Ventilation	10:27	13:35	11:55
Victim #1 Out	10:14	9:00	5:57
Victim #2 Out	13:46	11:09	11:37
Primary Search Complete	14:57	13:28	16:00

Table 32: Time to Task Completion (2009, 2015 and 2016 live fire drills)

Low Risk Fires

The risk analysis conducted by LFRA determined that low-risk fires include fires other than a structure fire or a grass/wildland fire. For example, this could include fires involving single passenger vehicles, dumpsters, boats, landscape materials, or other similar objects. A single engine company is dispatched to all low risk fires. If dispatch information indicates that a fire is close to a structure, it is classified as a fire threatening a structure and is upgraded to a full first alarm assignment.

Low Risk Fire Resource Determination		
APPARATUS	**Staffing**	**CRITICAL TASKS**
First Due Engine	Officer	Establish incident command
		360 degree scene size-up, develop incident action plan
		Incident Safety officer
	Engineer	Position apparatus
		Operate apparatus pump
	Firefighter	Use appropriate tools
		Deploy appropriate attack hose line
		Perform salvage/overhaul
ERF = 1 unit with	**3 personnel**	**To perform 8 critical tasks**

Moderate Risk Structure Fires

LFRA's risk analysis determined that a moderate risk structure fire is one involving a one- or two-family residential structure or a small commercial structure of less than 5,000 square feet. This also includes a structure that is threatened by an exterior fire involving a vehicle, trash container, and/or vegetation. LFRA's primary goal for fire suppression is to provide for public and firefighter safety by reducing the potential of flashover in the involved compartment(s). All initial tasks performed on the fireground are directed towards accomplishing this goal within the established risk profile (Table 33). Firefighter safety is of paramount concern to all personnel operating on scene. LFRA recognizes that all structure fires contain an environment that is immediately dangerous to life and health (IDLH) and expects all personnel actions to conform to the risk profile established by incident command.

RISK PROFILE	DESCRIPTION
Life Risk	Incident circumstances indicate that civilian and/or firefighter lives may be saved by aggressive action applied within a structured plan.
Property Risk	Incident circumstances indicate that no civilian and/or firefighter lives should be risked because of a non-survivable hazard zone.

Table 33: LFRA Risk Profile

The first alarm assignment for a moderate risk structure fire is displayed on City Alarm Levels and Rural Alarm Levels tables (Tables 34 and 35). LFRA staffs all first-due apparatus with a company officer, one engineer and at least one firefighter. Depending on the incident type or location, the company officer may split his/her crew and staff one of the secondary apparatus, such as a water tender, housed at the fire station. Additional personnel to staff secondary apparatus may be provided by on-duty administrative personnel and/or personnel responding to a shift recall. If an incident type can reasonably be expected to exceed the capabilities of LFRA's staffing capabilities, the responding Battalion Chief is able to request additional resources from LFRA or other mutual aid providers.

Prior to September 2014, LFRA's first alarm assignment included two (2) engines and two (2) truck companies, with the second due engine assigned to serve as a rapid intervention company (RIC) while staffing a second attack line. The agency determined that it was necessary to increase the response to include a third engine to improve RIC availability. Thus,

the agency's first alarm assignment for incidents occurring from September 2014 and beyond consists of three (3) engines and two (2) truck companies.

City Alarm Levels				
1st Alarm	2nd Alarm	3rd Alarm	4th Alarm	5th Alarm
Engine - LFRA	Engine - LFRA	Engine - PFA	Engine - PFA	Engine – PFA
Engine - LFRA	Engine - LFRA	Engine - Windsor	Engine – FFFD	Engine - LaSalle
Engine - LFRA	Engine - BFD	Engine - FFFD	Engine – Mtn View	Engine – Estes
Truck- LFRA	Truck- PFA	Engine - FRFR	Truck – Greeley	Engine – Evans
Rescue - LFRA	Rescue - LFRA	Truck – Longmont	Air/Light – PFA	Truck – PFA
BC - LFRA	BC - PFA	BC - Windsor	BC – Greeley	Rescue – WSFR
Med Unit - TVEMS	P329 - TVEMS	Canyon Page	BC – Longmont	BC – PFA
				Med Unit - TVEMS

Table 34: City Alarm Levels

Rural Alarm Levels				
1st Alarm	2nd Alarm	3rd Alarm	4th Alarm	5th Alarm
Engine - LFRA	Engine - LFRA	Engine - Windsor	Engine – FFFD	Engine – Evans
Engine - LFRA	Engine - LFRA		Engine – Longmont	Engine – Estes
Engine - LFRA	Engine - PFA			
Support - LFRA	Support – LFRA	Truck - PFA	Rescue – FRFR	Air/Light – PFA
Tender - LFRA	Rescue – LFRA	Tender – FRFR	Tender – WSFR	Tender – Mtn View
Tender - LFRA	Tender – PFA	Tender – PFA	Tender – Greeley	Tender – LaSalle
	Tender – Berthoud		BC – Longmont	
BC – LFRA	BC – PFA	BC - WSFR	BC – Greeley	BC - PFA
Med Unit - TVEMS	P329 - TVEMS	Canyon Page		Med Unit - TVEMS

Table 35: Rural Alarm Levels

From this point forward in this document, the critical task analysis presented is based on the assumption that an offensive strategy is established and all personnel are operating at a life risk profile, with the intent of saving savable lives. All LFRA officers function as safety officers embedded within their assigned crew or work group during all incident response activities. Thus, one individual is not designated as the "Incident Safety Officer." Finally, Thompson Valley EMS personnel and equipment are not included in the structure fire critical task analysis because they are not LFRA apparatus or personnel, and they are not trained, equipped or used as structural firefighters.

Residential Structure Fire / Detached Building Fire (within City limits)		
APPARATUS	**Staffing**	**CRITICAL TASK DESCRIPTION**
First Due Engine	Officer	Establish incident command
		360 degree scene size-up, develop incident action plan
	Firefighter	Form fire attack crew
	Engineer	Pump apparatus
Second Due Engine	Officer	Attack Group Supervisor: 360 degree scene size-up, update incident action plan
	Engineer	Establish water supply to 1st due engine
	Firefighter	Second attack line
Third Due Engine	Officer	Rapid intervention crew
	Engineer	
	Firefighter	
First Due Truck	Officer	360 degree scene size-up Ventilation assessment or Primary Search, as appropriate Control utilities
	Engineer	
	Firefighter	
Second Due Truck	Officer	Support Group Supervisor: 360 degree scene size-up, update incident action plan
	Engineer	Primary Search or support ventilation, as appropriate
	Firefighter	
First Due Battalion Chief	BC	Upgrade Incident Command Review and update incident action plan
ERF = 6 units with	**16 personnel**	**To perform 13 critical tasks**
Revised ERF in place as of September 2014		

Moderate Risk Structure Fires: Performance Benchmarks

For 90 percent of all moderate risk structure fires, the total response time for the arrival of the first due apparatus, staffed with at least one (1) officer, one (1) engineer and one (1) firefighter, shall be: 6 minutes and 59 seconds in the urban response area, and 15 minutes and 59 seconds in the rural response area. The first due apparatus for all risk levels shall be capable of: delivering a minimum of 400 gallons of tank water with a minimum of 1,500 gallons per minute rated pump capacity, establishing incident command, performing a 360 degree scene size-up, developing an appropriate incident action plan, requesting additional resources, deploying an appropriate fire attack hose line, providing sufficient water flow via the on-board tank and pump, and applying water to the fire.

For 90 percent of all moderate risk structure fires, the total response time for the arrival of the effective response force (ERF), staffed with at least 15 firefighters, engineers and officers, shall be: 9 minutes and 59 seconds in the urban response area and 19 minutes and 59 seconds in the rural response zone. The ERF shall be capable of: upgrading incident command,

establishing imbedded safety officers, providing an uninterrupted water supply, advancing a primary and secondary attack line for fire control, completing forcible entry, completing a primary search of the structure, providing a rapid intervention crew, controlling utilities, establishing operational groups and/or divisions as appropriate, providing ladders and other necessary equipment to support fireground operations, and performing salvage and overhaul.

This information reflects the capabilities of LFRA's first alarm assignment. This is the minimum number of apparatus and personnel necessary to accomplish the initial incident action plan. It is commonly understood that fireground tasks may require crew rotation and/or additional personnel beyond the minimum indicated. The incident commander may call for additional resources as needed to mitigate the incident. This is typically accomplished in one of two ways: requesting additional apparatus independently, or upgrading the incident to a greater alarm level, as reflected in the following figure.

Moderate Risk Structure Fires: Baseline System Performance

The following information contains response data from all moderate risk structure fires to which LFRA responded during the time period from January 1, 2012, through December 31, 2016. During this time period, the agency operated with a designated Urban Response Area and a Rural Response Area. Additional geographic zones are currently being developed to improve data analysis capabilities.

For 90 percent of all moderate risk structure fires, the total response time for the arrival of the first due apparatus, staffed with at least one (1) officer, one (1) engineer and one (1) firefighter, is: 7 minutes and 56 seconds in the urban response area, and 20 minutes and 42 seconds in the rural response zone. The first due apparatus for all risk levels is capable of: delivering a minimum of 400 gallons of tank water with a minimum of 1,500 gallons per minute rated pump capacity, establishing incident command, performing a 360-degree scene size-up, developing an appropriate incident action plan, requesting additional resources, deploying an appropriate fire attack hose line, providing sufficient water flow via the on-board tank and pump, and applying water to the fire. These actions were completed in accordance with departmental standard operating procedures while providing for the safety of responders and the general public.

For 90 percent of all moderate risk structure fires, the total response time for the arrival of the effective response force (ERF), staffed with at least 15 firefighters, engineers and officers, is: 12 minutes and 46 seconds in the urban response area and 22 minutes and 48 seconds in the rural response zone. The ERF is capable of: upgrading incident command, establishing imbedded safety officers, providing an uninterrupted water supply, advancing a primary and secondary attack line for fire control, completing forcible entry, completing a primary search of the structure, providing a rapid intervention crew, controlling utilities, establishing operational groups and/or divisions as appropriate, providing ladders and other necessary equipment to support fireground operations, and performing salvage and overhaul. These actions were completed in accordance with departmental standard operating procedures while providing for the safety of responders and the general public.

Moderate Risk Structure Fires - 90th Percentile Times - Baseline Performance			**2012 thru 2016**	**2016**	**2015**	**2014**	**2013**	**2012**	**Agency Target**
Alarm Handling	Pick-up to Dispatch	Urban	1:19	1:11	1:44	1:16	1:20	1:08	1:00
		Rural	2:40	3:17	1:16	4:14	2:38	1:51	1:00
Turnout Time	Turnout Time 1st Unit	Urban	2:22	2:25	1:52	2:20	2:28	1:38	0:59
		Rural	2:47	2:20	2:34	2:20	3:31	2:45	0:59
Travel Time	Travel Time 1st Unit **Distribution**	Urban	4:57	3:25	4:23	5:10	5:36	4:06	5:00
		Rural	20:17	20:54	18:01	18:58	14:22	19:31	14:00
	Travel Time ERF **Concentration**	Urban	9:15	7:59	8:15	10:02	10:36	8:32	9:00
		Rural	21:02	21:17	19:15	31:22*	14:39	28:11*	18:00
Total Response Time	Total Response Time 1st Unit On Scene **Distribution**	Urban	7:56 n=94	6:20 n=12	6:30 n=19	8:01 n=22	8:09 n=22	6:20 n=19	6:59
		Rural	20:42 n=29	23:07 n=9	20:19 n=5	18:50 n=3	18:39 n=6	21:26 n=6	15:59
	Total Response Time ERF **Concentration**	Urban	12:46 n=52	11:06 n=7	12:15 n=14	12:50 n=13	13:44 n=13	10:55 n=5	9:59
		Rural	22:48 n=11	23:30 n=4	21:22 n=3	34:45 n=1	19:54 n=2	31:02 n=1	19:59

* Indicates sample size (n) of 1 incident

High Risk Structure Fires

The response area for Loveland Fire Rescue Authority (LFRA) includes several occupancies that could be considered to be "high risk" structures. This term was defined and discussed extensively in the Community Risk and Emergency Services Assessment of this document. To summarize the term, LFRA has established that a structure that meets one or more of the following criteria shall be classified as a High-Risk Occupancy:

1. Building requires use of high-rise firefighting tactics
2. Building was identified as the "Maximum Risk" in each fire station planning zone during 2014 LFRA Fire Officer Survey

At the time this document was developed, LFRA had not established an accurate list of high-rise occupancies or "target hazards" that would require an enhanced response plan. However, the agency is currently working to establish an accurate target hazard list and a corresponding response plan. Based on the additional critical tasks commonly associated with this type of fire incident, it is anticipated that LFRA's response plan for a high risk structure fire may include additional apparatus beyond the moderate risk structure fire response plan.

