Summer 2024

VERSION 9

2024

Community Risk Assessment Standard of Cover

Boulder Fire-Rescue

Commission on Fire Accreditation International

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Document Information

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Version: 9

The Boulder Fire-Rescue (BFR) Community Risk Assessment / Standard of Cover is updated annually to ensure it remains a living document. The CRA/SOC serves as one of the department's planning documents.

Introduction

This document is the Boulder Fire-Rescue (BFR) Community Risk Assessment / Standard of Cover (CRA/SOC). The CRA/SOC serves as the primary deployment planning and resource allocation tool for BFR. The document's purpose is to evaluate the assessed risks faced by the community and mitigate the risks through Community Risk Reduction approaches that include planning, response, education, and prevention. Within the CRA/SOC is information about station and apparatus locations, response trends, and the specific risks faced by the citizens of the City of Boulder, and outlines BFR's level of service for response-based programs. The CRA/SOC describes the roles and responsibilities of each program area and highlights deployment strategies and operational elements required to maintain the stated level of service. Also, the document contains data elements and recommendations to enhance the Department's performance. The Department's primary goals are to improve service delivery and increase safety for the citizens of The City of Boulder.

The CRA/SOC and its recommendations inform the Fire-Rescue Master Plan by analyzing gaps within the document. The Master Plan is a process that most departments in the City of Boulder use to guide the provision of services and construction of supporting facilities. Master plans establish, and detail policies, priorities, service standards, and facility and system needs. The master plan will guide BFR for the next ten years to meet the community's service standards and sustainability goals.

The Master Plan and the CRA/SOC also support the Boulder Valley Comprehensive Plan (BVCP), a joint planning effort between the City and Boulder County. Among the objectives included in the BVCP is to inform decisions about how services such as police, fire, water utilities, and others are provided to the city. The BVCP is used to guide long-range planning, review development proposals, and other activities that shape the built and natural environments in the Boulder Valley. The plan helps the community create and preserve a sustainable future for the Boulder Valley and a high quality of life. The plan provides a general statement of the community's desires for future development and preservation of the Boulder Valley, and the city and county use it to guide long-range planning, the review of development proposals, and other activities that shape the built and natural environments in the Boulder Valley.

One of the challenges within the fire service is keeping up with an increasing demand for its services. The CRA/SOC provides department management with a process to constantly measure and evaluate the level and quality of service delivered to the community. It also provides quantitative data to justify financial requests made to the City Council. The CRA/SOC assists the Department in ensuring a safe and effective response force for structural and wildland fire suppression, emergency medical incidents, hazardous materials, and specialty response situations.