High Risk Structure Fires: Performance Benchmarks

For 90 percent of all high risk structure fires, the total response time for the arrival of the first due apparatus, staffed with at least one (1) officer, one (1) engineer and one (1) firefighter, shall be: 6 minutes and 59 seconds in the urban response area, and 15 minutes and 59 seconds in the rural response area. The first due apparatus for all risk levels shall be capable of: delivering a minimum of 400 gallons of tank water with a minimum of 1,500 gallons per minute rated pump capacity, establishing incident command, performing a 360 degree scene size-up, developing an appropriate incident action plan, requesting additional resources, deploying an appropriate fire attack hose line, providing sufficient water flow via the on-board tank and pump, and applying water to the fire.

For 90 percent of all high risk structure fires, the total response time for the arrival of the effective response force (ERF), staffed with at least 15 firefighters, engineers and officers, shall be: 9 minutes and 59 seconds in the urban response area and 19 minutes and 59 seconds

in the rural response zone. The ERF shall be capable of: upgrading incident command, establishing imbedded safety officers, providing an uninterrupted water supply, advancing a primary and secondary attack line for fire control, completing forcible entry, completing a primary search of the structure, providing a rapid intervention crew, controlling utilities, establishing operational groups and/or divisions as appropriate, providing ladders and other necessary equipment to support fireground operations, and performing salvage and overhaul.

High Risk Structure Fires: Baseline System Performance

The following information contains response data from all high risk structure fires to which LFRA responded during the time period from January 1, 2012, through December 31, 2016. During this time period, the agency operated with a designated Urban Response Area and a Rural Response Area. Additional geographic zones are currently being developed to improve data analysis capabilities.

For 90 percent of all high risk structure fires, the total response time for the arrival of the first due apparatus, staffed with at least one (1) officer, one (1) engineer and one (1) firefighter, is: 7 minutes and 3 seconds in the urban response area, and 18 minutes and 41 seconds in the rural response zone. The first due apparatus for all risk levels is capable of: delivering a minimum of 400 gallons of tank water with a minimum of 1,500 gallons per minute rated pump capacity, establishing incident command, performing a 360-degree scene size-up, developing an appropriate incident action plan, requesting additional resources, deploying an appropriate fire attack hose line, providing sufficient water flow via the on-board tank and pump, and applying water to the fire. These actions were completed in accordance with departmental standard operating procedures while providing for the safety of responders and the general public.

For 90 percent of all high risk structure fires, the total response time for the arrival of the effective response force (ERF), staffed with at least 15 firefighters, engineers and officers, is: 10 minutes and 6 seconds in the urban response area and 35 minutes and 37 seconds in the rural response zone. The ERF is capable of: upgrading incident command, establishing imbedded safety officers, providing an uninterrupted water supply, advancing a primary and secondary attack line for fire control, completing forcible entry, completing a primary search of

the structure, providing a rapid intervention crew, controlling utilities, establishing operational groups and/or divisions as appropriate, providing ladders and other necessary equipment to support fireground operations, and performing salvage and overhaul. These actions were completed in accordance with departmental standard operating procedures while providing for the safety of responders and the general public.

High Risk Structure Fires - 90th Percentile Times - Baseline Performance			**2012 thru 2016**	**2016**	**2015**	**2014**	**2013**	**2012**	**Agency Target**
Alarm Handling	Pick-up to Dispatch	Urban	1:15	n=0	1:15	0:57	1:09	0:57	1:00
		Rural	1:05	1:16	0:21*	n=0	n=0	n=0	1:00
Turnout Time	Turnout Time 1st Unit	Urban	2:10	n=0	1:18	1:39	2:21	1:45	0:59
		Rural	1:18	1:28	1:14	n=0	n=0	n=0	0:59
Travel Time	Travel Time 1st Unit **Distribution**	Urban	4:23	n=0	2:45	4:11	3:28	4:08	5:00
		Rural	14:34	15:24	9:52*	n=0	n=0	n=0	14:00
	Travel Time ERF **Concentration**	Urban	7:49 n=10	n=0	8:09 n=1	7:18 n=2	6:35 n=3	8:18 n=4	9:00
		Rural	28:47	37:59	9:52*	n=0	n=0	n=0	18:00
Total Response Time	Total Response Time 1st Unit On Scene **Distribution**	Urban	7:03	n=0	5:49 n=3	6:49 n=4	6:14 n=6	6:41 n=7	6:59
		Rural	18:41 n=3	16:38 n=2	22:00 n=1	n=0	n=0	n=0	15:59
	Total Response Time ERF **Concentration**	Urban	10:06 n=10	n=0	10:02 n=1	9:46 n=2	9:48 n=3	10:36 n=4	9:59
		Rural	35:37 n=2	47:01 n=1	22:00 n=1	n=0	n=0	n=0	19:59

* Indicates sample size (n) of 1 incident

Structure Fire Standards of Cover Calculations Methodology

The agency's computer-aided dispatch (CAD) system does not currently allow for a unique response plan for a "high risk" structure fire. In order to facilitate an understanding of one possible scenario for a high risk structure fire, the following information contains response data from all reported commercial structure fires to which LFRA was dispatched

during the time period from January 1, 2012, through December 31, 2016. During this time period, the agency operated with a designated Urban Response Area and a Rural Response Area. Additional geographic zones are currently being developed to improve data analysis capabilities.

The following lists describe the methods used to develop first due and ERF calculations for incidents evaluated within this document. The FireView Advanced Reporting Module was used to analyze all response performance data. Alarm Handling Time and Turnout Time analyses were based upon all apparatus assigned to the incident, to allow for accurate performance analysis.

Moderate Risk Fires

Resources:	2012 & 2013: 2 engines, 2 trucks, 1 Battalion Chief
	2014 – 2016: 3 engines, 2 trucks, 1 Battalion Chief
Alarm Handling:	Reporting time for all assigned apparatus
Turnout:	Reporting time for 1st due apparatus
ERF:	2012 & 2013: minimum 13 personnel
	2014 – 2016: minimum 16 personnel
	Reporting time for all apparatus to arrive on scene
Inclusion Criteria:	1st due unit is an Engine
	Call Nature: 1st Alarm Residential
	NFIRS Code: 111

High Risk Fires

Resources:	2012 & 2013: 2 engines, 2 trucks, 1 Battalion Chief
	2014 – 2016: 3 engines, 2 trucks, 1 Battalion Chief
Alarm Handling:	Reporting time for all assigned apparatus
Turnout:	Reporting time for 1st due apparatus
ERF:	2012 & 2013: minimum 13 personnel
	2014 – 2016: minimum 16 personnel
	Reporting time for all apparatus to arrive on scene
Inclusion Criteria:	Emergent responses only
	1st due unit is an Engine

CAD Nature Code: 1st Alarm Commercial

NFIRS Code: 111

Emergency Medical Services (EMS) Incidents

The scope of LFRA's emergency medical services program is limited to providing basic life support (BLS), including provision of supplemental oxygen and an automated external defibrillator (AED), based on patient need and treatment protocols. Emergency medical service in the LFRA response area is augmented by Thompson Valley EMS, which provides advanced life support (ALS) and ambulance transport. TVEMS transports patients to the nearest appropriate hospital emergency department for assessment and treatment. EMS service demand is heavily influenced by population density and commercial development. The following figure displays a visual representation of the count of all EMS incidents within the LFRA response area (Figure 47) between January 1, 2012, and December 31, 2016. The area of greatest concentration of calls, indicated by the dark orange shape, corresponds directly with the area of greatest population density.

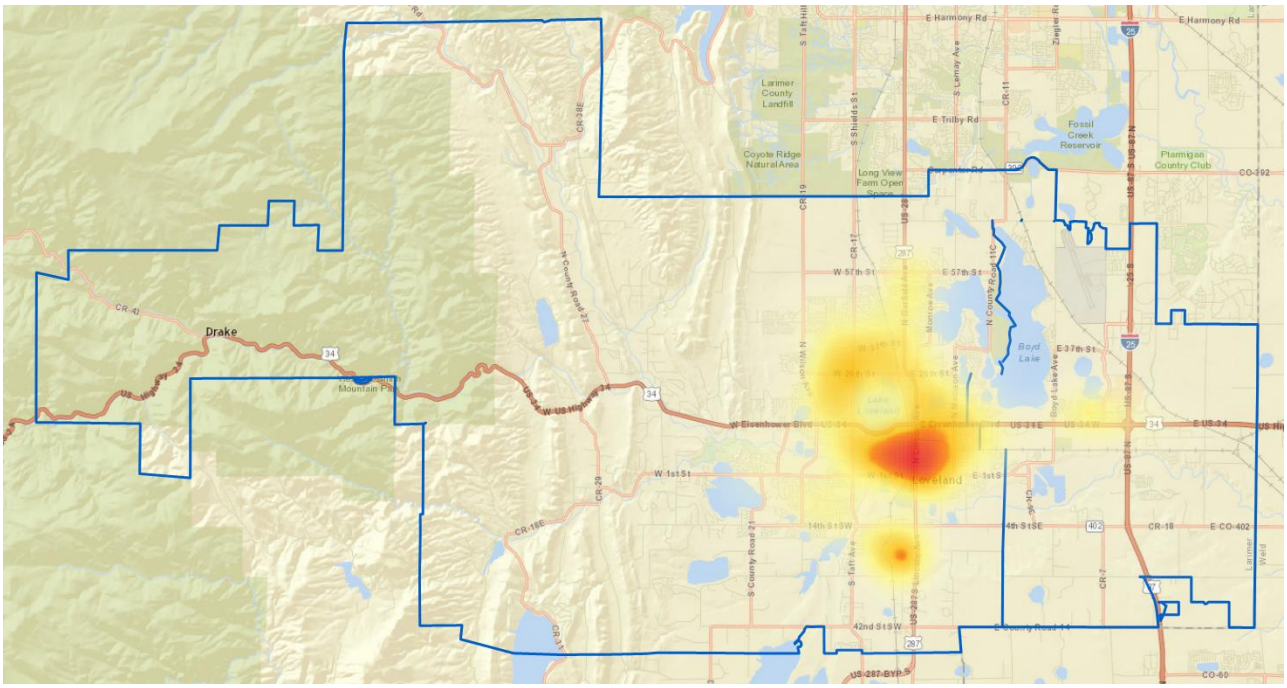


Figure 55: Heat Map of all EMS Incidents (2012 – 2016)

The following critical task analysis includes all LFRA apparatus that are normally assigned by the Loveland Emergency Communications Center, based on the response plan that is generated from the emergency medical dispatch (EMD) procedures. LFRA apparatus are not

routinely assigned to medical incidents that receive an EMD code of Alpha or Bravo. Thompson Valley EMS personnel and equipment are included in the critical task analysis only to reflect their advanced life support (ALS) capabilities.

Motor Vehicle Accident (MVA) with Injuries		
APPARATUS	**Staffing**	**CRITICAL TASKS**
First Due Engine	Officer	Establish command, size-up, develop IAP, scene safety officer
	Engineer & Firefighter	Perform BLS patient care, address scene hazards
TVEMS Ambulance	2	Provide ALS patient care
ERF = 1 LFRA unit with	**3 personnel**	**To perform 6 critical tasks**

Charlie (C), Delta (D) or Echo (E) Medical		
APPARATUS	**Staffing**	**CRITICAL TASKS**
First Due Engine	Officer	Establish command, size-up, develop IAP, scene safety officer
	Engineer & Firefighter	Perform BLS patient care, address scene hazards
*First Due Battalion Chief	1	Upgrade Incident Command and Safety Officer
TVEMS Ambulance	2	Provide ALS patient care
*TVEMS Captain	1	Assist with ALS patient care
ERF = 1 LFRA unit with	**3 personnel**	**To perform 6 critical tasks**

** LFRA Battalion Chief may self-assign to incidents as needed based on dispatch information.*

** TVEMS Captain responds to all Echo medicals, and may self-assign to Charlie and Delta medical as needed based on dispatch information.*

Mass Casualty Incident (greater than 3 patients)		
APPARATUS	**Staffing**	**CRITICAL TASKS**
First Due Engine	Officer	Establish command, size-up, develop IAP, scene safety officer
	Engineer	Initiates triage
	Firefighter	Assist with BLS patient care
Second Due Engine	Officer	Establish apparatus staging location
	Engineer & Firefighter	Assist with BLS patient care
First Due Truck	All personnel	Assist with BLS patient care
Second Due Truck	All personnel	Assist with BLS patient care
First Due Battalion Chief	1	Upgrade Incident Command and Safety Officer
TVEMS Ambulance	2	Senior medic establishes Triage Officer position
		Provide ALS patient care and transport
TVEMS Ambulance	2	Provide ALS patient care and transport
TVEMS Captain	1	Establish Medical Group Supervisor position
TVEMS Chief	1	Liaison with unified command structure
ERF = 5 units with	**13 personnel**	**To perform 6 critical tasks**

Emergency Medical Services (EMS) Incidents: Performance Benchmarks

For 90 percent of all EMS incidents, the total response time for the arrival of the first due apparatus, staffed with at least two (2) firefighters, shall be: 6 minutes and 59 seconds in the urban response area, and 15 minutes and 59 seconds in the rural response area. The first due apparatus for all EMS incidents shall be capable of: performing a 360-degree scene survey; sizing up the situation; requesting additional resources; initiating patient care to include conducting a patient assessment, obtaining vital signs and patient medical history, managing a victim's airway, providing supplemental oxygen, providing CPR and/or administering early defibrillation.

The agency relies upon Thompson Valley EMS (TVEMS), a third-party provider, to complete the effective response force component of its EMS program. The first arriving LFRA company is capable of providing BLS patient care, including the use of an automated external defibrillator (AED), until the arrival of the third-party provider. If the third-party provider arrives on scene first, those personnel shall initiate patient care and the personnel from the first arriving LFRA apparatus shall provide support as needed.

Emergency Medical Services (EMS) Incidents: Baseline System Performance

The following information contains response data from all EMS incidents with an EMD code of Charlie, Delta and/or Echo, to which LFRA responded during the time period from January 1, 2012, through December 31, 2016. These types of EMS incidents are the ones to which LFRA is always assigned and will always respond with lights and siren. During this time period, the agency operated with a designated Urban Response Area and a Rural Response Area. Additional geographic zones are currently being developed to improve data analysis capabilities.

For 90 percent of all EMS incidents, the total response time for the arrival of the first due apparatus, staffed with at least two (2) firefighters is: 9 minutes and 12 seconds in the urban response area, and 19 minutes and 54 seconds in the rural response zone. The first due apparatus is capable of: performing a 360 degree scene survey; sizing up the situation; requesting additional resources; initiating patient care to include conducting a patient

assessment, obtaining vital signs and patient medical history, managing a victim's airway, providing supplemental oxygen, providing CPR and/or administering early defibrillation.

The agency relies upon Thompson Valley EMS (TVEMS), a third-party provider, to complete the effective response force component of its EMS program. The first arriving LFRA company is capable of providing BLS patient care, including the use of an automated external defibrillator (AED), until the arrival of the third-party provider. If the third-party provider arrives on scene first, those personnel shall initiate patient care and the personnel from the first arriving LFRA apparatus shall provide support as needed.

Emergency Medical Services Response - 90th Percentile Times - Baseline Performance			**2012 thru 2016**	**2016**	**2015**	**2014**	**2013**	**2012**	**Agency Target**
Alarm Handling	Pick-up to Dispatch	Urban	2:50	2:47	2:46	2:53	2:58	2:48	1:00
		Rural	2:45	3:06	2:41	2:34	2:56	2:42	1:00
Turnout Time	Turnout Time 1st Unit	Urban	1:37	1:34	1:37	1:39	1:41	1:31	0:59
		Rural	1:41	1:32	1:39	1:40	1:47	1:32	0:59
Travel Time	Travel Time 1st Unit **Distribution**	Urban	6:08	6:05	5:59	6:13	6:10	6:09	5:00
		Rural	17:14	18:33	16:47	15:46	19:14	16:31	14:00
	Travel Time ERF **Concentration**	Urban	6:08	6:05	5:59	6:13	6:10	6:09	9:00
		Rural	17:14	18:33	16:47	15:46	19:14	16:31	18:00
Total Response Time	Total Response Time 1st Unit On Scene **Distribution**	Urban	9:12 n=17435	8:59 n=3922	8:59 n=3782	9:23 n=3566	9:26 n=3144	9:17 n=3021	6:59
		Rural	19:54 n=896	21:22 n=176	19:20 n=158	18:41 n=207	21:34 n=171	19:17 n=184	15:59
	Total Response Time ERF **Concentration**	Urban	9:12 n=17435	8:59 n=3922	8:59 n=3782	9:23 n=3566	9:26 n=3144	9:17 n=3021	9:59
		Rural	19:54 n=896	21:22 n=176	19:20 n=158	18:41 n=207	21:34 n=171	19:17 n=184	19:59

Emergency Medical Services Standards of Cover Calculations Methodology

The following lists describe the methods used to develop first due and ERF calculations for incidents evaluated within this document.

Resources:	1 engine or truck
Alarm Handling / Turnout:	Reporting time for 1st due apparatus
ERF:	1 engine or truck
Inclusion Criteria:	Emergent responses only
	Times determined for 1st due apparatus
Dispatch Nature Codes:	Charlie/Delta, Echo

Wildland Fire Incidents

Grass and Wildland Fires vary in size, location and intensity as influenced by the fuels, weather and topography associated with the incident. LFRA routinely responds to many small grass fires that are handled by the first-due engine company. However, there are several locations within the response area that present unique hazards that dictate enhanced response plans.

Wildland Alarm Levels			
1st Alarm	2nd Alarm	3rd Alarm	4th Alarm
Engine - LFRA	Engine - LFRA	Engine - LFRA	
Engine - LFRA	Engine - PFA	Engine - Windsor	
	Engine (Type3) - BFD		
Brush - LFRA	Brush - LFRA	Brush - Berthoud	Brush - Wellington
Brush - LFRA	Brush - LFRA	Brush - Canyon	Brush - Estes Park
	Brush - PFA	Brush - PFA	Brush - Lyons
			Brush - Mtn View
	Tender - LFRA	Tender - Canyon	Tender - Mtn View
	Tender - LFRA	Tender - PFA	
BC - LFRA	BC - PFA		
	LFRA Shift Recall		
	LCSO Notification		
	900 notify FTC Disp		

Landscape Fire		
APPARATUS	**Staffing**	**CRITICAL TASKS**
First Due Engine	Officer	Establish command, size-up, develop and implement IAP
	Engineer	Operate pump
	Firefighter	Deliver Type 6 Engine to scene, implement IAP with officer
ERF = 1 unit with	**3 personnel**	**To perform 6 critical tasks**

Wildland Fire (1st Alarm)		
APPARATUS	**Staffing**	**CRITICAL TASKS**
First Due Engine with Type 6 Engine	Officer	Establish command, size-up, develop and implement IAP
	Engineer	Operate pump
	Firefighter	Deliver Type 6 Engine to scene, implement IAP with officer
Second Due Engine with Type 6 Engine	Officer	Become Division/Group supervisor
	Engineer	Establish uninterrupted water supply
	Firefighter	Assist with fire attack as assigned
First Due Battalion Chief	BC	Upgrade Incident Command and Safety Officer
ERF = 5 units with	**7 personnel**	**To perform 10 critical tasks**

Wildland Fire Incidents: Performance Benchmarks

For 90 percent of all 1st alarm wildland fires, the total response time for the arrival of the first due apparatus, staffed with at least one (1) officer, one (1) engineer and one (1) firefighter, shall be: 6 minutes and 59 seconds in the urban response area, and 12 minutes and 59 seconds in the rural response area. The first due apparatus for all risk levels shall be capable of: delivering a minimum of 400 gallons of tank water with a minimum of 1,500 gallons per minute rated pump capacity, establishing incident command, performing a scene size-up, developing an appropriate incident action plan, requesting additional resources, establishing an anchor point, and initiating fire attack.

For 90 percent of all 1st alarm wildland fires, the total response time for the arrival of the effective response force (ERF), staffed with seven (7) firefighters, engineers and officers, shall be: 9 minutes and 59 seconds in the urban response area and 15 minutes and 59 seconds in the rural response zone. The ERF shall be capable of: upgrading incident command; establishing imbedded safety officers; establishing lookouts, communications, escape routes, and safety zones (LCES); establishing an uninterrupted water supply; reinforcing the anchor point; and establishing operational groups and/or divisions as appropriate.

Wildland Fire Incidents: Baseline System Performance

The following information contains response data from all grass/wildland fires to which LFRA responded during the time period from January 1, 2012, through December 31, 2016. During this time period, the agency operated with a designated Urban Response Area and a Rural Response Area. Additional geographic zones are currently being developed to improve data analysis capabilities.

For 90 percent of all 1st alarm wildland fire incidents, the total response time for the arrival of the first due apparatus, staffed with at least one (1) officer, one (1) engineer and one (1) firefighter, is: 9 minutes and 30 seconds in the urban response area, and 20 minutes and 52 seconds in the rural response zone. The first due apparatus for all risk levels is capable of: delivering a minimum of 400 gallons of tank water with a minimum of 1,500 gallons per minute rated pump capacity, establishing incident command, performing a scene size-up, developing an appropriate incident action plan, requesting additional resources, establishing an anchor point, and initiating fire attack.

For 90 percent of all 1st alarm wildland fires, the total response time for the arrival of the effective response force (ERF), staffed with seven (7) firefighters, engineers and officers, is: 19 minutes and 14 seconds in the urban response area and 22 minutes and 25 seconds in the rural response zone. The ERF is capable of: upgrading incident command; establishing imbedded safety officers; establishing lookouts, communications, escape routes, and safety zones (LCES); establishing an uninterrupted water supply; reinforcing the anchor point; and establishing operational groups and/or divisions as appropriate.

Wildland Fires - 90th Percentile Times - Baseline Performance			2012 thru 2016	2016	2015	2014	2013	2012	Agency Target
Alarm Handling	Pick-up to Dispatch	Urban	1:58	2:14	2:06	1:44	1:44	1:46	1:00
		Rural	2:56	3:22	2:54	2:40	2:38	1:58	1:00
Turnout Time	Turnout Time 1st Unit	Urban	2:16	2:16	2:22	2:06	1:18	2:24	0:59
		Rural	2:42	2:22	3:08	2:42	2:02	2:50	0:59
Travel Time	Travel Time 1st Unit **Distribution**	Urban	9:30	9:52	9:10	9:12	10:26	8:04	5:00
		Rural	17:46	20:20	17:16	16:12	17:30	14:02	14:00
	Travel Time ERF **Concentration**	Urban	12:41 n=59	13:33 n=18	12:36 n=18	10:26 n=9	12:05 n=6	12:24 n=5	9:00
		Rural	20:17 n=27	21:48 n=11	17:19 n=8	15:39 n=2	20:58 n=3	18:34 n=3	18:00
Total Response Time	Total Response Time 1st Unit On Scene **Distribution**	Urban	9:30 n=145	12:34 n=54	13:14 n=32	12:04 n=22	13:36 n=17	10:56 n=20	6:59
		Rural	22:52 n=131	23:34 n=41	20:02 n=31	18:17 n=18	19:42 n=26	17:18 n=14	15:59
	Total Response Time ERF **Concentration**	Urban	19:14 n=59	17:22 n=18	18:31 n=18	14:58 n=9	18:18 n=6	18:54 n=5	9:59
		Rural	22:25 n=27	27:34 n=11	20:55 n=8	18:44 n=2	21:34 n=3	20:18 n=3	19:59

Wildland Fire Standards of Cover Calculations Methodology

The following lists describe the methods used to develop first due and ERF calculations for wildland fire incidents evaluated within this document. The FireView Advanced Reporting Module was used to analyze all response performance data.

Resources:	2 Type 1 engines, 2 Type 6 engines, 1 Battalion Chief
Alarm Handling:	Reporting time for all assigned apparatus
Turnout:	Reporting time for 1st due apparatus
ERF:	minimum 7 personnel
	Reporting time for all apparatus to arrive on scene
Dispatch Nature Code:	Wildland/Grass and NFIRS Codes 140-143

Hazardous Materials Incidents

Hazardous materials incidents range in complexity from a small spill that can be handled by a single engine company, to large-scale and highly complex incidents that involve numerous mutual aid partners. LFRA's goal is to provide personnel and equipment capable of mitigating smaller scale incidents with a group of personnel trained to the Hazardous Materials Operations level. These personnel are expected to initiate defensive actions to prevent the spread of contamination beyond an initial containment zone. LFRA personnel do not routinely perform offensive HazMat mitigation activities. The agency's Special Operations Team members provide the Technician-level expertise for the agency. There are currently 13 members certified as Hazardous Materials Technicians, with three (3) members trained as Hazardous Materials Specialists in: Radioactive Materials, Railcars, and/or Highway Tanks.

Small Fuel Spill (less than 10 gallons)		
APPARATUS	**Staffing**	**CRITICAL TASKS**
First Due Engine	Officer	Establish command, size-up, develop IAP
	Engineer	Incident mitigation, as directed
	Firefighter	
ERF = 1 unit with	**3 personnel**	**To perform 6 critical tasks**

Level 1 HazMat Incident		
APPARATUS	**Staffing**	**CRITICAL TASKS**
First Due Engine	Officer	Establish command, size-up, develop IAP, notify and call for additional resources
	Engineer	Isolate site and establish safety zones
	Firefighter	Establish decontamination area
First Due Heavy Rescue	Officer	Technical reference
	Engineer	Entry team
	Firefighter	
Second Due Engine	Officer	Backup entry team
	Engineer	
	Firefighter	Assist with decontamination area
First Due Battalion Chief	BC	Upgrades Incident Command and Safety Officer
First Due Ambulance	2	Establish Medical Group
		Perform pre- and post-entry medical checks
ERF = 4 LFRA units with	**10 personnel**	**To perform 12 critical tasks**

Hazardous materials emergencies are divided into levels to better define the types and quantities of resources that may be needed to effectively manage and mitigate the incident. These levels are dynamic and can be upgraded or downgraded as further information becomes available to the Incident Commander.

- Level 1 Incident: An incident or threat of a hazardous release that can be controlled by a single engine company or team trained to the Hazardous Materials Operations level. The incident will not require evacuation beyond one involved building or the immediate area. A Level 1 incident is confined to a small area and poses no threat to life. A Level 1 incident is identified by both size of affected area and type of material released. If either is exceeded or undetermined, then the incident should be considered a Level 2 incident.
    - Examples: Gasoline leaking slowly from a passenger vehicle fuel tank. LPG leaking from a container of 20 pounds or less. Ruptured/broken residential natural gas supply line. Broken containers of consumer commodities in a mercantile occupancy. Spill of less than 10 gallons of a petroleum product.
- Level 2 Incident: Incidents involving an increased hazard or a larger affected area. This type of incident may pose a threat to life and/or property. It may require limited scale evacuations.
    - Examples: Spill of more than 100 gallons of a petroleum product. Evacuation area exceeds the immediate area. Railcar derailment with real or suspected mechanical or chemical damage to the container. LPG accident involving tank equal to or greater than 500 gallons. Spill or leak requiring notification of a State agency.

Hazardous materials incidents that involve a severe hazard and/or a large area may pose an extreme threat to life and property and require large-scale evacuations. Incidents of this magnitude could require involvement from regional, State and/or federal agencies. Examples may include: multiple alarm fires involving real or suspected hazardous materials, railcar derailment involving HazMat on fire or impinged by fire, or rupture of high pressure compressed natural gas (CNG) transmission line.

Hazardous Materials (HazMat) Incidents: Performance Benchmarks

For 90 percent of all Level 2 hazmat incidents, the total response time for the arrival of the first due apparatus, staffed with at least one (1) officer, one (1) engineer, and one (1) firefighter, shall be: 6 minutes and 59 seconds in the urban response area, and 12 minutes and 59 seconds in the rural response area. All personnel on the first arriving apparatus shall all, at a minimum, be certified to the Hazardous Materials Operations level and shall be capable of: establishing incident command, performing a scene size-up, developing an appropriate incident action plan, establishing initial containment zones, deploying air monitoring equipment, determining the need for additional resources, initiating emergency decontamination, and implementing incident-specific defensive actions.

For 90 percent of all Level 2 hazmat incidents, the total response time for the arrival of the effective response force (ERF), staffed with 15 firefighters, engineers and officers, shall be: 9 minutes and 59 seconds in the urban response area and 15 minutes and 59 seconds in the rural response area. The ERF shall be capable of: upgrading incident commander; establishing technical decontamination; and providing at least two (2) personnel certified to the Hazardous Materials Technician level capable of entering a potentially contaminated atmosphere while wearing appropriate personal protective equipment to establish air monitoring, perform product transfer, collect material for analysis, and/or rescue victims.

Hazardous Materials (HazMat) Incident: Baseline System Performance

The following information contains response data from all hazardous materials incidents to which LFRA responded during the time period from January 1, 2012, through December 31, 2016. During this time period, the agency operated with a designated Urban Response Area and a Rural Response Area. Additional geographic zones are currently being developed to improve data analysis capabilities.

For 90 percent of all Level 2 hazmat incidents, the total response time for the arrival of the first due apparatus, staffed with at least one (1) officer, one (1) engineer and one (1) firefighter, is: 7 minutes and 40 seconds in the urban response area and 28 minutes and 04 seconds in the rural response area. The first due apparatus is capable of: establishing incident command, performing a scene size-up, developing an appropriate incident action plan,

establishing initial containment zones, deploying air monitoring equipment, determining the need for additional resources, initiating emergency decontamination, and implementing incident-specific defensive actions.

For 90 percent of all Level 2 hazmat incidents, the total response time for the arrival of the effective response force (ERF), staffed with 15 firefighters, engineers and officers, is: 17 minutes and 12 seconds in the urban response area and 27 minutes and 38 seconds is the rural response area. The ERF is capable of: establishing incident command, performing a scene size-up, developing an appropriate incident action plan, establishing initial containment zones, deploying air monitoring equipment, determining the need for additional resources, initiating emergency decontamination, and implementing incident-specific defensive actions.

Hazardous Materials Incidents - 90th Percentile Times - Baseline Performance			**2012 thru 2016**	**2016**	**2015**	**2014**	**2013**	**2012**	**Agency Target**
Alarm Handling	Pick-up to Dispatch	Urban	2:02	1:26	1:34	n=0	1:38	4:34	1:00
		Rural	6:08	n=0	6:08	8:50	n=0	1:26	1:00
Turnout Time	Turnout Time 1st Unit	Urban	1:46	1:58	1:46	n=0	1:44	2:00	0:59
		Rural	1:52	n=0	4:34	1:16	n=0	3:42	0:59
Travel Time	Travel Time 1st Unit **Distribution**	Urban	4:52 n=11	2:26	4:36	n=0	6:24*	2:20	5:00
		Rural	23:00 n=4	n=0	n=0	16:50*	n=0	23:48	14:00
	Travel Time ERF **Concentration**	Urban	9:56 n=8	8:36 n=3	9:36 n=2	n=0	13:28*	10:40 n=2	9:00
		Rural	28:36 n=4	n=0	n=0	19:52*	n=0	28:38 n=3	18:00
Total Response Time	Total Response Time 1st Unit On Scene **Distribution**	Urban	7:40 n=11	5:50 n=2	6:44 n=3	n=0	8:48*	7:28	6:59
		Rural	28:04 n=4	n=0	n=0	26:56*	n=0	26:56	15:59
	Total Response Time ERF **Concentration**	Urban	17:12 n=8	18:42 n=3	11:16 n=2	n=0	17:40*	15:58 n=2	9:59
		Rural	27:38 n=4	n=0	n=0	28:12*	n=0	27:50 n=3	19:59

* Indicates sample size (n) of 1 incident

Hazardous Materials Standards of Cover Calculations Methodology

The following lists describe the methods used to develop first due and ERF calculations for incidents evaluated within this document. The FireView Advanced Reporting Module was used to analyze all response performance data.

Hazardous Materials Incident

Resources:	3 engines, 2 trucks, 1 Battalion Chief
Alarm Handling:	Reporting time for all assigned apparatus
Turnout:	Reporting time for 1st due apparatus
ERF:	minimum 15 personnel
	Reporting time for all apparatus to arrive on scene
Inclusion Criteria:	Call Nature: HazMat II

Technical Rescue Incidents

There is tremendously wide range of technical rescue incidents which could reasonably be expected to occur within the LFRA response area. The agency is staffed and equipped to provide an initial response to assess and stabilize the incidents that are most likely to occur. Incidents that could be expected to exceed a "first alarm" incident, or necessitate Technician-level expertise in a technical rescue discipline, will be upgraded as needed by the Incident Commander. The Special Operations Team consists of 28 LFRA personnel with the following advanced training in the various technical rescue disciplines:

Urban Search and Rescue (USAR)

- 5 – Collapse Rescue Technicians
- 1 – Collapse Rescue Specialist (USAR – Structural Engineer)
- 6 – Confined Space Technicians
- 2 – Large Animal Rescue Technicians
- 13 – Rope Rescue Technicians
- 15 – Trench Rescue Technicians

Water Rescue

- 10 – Public Safety Divers
- 12 – Swift Water Rescue Technicians

Thompson Valley EMS (TVEMS) provides nine (9) personnel to the Special Operations Team with the following specialized training:

- 9 – Emergency Medical Technicians (EMT) - Paramedics
- 4 – Trench Rescue Technicians
- 1 – Rope Rescue Technician

Windsor Severance Fire Rescue (WSFR) provides three (3) personnel to the Special Operations Team with the following specialized training:

- 1 – Public Safety Diver
- 1 – Swift Water Rescue Technician
- 2 – Confined Space Technicians
- 2 – Rope Rescue Technicians

Extrication (Motor Vehicle Accident or Equipment)		
APPARATUS	**Staffing**	**CRITICAL TASKS**
First Due Engine	Officer	Establish command, size-up, develop IAP, patient triage
	Engineer	Establish safe operating area, initiate patient care
	Firefighter	
Second Due Engine	Officer	Vehicle triage
	Engineer	Establish water supply and operate pump
	Firefighter	Hose line for fire control
Third Due Engine	Officer	Begin vehicle stabilization
	Engineer	
	Firefighter	
First Due Truck	Officer	Rescue Group Supervisor
	Engineer	Stabilize vehicle(s), extrication
	Firefighter	
Second Due Truck	Officer	Operate extrication equipment
	Engineer	
	Firefighter	
First Due Battalion Chief	BC	Upgrade Incident Command and Safety Officer
ERF = 6 units with	**16 personnel**	**To perform 10 critical tasks**

Dive Rescue		
APPARATUS	**Staffing**	**CRITICAL TASKS**
First Due Engine	Officer	Establish command, size-up, develop IAP
	Engineer	Witness interviews and triangulation
	Firefighter	
Second Due Engine	Officer	Rescue Group supervisor
	Engineer	Primary diver (Dive Rescue Specialist)
	Firefighter	Line tender for primary diver
Third Due Engine	Officer	Assist with shore support
	Engineer	Backup diver (Dive Rescue Specialist)
	Firefighter	Line tender for backup diver
First Due Truck	Officer	Assist with shore support
	Engineer	Deploy and operate water rescue boat
	Firefighter	
Second Due Truck	Officer	Assist with shore support
	Engineer	Assist with operation/deployment of water rescue boat
	Firefighter	
First Due Battalion Chief	BC	Upgrade Incident Command and Safety Officer
ERF = 6 units with	**16 personnel**	**To perform 14 critical tasks**

Swift Water Rescue		
APPARATUS	**Staffing**	**CRITICAL TASKS**
First Due Engine	Officer	Establish command, size-up, develop IAP
	Engineer	Witness interviews and triangulation
	Firefighter	
Second Due Engine	Officer	Rescue Group supervisor
	Engineer	Primary swift water rescue technicians
	Firefighter	
Third Due Engine	Officer	Coordinate deployment of rescue boat or rope rescue
	Engineer	Secondary swift water rescue technicians
	Firefighter	
First Due Truck	Officer	Officer establishes Support Group supervisor
	Engineer	Downstream safety personnel
	Firefighter	
Second Due Truck	Officer	Assist with downstream safety, rescue boat, or highline
	Engineer	Deploy rescue boat or set-up highline as directed
	Firefighter	
First Due Battalion Chief	BC	Upgrade Incident Command and Safety Officer
ERF = 6 units with	**16 personnel**	**To perform 12 critical tasks**

Confined Space / Structural Collapse Rescue / Trench Rescue		
APPARATUS	**Staffing**	**CRITICAL TASKS**
First Due Engine	Officer	Establish command, size-up, develop IAP
	Engineer	Initial entry team
	Firefighter	
Second Due Engine	Officer	Officer establishes Rescue Group supervisor
	Engineer	Set up anchors/rigging, line tenders for initial entry team
	Firefighter	
Third Due Engine	Officer	Coordinate communications
	Engineer	Backup entry team
	Firefighter	
First Due Truck	Officer	Air supply manager
	Engineer	Maintain supplied air system
	Firefighter	
Second Due Truck	Officer	Support Group supervisor
	Engineer	Cutting/Support team or line tenders for backup entry team
	Firefighter	
First Due Battalion Chief	BC	Upgrade Incident Command and Safety Officer
ERF = 6 units with	**16 personnel**	**To perform 16 critical tasks**

Technical Rescue Incidents: Performance Benchmarks

For 90 percent of all technical rescue incidents, the total response time for the arrival of the first due apparatus, staffed with at least one (1) officer, one (1) engineer, and one (1) firefighter, shall be: 6 minutes and 59 seconds in the urban response area, and 12 minutes and 59 seconds in the rural response area. The first due apparatus to a technical rescue incident shall be capable of: establishing incident command, conducting a scene size-up, establishing scene security, requesting additional resources as necessary, and providing and operating the tools and equipment necessary to implement a rapid rescue. All first due apparatus shall carry basic low-angle rope rescue equipment, cribbing, mechanical advantage tools, personal floatation devices, water rescue rope throw bags, surface ice rescue equipment and swift water rescue boards.

For 90 percent of all technical rescue incidents, the total response time for the arrival of the effective response force (ERF), staffed with 15 firefighters, engineers and officers, shall be: 9 minutes and 59 seconds in the urban response area and 15 minutes and 59 seconds in the rural response area. The ERF shall be capable of: upgrading incident command, establishing imbedded safety officers, establishing patient contact, staging responding apparatus, and implementing appropriate rescue techniques.

Technical Rescue Incidents: Baseline System Performance

The following information contains response data from all technical rescue incidents to which LFRA responded during the time period from January 1, 2012, through December 31, 2016. During this time period, the agency operated with a designated Urban Response Area and a Rural Response Area. Additional geographic zones are currently being developed to improve data analysis capabilities.

For 90 percent of all technical rescue incidents, the total response time for the arrival of the first due apparatus, staffed with at least one (1) officer, one (1) engineer, and one (1) firefighter, is: 10 minutes and 30 seconds in the urban response area and 22 minutes and 30 seconds in the rural response area. Every first due apparatus carries basic low-angle rope rescue equipment, cribbing, mechanical advantage tools, personal floatation devices, water rescue rope throw bags, surface ice rescue equipment and swift water rescue boards, and is capable of: establishing incident command, conducting a scene size-up, establishing scene security, requesting additional resources as necessary, and providing and operating the tools and equipment necessary to implement a rapid rescue.

For 90 percent of all technical rescue incidents, the total response time for the arrival of the effective response force (ERF), staffed with 15 firefighters, engineers and officers, is: 19 minutes and 27 seconds in the urban response area and 48 minutes and 13 seconds in the rural response area. The ERF is capable of: upgrading incident command, establishing imbedded safety officers, establishing patient contact, staging responding apparatus, and implementing appropriate rescue techniques.

Technical Rescue Standards of Cover Calculations Methodology

The following lists describe the methods used to develop first due and ERF calculations for incidents evaluated within this document. The FireView Advanced Reporting Module was used to analyze all response performance data.

Resources:	3 engines, 2 trucks, 1 Battalion Chief
Alarm Handling:	Reporting time for 1st due apparatus
Turnout:	Reporting time for 1st due apparatus

ERF: minimum 15 personnel

Reporting time for all apparatus to arrive on scene

Inclusion Criteria: Call Nature: Building Collapse, Confined Space Rescue, Dive Rescue, Industrial Rescue, MVA Extrication, Rope Rescue, Trench Rescue

All Technical Rescue Incidents - 90th Percentile Times - Baseline Performance			**2012 thru 2016**	**2016**	**2015**	**2014**	**2013**	**2012**	**Agency Target**
Alarm Handling	Pick-up to Dispatch	Urban	2:50	2:06	2:20	2:34	4:50	3:04	1:00
		Rural	3:16	2:50	2:08	3:56	4:20	2:28	1:00
Turnout Time	Turnout Time 1st Unit	Urban	2:04	1:38	2:02	2:02	2:12	1:58	0:59
		Rural	2:08	2:08	1:48	2:08	2:32	2:04	0:59
Travel Time	Travel Time 1st Unit **Distribution**	Urban	7:28 n=272	7:14 n=56	6:54 n=66	8:12 n=54	6:50 n=57	6:16 n=39	5:00
		Rural	19:52 n=102	23:20 n=20	16:58 n=22	15:38 n=20	17:22 n=23	20:26 n=17	14:00
	Travel Time ERF **Concentration**	Urban	14:20 n=18	12:29 n=6	14:41 n=5	13:07 n=3	18:48 n=4	9:34 n=4	9:00
		Rural	41:44*	n=0	n=0	41:44*	n=0	n=0	18:00
Total Response Time	Total Response Time 1st Unit On Scene **Distribution**	Urban	10:30 n=272	9:08 n=56	10:04 n=66	11:20 n=54	10:34 n=57	10:14 n=39	6:59
		Rural	22:30 n=102	25:02 n=20	17:58 n=22	21:20 n=20	21:44 n=23	22:48 n=17	15:59
	Total Response Time ERF **Concentration**	Urban	19:27 n=18	19:27 n=6	18:04 n=5	16:59 n=3	22:31 n=4	17:32 n=4	9:59
		Rural	48:13*	n=0	n=0	48:13*	n=0	n=0	19:59

* Indicates sample size (n) of 1 incident

Chapter 5 – Compliance Methodology

Going from Good to Great

The membership of Loveland Fire Rescue Authority (LFRA) continues to establish programs and processes that will lay a foundation for the long-term success of the agency. All levels of the agency are involved in the day-to-day operations of the agency, with every member responsible for at least one project or program area. As a direct result of the agency's growth since 2009, every employee has learned the value of hard work and the dedication that is required from a great fire service agency. Employees have also learned what can happen when vision is lost or is incorrectly applied. The agency's two leadership teams, Executive Leadership and the Operations Team, will continue to provide the courageous leadership that is necessary to keep a great organization focused on the future while not forgetting about the past.

Building Enduring Greatness

By the end of 2015, the agency was halfway through the planning cycle that was established by the 2012 Strategic Plan. By the end of 2016, the leadership of Fire Chiefs Randy Mirowski and Mark Miller enabled the agency to achieve nearly 100% of the 28 initiatives established in the 2012 Strategic Plan. During late 2016, the agency began the process of developing an updated strategic plan, which is expected to be complete by the end of 2017.

During the time period from 2009 to 2014, all positions in the organization have been focused on going from good to great, and building LFRA to last. Under Fire Chief Mark Miller's leadership, employees are now unified in the effort to build enduring greatness into the very fabric of the organization, with an emphasis on ethical and others-centered behavior. Members of the LFRA have committed to focusing on six (6) elements of leadership to aid in that quest: empathy, self-awareness, self-regulation, motivation, teamwork, and personal humility with a fierce will. It is through focus on these elements that LFRA will stay on a path of continuous improvement and provide services to our community that exceed their expectations. These results will only be possible with a

talented and dedicated workforce that is supported by a unified group of leaders and elected officials.

Members of the agency are currently establishing and clarifying the agency's ethos: our core philosophy and cultural expectations. This process is intended to unify the membership under common themes and the foundational doctrine that guides all decisions and actions of the LFRA family. The "4Rs" term that LFRA has coined (Response, Readiness, Relationships, Resources) has become a standard by which employees prepare for and perform their duties. All decisions are based on their anticipated impact, good or bad, on the 4Rs. The lessons learned in LFRA's journey towards Accredited Agency status must become part of the agency's everyday life, not a standalone system. Periodic review and reporting must become commonplace:

1. Maintain positive relationships with external agencies
2. Support all decisions with verifiable data
3. Review and update progress towards adopted Strategic Plan
4. Communicate expectations between leadership and employees
5. Monitor response performance in relation to established goals and objectives
6. Promote unity throughout the agency and an "Others Centered" approach to service delivery

Chapter 6 – Overall Evaluation and Recommendations

The agency has evaluated both itself and the community it serves, in terms of hazards, risks, service delivery, and response performance. This evaluation was conducted in comparison to established standards as well as fire service "best practice" recommendations. Throughout all assessments, the agency was able to identify not only when things were done well, but also areas where improvements could be made. Procedures have been established to help the agency remain vigilant in the assessment of the agency and the programs and services delivered. In order to continue to promote the pursuit of excellence, the following recommendations are made, based on the lessons learned during the development of this document:

1. The agency should continue to seek opportunities to improve reporting procedures to better capture incident information.
2. The agency should continue to evaluate response performance in comparison with population density, resource location, and community risk to ensure that performance goals and objectives are met.
3. The agency should share and explain the contents of this document with all department membership and key external stakeholders to ensure that is it understood by all.
4. The agency should share this document with the Board of Directors and request that it be adopted by the Board.

Appendix A: Big Thompson Canyon Incident Summary

The Big Thompson Canyon Volunteer Fire Department (BTCVFD) was formed within the existing Loveland Rural Fire Protection District (LRFPD) in 1963 to improve service to the residents and businesses within the canyon. The BTCVFD is staffed with volunteers who are able to respond to incidents in their personal vehicles as well as is agency apparatus. When LFRA was formed in 2012, the BTCVFD joined the agency; however, the BTCVFD maintains their own fire department ID number for reporting incident response information to the State of Colorado. Additionally, the BTCVFD is rated as a separate agency by the Insurance Services Office (ISO) because they are primarily staffed by volunteers and supported by automatic aid from LFRA.

Because of this unique arrangement, BTCVFD does not submit incident reports via Emergency Technologies, Inc. (ETI), LFRA's records management system. Fortunately, the BTCVFD is dispatched by the Loveland Emergency Communications Center (LECC), so LFRA is able to obtain incident response information, including all time stamps from the LECC computer-aided dispatch system. The following information represents a summary of the incident response history for the BTCVFD for the time period from January 1, 2012, through December 31, 2016.

Call Type	2016	%	2015	%	2014	%	2013	%	2012	%
Structure Fire	9	6.16%	6	5.04%	4	3.96%	4	4.04%	2	2.02%
Grass/Wildland	20	13.70%	20	16.81%	3	2.97%	3	3.03%	8	8.08%
Vehicle Fire	0	0.00%	0	0.00%	1	0.99%	1	1.01%	0	0.00%
Other Fire	20	13.70%	2	1.68%	6	5.94%	7	7.07%	9	9.09%
Smoke Investigation	7	4.79%	3	2.52%	9	8.91%	12	12.12%	9	9.09%
Tech Rescue	8	5.48%	4	3.36%	6	5.94%	5	5.05%	9	9.09%
EMS	31	21.23%	35	29.41%	44	43.56%	23	23.23%	27	27.27%
MVA	29	19.86%	33	27.73%	20	19.80%	24	24.24%	32	32.32%
Service Call	16	10.96%	11	9.24%	4	3.96%	15	15.15%	3	3.03%
Haz Condition	5	3.42%	3	2.52%	3	2.97%	5	5.05%	0	0.00%
Fire Alarm	1	0.68%	2	1.68%	1	0.99%	0	0.00%	0	0.00%
Annual Total	**146**	**100.00%**	**119**	**100.00%**	**101**	**100.00%**	**99**	**100.00%**	**99**	**100.00%**

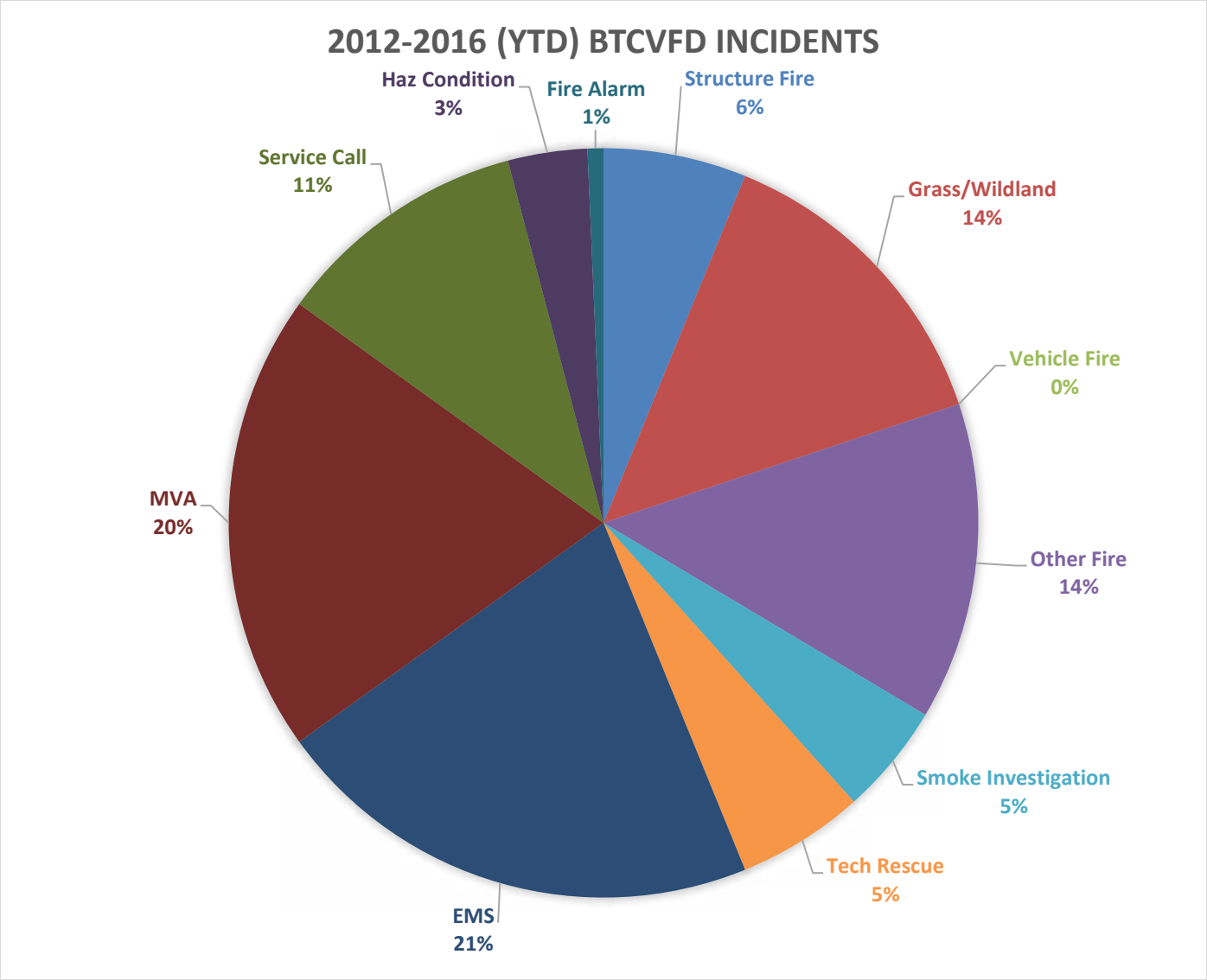


Figure 57: BTCVFD Incident Frequency (2012-2016)

Based on the extremely low call volume in the BTCVFD response area, it was determined that their response performance was statistically insignificant in comparison to overall response performance for LFRA. However, BTCVFD response performance was analyzed for all incidents that occurred in their response area during the time period from January 1, 2012, through December 31, 2016, to assist LFRA understand the current situation and to identify possible opportunities for improvement.

	80th Percentile Performance					90th Percentile Performance				
	2016	2015	2014	2013	2012	2016	2015	2014	2013	2012
Call Processing	0:02:34	0:02:27	0:02:45	0:03:07	0:02:35	0:3:13	0:03:17	0:04:15	0:04:46	0:04:10
Turnout	0:13:48	0:08:39	0:10:13	0:10:18	0:09:54	0:21:31	0:12:31	0:14:10	0:14:05	0:15:04
1st Travel	0:13:27	0:10:45	0:09:38	0:14:34	0:15:35	0:17:50	0:14:24	0:12:27	0:18:30	0:21:49
ERF Travel	0:14:57	0:14:58	0:14:38	0:19:24	0:16:50	0:27:59	0:24:39	0:22:58	0:44:16	0:26:21
1st Response	0:23:11	0:22:41	0:24:09	0:26:12	0:24:47	0:32:49	0:28:09	0:27:30	0:35:31	0:36:53
ERF Response	0:27:36	0:28:53	0:27:04	0:26:12	0:30:37	0:45:08	0:43:57	0:36:12	0:39:14	0:35:43

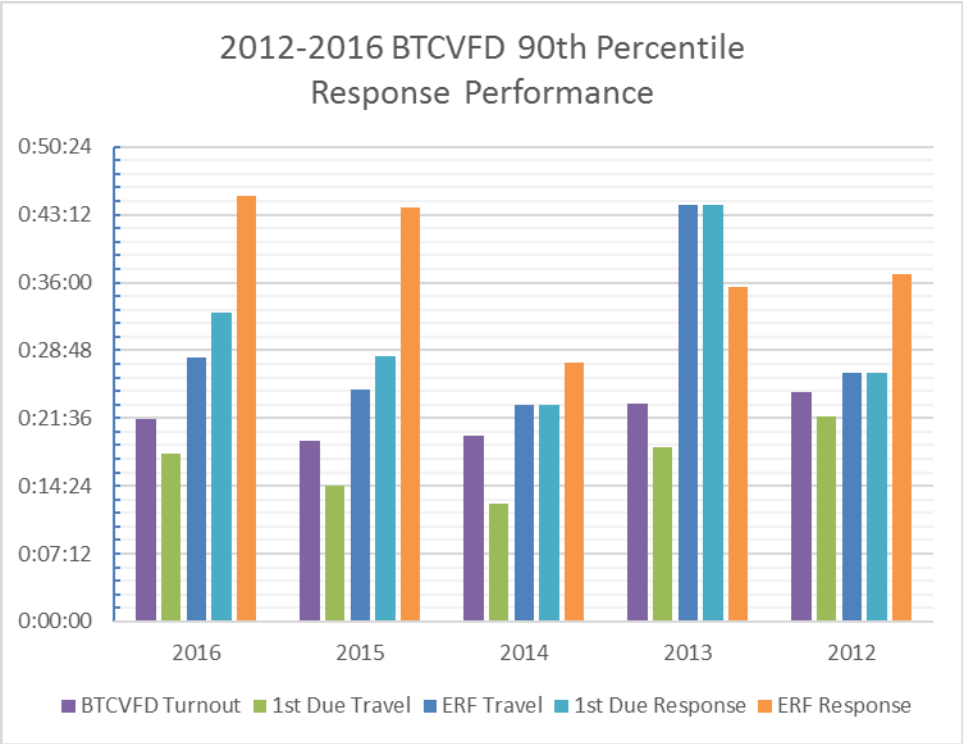


Figure 58: BTCVFD 90th Percentile Response Performance

The greatest hurdle to overcome in terms of improving response performance in the canyon is that the BTCVFD is 100% staffed with volunteers. Currently, the volunteers do not regularly staff one of the BTCVFD fire stations. Rather, volunteers are notified of a call in their response area, then they either respond directly to the scene in their personal vehicle or they respond to the nearest fire station to staff an apparatus. This leads to extended times for both Turnout and Travel time calculations. LFRA Executive Leadership is currently working collaboratively with BTCVFD leadership to identify opportunities for improvement.

Appendix B: Glossary of Terms and Abbreviations

A

Acting Positions – Any member may be selected to "act" one rank above their designated rank, provided they have the necessary certifications and have completed a pre-determined training program to assess their qualifications. Acting positions are generally intended to fill short-term needs to maintain minimum staffing requirements.

ADA – Americans with Disabilities Act

After Action Review (AAR) – Critiques performed after major incidents to discuss lessons learned from the incident. Participants may include all participating LFRA personnel as well as outside agencies. (See also, Significant Incident Summary Report)

Agency – This is a general term that refers to Loveland Fire Rescue Authority to avoid redundancy and repetition. This term may specifically reference another entity within the context of a specific section of the document.

Air Pack – Refers to the self-contained breathing apparatus (SCBA) worn by firefighters within an atmosphere that could by immediately dangerous to life and health

Advanced Life Support (ALS) – The highest level of pre-hospital emergency medical care. This care is provided by Paramedics with Thompson Valley EMS and includes advanced treatment protocols.

Alarm Processing Time – Length of time between when a 911 emergency call is received in the dispatch center until the first emergency unit is assigned to the call. This time is the first component of Total Response Time. (See also Call Processing Time)

Annual Report – A document produced by LFRA at the end of each calendar year to provide detailed information to stakeholders about performance of the agency.

Apparatus – A mobile vehicle specially designed to support firefighting activities. Most common apparatus include a fire engine, truck, heavy rescue, and a water tender.

ATF – Bureau of Alcohol, Tobacco, Firearms and Explosives. This federal agency may assist with complex fire investigations.

Authority – Loveland Fire Rescue Authority. Within the context of the document, the term may also be applied to a separate governmental entity that exists to provide a specific range of services, separate from other city, county or state government system.

Automated External Defibrillator (AED) – A device that may be applied by an EMT to a patient suspected of being in cardiac arrest which delivers a shock in an attempt to restore normal cardiac rhythm. (See also Defibrillator)

B

Basic Life Support (BLS) – Emergency medical care provided by LFRA personnel. Acts allowed are limited to non-invasive procedures that are intended to prolong life support functions until the arrival of advanced life support personnel.

Battalion – The Operations Division work group that works a 24-hour shift. Also referred to as a shift. LFRA uses a three (3) battalion/shift system (A, B, and C), with one shift on-duty each day. Each shift is supervised by a Battalion Chief with Captains, Lieutenants, Engineers and Firefighters assigned to specific apparatus on each shift.

Battalion Chief (BC) – A promotional position within LFRA Command Staff. Battalion Chiefs manage the daily operations of the Operations Division, including direct supervision of the Captains and Lieutenants on each shift. One additional Battalion Chief manages the Training Division.

Berthoud Fire Department (BFD) – A fire protection district south of the LFRA jurisdiction, providing coverage to the Town of Berthoud and surrounding areas.

Big Thompson Canyon Volunteer Fire Department (BTCVFD) – A subsidiary department of the Loveland Rural Fire Protection District that was established in 1963 to improve fire and rescue services to the citizens and visitors within the Big Thompson Canyon between Loveland and Estes Park. The BTCVFD operates as a battalion within LFRA, overseen by a Battalion Chief elected from BTCVFD membership.

Blue Card – A training and certification program designed to train, evaluate and certify fire service officers who serve in the role of Incident Commander to effectively supervise and manage hazard zone operations for small-scale incidents/events.

Board of Directors – The governing body of a special district or fire authority. The Board of Directors for the Loveland Rural Fire Protection District (LRFPD) consists of six (6) members. The Board of Directors for the Loveland Fire Rescue Authority (LFRA) consists of five (5) members, two each from the City of Loveland and the LRFPD, with the fifth member selected by the four other members.

Brush Patrol – A four-wheel drive vehicle that is designed for use in wildland firefighting activities. Modifications typically include a small pump, water tank, various sizes and lengths of wildland firefighting hose, and numerous tools. These apparatus are usually built on a one-ton pickup chassis to allow for increased maneuverability as compared to a standard fire engine. (See also Type 6 Engine)

Budget – A plan of anticipated financial activities for a fiscal year, which includes all expected revenues as well as expenditures. It must be approved by both governing partners prior to being adopted by the LFRA Board of Directors. The adoption process provides the legal basis for expenditures.

Bunker Gear – A system of outer protective clothing worn by firefighters. Depending on the context, the term can apply to only the jacket, trousers and boots, or to the entire combination of personal protective clothing and equipment. The term is derived from historical placement of the pants and boots being left by the firefighter's bunk when sleeping. (See also Turnout Gear)

Bureau – A term that references the Fire Prevention Bureau. This branch of LFRA is referred to as the Community Safety Division (CSD).

C

CAD – Computer-Aided Dispatch

Call Processing Time – See also Alarm Processing Time.

Captain – A promotional position. Each shift has a Captain assigned to each of the two truck companies. These Captains supervise their assigned company as well as the engine companies on their designated shift. There are also Captains assigned as the Emergency Manager and as the Deputy Fire Marshal.

Career Company – A group of paid firefighters staffing a designated apparatus. (See also Company)

Career Firefighter – A paid, full-time firefighter.

CFAI – Commission on Fire Accreditation International

Chain of Command – The line of authority, communication and responsibility within an organization.

CPSE – Center for Public Safety Excellence

CPC – Commission for Professional Credentialing

Chief Officers – Positions that include the Fire Chief, Division Chiefs, and Battalion Chiefs.

City – City of Loveland

City Council – Loveland City Council. The governing body for the City of Loveland.

Civilian Personnel – Employees of LFRA who are not sworn firefighters

Certificate of Occupancy (CO) – A document issued by a local government building department or division that certifies a building's compliance with applicable codes and standards. When a building receives a certificate of occupancy, it indicates that the building may be legally occupied by the owner.

CNG – Compressed Natural Gas

Code 1 – A term used to describe a mode of emergency response to an incident. A code 1 response does not include use of emergency lights and/or siren and is correctly referred to as a "non-emergent" response.

Code 3 – A term used to describe a mode of emergency response to an incident. A code 3 response includes use of emergency lights and siren and is correctly referred to as an "emergent" response.

Colorado Bureau of Investigation (CBI) – A branch of the Colorado Department of Public Safety that provides expertise in the investigation of crimes. Services provided include laboratory analysis, fingerprint analysis, certified fire investigators, and accelerant detection K-9.

Colorado State Patrol (CSP) – A branch of the Colorado Department of Public Safety that provides law enforcement and hazardous materials response on State and Federal highways.

Colorado State University (CSU) – An institute of higher learning that is located in Fort Collins.

Command Staff – LFRA leadership team consisting of the Fire Chief, both Division Chiefs, the Administrative Director and all Battalion Chiefs.

Command Team – Any group of individuals in command of an incident. A Command Team is typically formed on larger and/or more complex incidents, and may involve multiple agencies.

Community Safety Division (CSD) – LFRA Division that coordinates fire prevention-related activities, including development/plan review, fire inspection, public information and education, fire investigation and the Office of Emergency Management (OEM).

Company – The basic functional unit of any fire service agency. This organized team of firefighters typically consists of an officer, an engineer and a firefighter. A company is assigned to a designated apparatus, such as an engine company or a truck company. A company designation indicates the primary functional role of that company on an emergency scene. LFRA staffs seven (7) career companies per shift. (See also Crew)

Company Qualifications Testing (CQT) – Company-specific tasks that are designed and intended to measure a company's ability to perform basic fireground operations according to established policies, procedures and/or guidelines.

Confined Space Rescue – Organized rescue and/or recovery efforts within an area that has limited or restricted means of entry or exit, which is not designed for continuous occupancy, and may contain an atmosphere that is immediately dangerous to life and health.

CPR – Cardiopulmonary Resuscitation

Crew – See Company

Cross-Staffing – A staffing concept where personnel may deploy on any apparatus housed within their fire station based on the type of incident to which they are dispatched (e.g., staffing a water tender and an engine for a rural structure fire).

CSFS – Colorado State Forest Service

CSU-HPL – Colorado State University Human Performance Laboratory

D

Driver/Operator (D/O) – A promotional position. An individual who has received specialized training and is assigned to drive and operate fire apparatus. This position is commonly referred to as an "Engineer."

Defibrillator – See Automated External Defibrillator (AED)

Department – Commonly used by employees of LFRA when referring to the agency. May also be used to refer to another fire service agency or a division of local government, as specified in context.

Designated Emergency Response Agency (DERA) – A governmental entity or agency designated as the regional leader for emergency response and mitigation of hazardous materials incidents.

DHS – Department of Homeland Security

Dispatch – See Loveland Emergency Communications Center (LECC)

District – Loveland Rural Fire Protection District or LRFPD. This term may also be used to refer to another special district, as specified in context.

Division Chief – A promotional position. The individual designated to supervise one of two functional divisions of LFRA: Operations and Community Safety.

Drake – A community within the Big Thompson Canyon

E

EAP – Employee Assistance Program. A confidential counseling service provided to employees through the City of Loveland.

EEO – Equal Employment Opportunity

Emergency Response – A response by public safety personnel to mitigate the hazards associated with an incident. An emergency response may be either Code 1 or Code 3, as described above.

Emergency Medical Services (EMS) – Pre-hospital medical care provided for the sick and/or injured.

Emergency Medical Technician (EMT) – Individuals trained and certified to provide basic life support pre-hospital medical care for the sick and/or injured.

Emergency Technologies Inc (ETI) – The records management system utilized by LFRA to document all NFIRS and EMS calls for service, as well as personnel training records, inspections, pre-fire planning and permits.

Emergent – A term used to describe a mode of emergency response to an incident. An emergent response includes use of emergency lights and siren and may be referred to as a "Code 3" response.

En Route – A term used to signify that a fire company is responding to a call for service.

Engine – A fire apparatus that carries water, a fire pump, various hose, and an assortment of firefighting tools and equipment. (See also Fire Engine)

Engine Company – The basic firefighting unit that is composed of an officer, engineer, and a firefighter, staffed on an engine.

EOC – Emergency Operations Center

Estes Valley Fire Protection District (EVFPD) – A fire protection district west of LFRA jurisdiction, providing coverage to the community of Estes Park and surrounding areas.

Executive Staff – LFRA senior leadership group composed of the Fire Chief, both Division Chiefs and the Administrative Director.

F

Fast Track – A plan review process designed to expedite review and approval processes, attended by customers, City of Loveland Development Services staff and LFRA staff.

FEMA – Federal Emergency Management Agency

Fire Company – See Company

Fire Inspection Technician (FIT) – A rotational development position staffed by an Engineer on special assignment. This position serves as the third member of the Rescue Company but operates in a separate vehicle. In addition to their Operations Division responsibilities, the FIT performs a variety of fire prevention-related activities, including fire inspection/code enforcement, public education and fire investigation. There is one (1) FIT assigned to each shift.

Fire Prevention Bureau – See Community Safety Division

Fire Rescue Advisory Commission (FRAC) – A nine (9) member citizen advisory body that provides input to the Fire Chief regarding strategic planning, fire protection, rescue and emergency management issues.

Firefighter (FF) – An employee trained and certified in fire suppression, rescue, and emergency medical care. The term may refer to the specific rank of Firefighter or may be used in a more general sense to refer to all firefighting personnel.

Fireground – The geographic area where incident response and mitigation activities take place.

First-Due Area – The geographic area served by a fire station. Each fire station is assigned a first-due area in which they are expected to be most familiar with terrain, geography, streets, occupancies, risks and hazards.

Flashover – A transitional phase in the development of a compartment fire in which surfaces exposed to thermal radiation reach their ignition temperature simultaneously, resulting in rapid fire spread to all fuel sources within the space which leads to full room involvement, or a fully involved compartment fire.

Front Range Fire Consortium (FRFC) – An organization formed by several fire departments within northern Colorado and southern Wyoming to provide training and certification support to its member agencies. Member agencies include: Boulder Fire Department, Cheyenne Fire and Rescue, Greeley Fire Department, Laramie Fire District #2, Longmont Fire Department, Loveland Fire Rescue Authority, Mountain View Fire Protection District, Poudre Fire Authority, and Windsor Severance Fire Rescue. Together, these agencies serve a population of nearly 600,000 with 635 career and 190 volunteer personnel.

Front Range Fire Rescue (FRFR) – A fire rescue authority southeast of LFRA's jurisdiction that was formed through an intergovernmental agreement between the Johnstown Fire

Protection District and the Milliken Fire Protection District, providing coverage to those communities.

FTE – Full-time employee or full-time equivalent

Fully Involved – A stage in the growth of a compartment or structure fire which occurs after flashover and describes when a compartment, room or entire structure is completely involved in fire.

G

Geographic Information System (GIS) – A technology system designed for storing and manipulating geographical information.

H

Hazardous Materials (HazMat) – A nuclear, chemical, biological, radiological or reactive substance or product that can be harmful and/or dangerous to humans, animals or the environment during transportation, use or storage.

Hazardous Materials Management Plan (HMMP) – A document that may be required by the Community Safety Division from a business that uses, stores and/or dispenses hazardous materials.

HazMat Incident – An emergency situation that requires specialized training, certification and equipment to mitigate the circumstances of the material. All LFRA Operations Division employees are required to maintain minimum certification to the level of HazMat Operations, but several employees are certified to the level of HazMat Technician and HazMat Specialist, based on agency need.

Human Resources (HR) – The specific program within Loveland Fire Rescue Authority or the City of Loveland that provides and oversees human resource management, benefits and payroll functions.

I

Immediately Dangerous to Life and Health (IDLH) – An environment that contains airborne contaminants and is likely to cause death or immediate or delayed permanent adverse health effects or prevent escape.

International Association of Arson Investigator (IAAI) – A professional association that provides training and certification to fire investigators.

International Association of Fire Chiefs (IAFC) – A professional association that represents and supports chief fire officers, company officers, and fire and emergency services managers throughout the world.

International Association of Fire Fighters (IAFF) – The trade union representing firefighters. The union is associated with the American Federation of Labor and Congress of Industrial Organizations (AFL-CIO). LFRA's local is 3566.

Incident Command System (ICS) – A standardized incident scene management concept that allows emergency responders to adopt an integrated organizational structure equal to the complexity and demands of an incident. ICS enables integrated communication and planning by establishing a manageable span of control. LFRA uses the Blue Card Incident Management System for management of all small-scale incidents/events within the jurisdiction.

Incident Commander (IC) – The individual who manages the incident action plan for a designated scene or event, typically an emergency event. Responsibilities typically include overseeing resources, developing assignments, and coordinating strategic level decision-making.

International Building Code (IBC) – A model code written by the ICC that contains provisions for the safe construction of buildings. The IBC is primarily enforced by the Building Division of either the City of Loveland or Larimer County.

International Code Council (ICC) – An international code development organization that was created in 1994 to review and approve numerous model codes.

International Fire Code (IFC) – A model code the contains provisions to regulate fire hazards in existing buildings, as well as provisions for the installation, testing and maintenance of fire protection features in both new and existing buildings.

International Fire Service Training Association (IFSTA) – An organization established in 1934 to improve training, operations and safety in the fire service. This organization publishes numerous training manuals used by LFRA.

Intergovernmental Agreement (IGA) – Any recognized agreement between two or more government agencies or levels of government. IGAs are typically developed to upgrade service, provide additional levels of service, consolidate resources, and/or to save money through economies of scale.

Incident Priorities – Life Safety, Incident Stabilization, Property Conservation. These priorities are applied by LFRA personnel to every incident response.

Incident Stabilization – This result is achieved when actions performed by emergency response personnel prevent an incident from getting worse.

Information Technology (IT) – A term or abbreviation referring to the City of Loveland Information Technology Department, which provides administration and support for all LFRA computers, phone systems, and other technology infrastructure.

Infrastructure – The basic physical and organizational structures and facilities (e.g., buildings, roads, power supplies) needed for continued operation of a community.

Insurance Services Office (ISO) – A subsidiary of Verisk Analytics that provides data, underwriting and legal/regulatory services, with special focus on community fire protection efforts, to property insurance providers.

Inter-Governmental Agreement (IGA) – Any recognized agreement between two or more governmental bodies or levels of government. IGAs typically exist to upgrade services, consolidate resources and/or save money through economies of scale.

J

Jurisdiction – The 194 square mile area served by the Loveland Fire Rescue Authority, consisting of the City of Loveland and the Loveland Rural Fire Protection District.

L

Ladder – See Truck

Larimer County Emergency Services (LCES) – A division of the Larimer County Sheriff's Office that has primary responsibility for wildland fire suppression as well as search and rescue operations throughout Larimer County.

Larimer County Sheriff's Office (LCSO) – The agency that provides law enforcement services to residents of Larimer County who do not live within incorporated Cities and/or Towns. LCSO is the Designated Emergency Response Authority for hazardous materials incidents within the county.

Leader's Intent – A term that describes the clear vision communicated by a leader to those following that provides a common basis for understanding the task(s) to be accomplished, the reason(s) why the task is to be implemented, and the desired end state when the operational period has ended.

Leadership in Energy & Environmental Design (LEED) – A building standards certification program that recognizes best-in-class building strategies and practices.

Life Safety – The first incident priority, focusing on the safety of both firefighters and citizens during mitigation of emergency incidents.

LNG – Liquefied Natural Gas

Loveland Police Department (LPD) – The law enforcement agency for the City of Loveland.

Loveland Rural Fire Protection District (LRFPD) – A special district formed in 1950 to serve a 194 square mile area consisting of urban, rural, foothills and mountain properties. The boundaries of the LRFPD are generally Larimer County Road 32 to the north, Drake area to the west, Southeast 48th Street to the south, and the Larimer/Weld county line to the east.

LPG – Liquefied Propane Gas

M

Master Stream – A high-capacity water delivery device used for fire suppression, usually capable of delivering at least 500 gallons of water per minute. A master stream may be portable or permanently mounted on an apparatus.

McKee Medical Center (MMC) – One of two hospitals in Loveland. MMC is a Level III trauma center operated by Banner Health System.

MDT – Mobile Data Terminal

Medical Center of the Rockies (MCR) – One of two hospitals in Loveland. MCR is a Level II trauma center operated by University of Colorado Health System.

Memorandum of Agreement (MOA) – A cooperative agreement between parties to cooperate on a specific project or a mutual objective.

Memorandum of Understanding (MOU) – A cooperative agreement between two or more parties to express a convergence of will between the parties, often indicating an intended common course of action.

MHz – Megahertz

N

NCRCN – Northern Colorado Regional Communications Network

NEMSIS – National Emergency Medical Service Information System

NFA – National Fire Academy

NFIRS – National Fire Incident Reporting System

NIOSH – National Institute for Occupational Safety and Health

National Association of Fire Investigators (NAFI) – A professional association that provides training and certification to fire investigators.

National Fire Protection Association (NFPA) – A global non-profit organization formed in 1896 that is devoted to eliminating death, injury, property and economic loss due to fire, electrical and related hazards through the establishment of codes and standards.

National Incident Management System (NIMS) – A comprehensive system established to standardize incident management, regardless of incident cause, size, location or complexity. NIMS is applicable to both public and private entities. The NIMS program is managed by FEMA.

National Testing Network (NTN) – A private company that contracts with LFRA to provide standardized pre-employment physical ability screening processes.

National Wildfire Coordinating Group (NWCG) – A federal agency that provides national leadership to develop, maintain, and communicate interagency standards, guidelines, qualifications, training and other capabilities that enable interoperability among federal and non-federal responders to wildland fires.

Non-Emergent – A term used to describe a mode of emergency response to an incident. A non-emergent response does not include use of emergency lights and/or siren and may be referred to as a "Code 1" response.

Non-Hydranted Area – Geographic areas, typically within the Loveland Rural Fire Protection District, that do not contain fire hydrants.

Non-Sprinkled – A term used to describe a building or structure, or portion thereof, that does not have an installed fire sprinkler system. May also be referred to as "non-sprinklered."

North Colorado Medical Center (NCMC) – A hospital operated by Banner Health System in Greeley, CO. NCMC operates the regional burn center.

NPS – National Park Service

O

O&M – Operations and Maintenance

OSHA – Occupational Safety and Health Administration

Office of Emergency Management (OEM) – A functional branch of the LFRA Community Safety Division that is responsible for planning, coordinating and supporting activities that prepare for, respond to, and recover from disasters and emergencies.

Operations – The LFRA Division that provides emergency and non-emergency response and mitigation for reports of fire, EMS, technical rescue, hazardous materials and other types of incidents.

Operations Staff – The Operations Division leadership group comprised of the Operations Division Chief, all Battalion Chiefs and Operations Division Captains.

Opticom – A traffic signal pre-emption system located throughout the urban portions of the LFRA response area. Transmitters are located on all fire apparatus and are activated when the apparatus is responding Code 3. Activation of a receiver, which is installed on traffic signals, forces the traffic signal to provide a green light to the responding apparatus.

P

Paramilitary – An organizational structure that assigns employees to various ranks and an associated authority or chain of command.

PD – Police Department

PDFO – Professional Development for Fire Officers. A training program hosted by the FRFC to train new and prospective fire officers.

Per Capita – Per unit of population, per person

Peer Fitness Trainer (PFT) – Individual LFRA members who have completed a certification process through the American Council on Exercise to provide exercise instruction to fellow firefighters.

Peer Support Team (PST) – LFRA employees who have received special training to provide stress management, critical incident stress and crisis intervention techniques to LFRA personnel and their families. The PST is supervised by a licensed mental health professional that is shared between LFRA and Loveland Police Department.

Personal Protective Equipment (PPE) – The ensemble worn by firefighters while performing their duties, including combinations of specialized outerwear, head protection, eye protection, hand protection, footwear, and/or respiratory protection that are intended to prevent injury to the firefighter from smoke, heat, trauma or infectious/communicable disease.

Positive Pressure Attack (PPA) – A fire suppression tactic that uses high-powered fans to push smoke and heat from inside a building in coordination with an interior fire attack.

Positive Pressure Ventilation (PPV) – Use of mechanical forced ventilation to remove smoke or other airborne pollutants from the interior of a building or structure in attempt to provide a breathable atmosphere.

Poudre Valley Hospital (PVH) – The primary hospital serving Fort Collins.

Property Conservation – The third incident priority, which focuses on saving structures or personal property from further damage during a fire or other emergency event.

Public Education Team – A group of LFRA employees and volunteers who receive specialized training in the area of public education. The public education team supports all types of community outreach activities for the agency.

Q

Quality Assurance (QA) – A reactive method or process for reviewing reports written by LFRA members to document activities and actions during LFRA response to calls for service.

Quality Improvement (QI) – A process that examines both current and past activities, systems and/or processes to find opportunities for future improvement.

R

Rapid Intervention Team (RIT) – A company assigned to a significant incident that serves as a backup crew

Recall – The process where off-duty LFRA personnel are notified of the need for additional staffing, most commonly related to large numbers of on-duty LFRA resources being assigned for a long period of time to a significant incident. Also referred to as a Shift Recall.

Records Management System – A centralized computer database that is used to document information pertaining to calls for service, training records, personnel information, etc. See also Emergency Technologies Inc.

Recruit – A newly hired firefighter who is participating in initial hire training and is not yet a fully functioning firefighter.

Rescue – A fire apparatus that carries specialized rescue equipment and provides Truck-related functions on an emergency scene. May also be referred to as a Heavy Rescue.

Request for Proposal (RFP) – A formal solicitation, often made through a bid process, in which an organization announces that funding is available for a specific project and interested companies can submit bids to compete for the contract to complete the project.

Reserve Firefighter – An individual who volunteers as a firefighter for LFRA. Reserve firefighters must maintain the same certification and training standards as career LFRA firefighters.

Revenue – The sources of income/finance for the operations of LFRA.

Ride-Along Program – A program that allows citizens to spend time with on-duty LFRA personnel at a fire station, to include riding in an apparatus to calls for service.

Risk Profile – A decision-making guide used by LFRA to ensure implementation of appropriate actions on emergency scenes: "We may risk our lives, within a structured plan, to save savable lives. We may risk our lives a little, within a structured plan, to save savable property. We will not risk our lives at all to save lives or property that has already been lost."

Rotational Position – A position within the LFRA organizational structure that is staffed by uniformed personnel for specified time period, usually three (3) years.

S

Self-Contained Breathing Apparatus (SCBA) – An backpack style air pack worn by firefighters to provide compressed atmospheric air while operating in an environment that does not support life.

Shift – The Operations Division work group that works a 24-hour shift. LFRA uses a three (3) battalion/shift system (A, B, and C), with one shift on-duty each day. Each shift is supervised by a Battalion Chief with Captains, Lieutenants, Engineers and Firefighters assigned to specific apparatus on each shift. See also Battalion.

Shift Recall – See Recall

Significant Incident Summary Report (SISR) – A document that is prepared to summarize incident information for large-scale incidents, such as structure fires, wildland fires, hazardous materials incidents, etc.

SME – Subject Matter Expert

Special Operations Team (SOT) – Members of LFRA's Operations Division with advanced training in the areas of water rescue, hazardous materials, collapse rescue, trench rescue, large animal rescue, urban search and rescue, rope rescue and other disciplines within the special rescue disciplines.

Squad – A fire apparatus that was previously operated out of Fire Station 2. The Squad Company provided Truck-related functions on emergency scenes. The Squad was a fully equipped fire engine that contained a wide variety of equipment commonly found on a Heavy Rescue apparatus. The Squad Company was re-purposed to a Rescue company in September 2014 with the opening of the Fire Station 2 and personnel were hired to staff Engine 2.

Steering Committee – A strategic planning committee comprised of members from various organizations that work closely with LFRA in emergency response, planning or administration.

Strategic Plan – A document developed in 2012 with the formation of Loveland Fire Rescue Authority that sets a 10-year vision for the agency. The document is reviewed and updated annually and provides clear information on the mission, vision and values of the agency, as well as goals, objectives, program strategies and financial plans.

Succession Planning – A process for identifying and developing LFRA personnel with potential to fill critical organizational positions. Succession planning ensures that experienced and capable personnel will be available and prepared to assume new roles in the agency as they become available.

Support Staff – Personnel who provide service to support the delivery of emergency response and risk reduction services to the community.

T

Tactical Fire – A team comprised of LFRA members who work closely with the Loveland Police Department Special Weapons and Tactics (SWAT) team to provide fire and rescue related services, such as forcible entry, rope rescue anchor systems, patient handling and fire suppression.

Technical Rescue – Life saving techniques that utilize specialized tools, equipment and/or training that exceed the normal scope of firefighter training. Examples may include collapse rescue, high-angle rope rescue, and urban search and rescue.

Thermal Imaging Camera (TIC) – Infrared devices that can detect and visually display temperature differences, which allow firefighters to see objects in environments with zero visibility.

Thompson School District (TSD) – The public school district serving the Loveland and Berthoud communities.

Time Trade – An agreement between two firefighters whereby they trade on-duty days with each other, with prior approval from both Battalion Chiefs.

Tower – See Truck

Training Battalion – A group of Operations Division personnel tasked with creating and delivering training to firefighters. The Training Battalion is frequently referred to as a "Division" even though it is not one of LFRA's divisions.

Travel Time – Amount of time for an emergency crew to travel to the scene of an incident. This is the third component of emergency response time and represents the elapsed time between an apparatus going "en route" until that apparatus arrives on scene.

Truck – A fire apparatus with a 100-foot aerial ladder, ground ladders and specialized equipment for ventilation, extrication and technical rescue.

Truck Company – A group of firefighters trained to perform support functions and specialized rescue on emergency scenes. Examples of truck company activities include search and rescue of victims, ventilation, extrication, forcible entry, and ventilation.

Turnout Time – The second component of emergency response time that measures the elapsed time between when a fire company is notified by Dispatch of a call for service and when that fire company goes "en route" to the call. During this time, all members of the company must assemble at the apparatus, don their personal protective equipment, mount the apparatus, and fasten their seatbelts.

U

Unity of Command – The principle that each responder is directly supervised by a specific individual. This allows for increased responder safety on emergency scenes and also provides for accountability.

University of Colorado Health (UCH) – The hospital system that owns and operates Medical Center of the Rockies and also provides ALS ambulance treatment and transport for Fort Collins.

Urban Search and Rescue (USAR) – A type of technical rescue that addresses large-scale emergency and/or disaster scenes that cover large geographic areas.

USFS – United States Forest Service

V

Volunteer – An unpaid worker who provides services to LFRA as a public service, either to gain skills or as a personal interest. The firefighters of the Big Thompson Canyon Volunteer Fire Department are all volunteers.

Virtual Private Network (VPN) – A computer network that uses a telecommunications infrastructure such as the internet to provide remote users with the ability to access the agency's secure computer network.

W

Water Tender – A firefighting apparatus designed to deliver water to non-hydranted areas. These apparatus carry in excess of 1,500 gallons of water and are capable of being

filled and subsequently delivering their water quickly so that a continuous water supply can be established to support firefighting operations.

Wildland Firefighting – Fire operations in primarily undeveloped areas involving vegetation and potentially threatening structures. Wildland fires are often difficult to access by vehicle due to terrain. Additional challenges of wildland firefighting are topography, involved fuels, weather and water supply. All LFRA firefighters are trained and certified as wildland firefighters.

Wildland-Urban Interface (WUI) – An area where development has occurred in a previously remote wildland environment. Fires in these areas can quickly expand to involve multiple structures, are in rugged terrain and usually have very limited water supplies, making it very difficult to implement normal structure firefighting tactics.

WMD – Weapons of Mass Destruction