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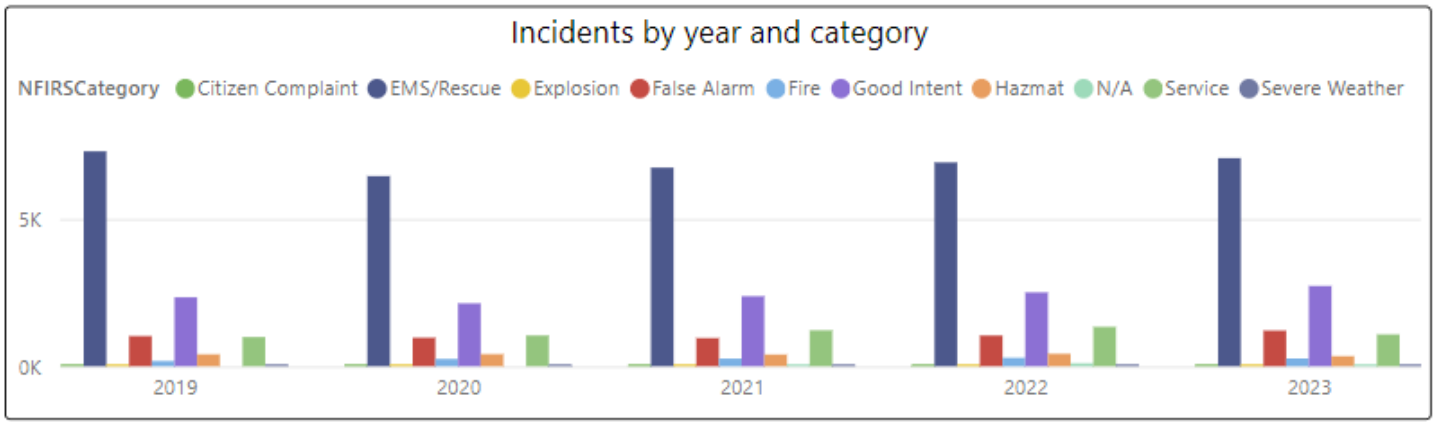
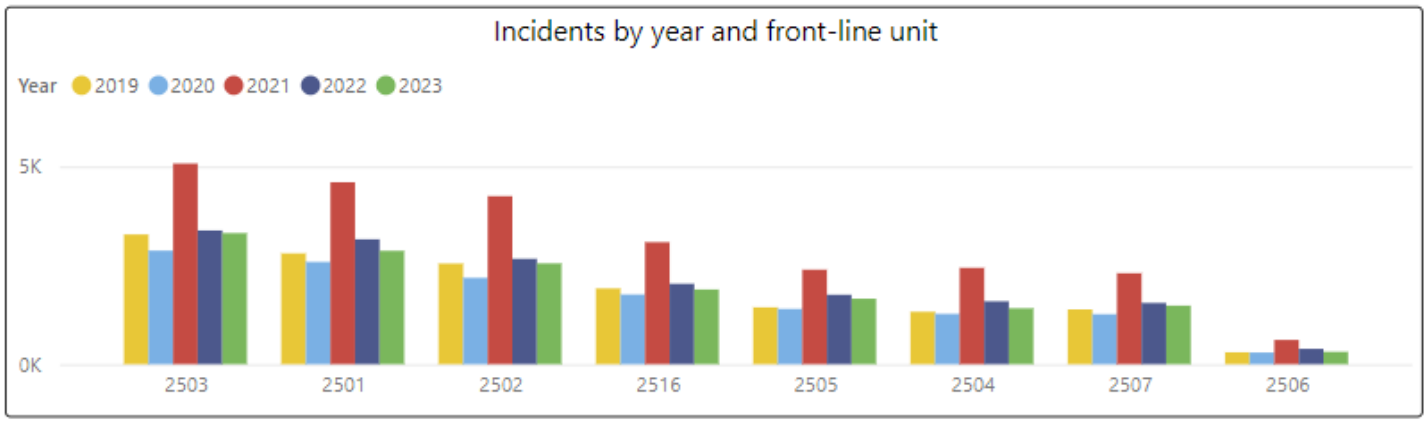
Table of Contents

Table of Figures





Section I: Jurisdiction Profile

History of The City of Boulder

During the 19th century, explorers Zebulon Pike, Stephan Long, and John Fremont were commissioned to explore the Boulder area. What was once unfit for settlement soon became a location of interest when William Gilpin, who later became the Colorado Territory's first governor, reported gold findings (About Boulder, 2015). The first settlement in Boulder County, which was established at Red Rocks, now known as Settler's Park, by gold-seekers, was established on October 17, 1858. One of the settlers, A.A. Brookfield, organized the Boulder City Town Company on February 10, 1859. From there, Boulder became a city. Sixty shareholders divided each party's 1,280 acres along Boulder Creek into 18 lots. The remaining lots were put up for sale for $1000 each. Due to the high price of the lots, Boulder's growth rate remained low at only 324 by 1860. At that time, Boulder City was part of the Nebraska Territory; Boulder did not become the county seat until February 1861. Then, in 1867, a Federal Bill established the Territory of Colorado.

While mining was essential in bringing people to Boulder, developing a robust agricultural industry encouraged people to stay. The town of Boulder became incorporated on November 3, 1871. Residential areas appeared in the Downtown, Mapleton Hill, and Whittier Districts. Then, when commercial activities expanded in the downtown core, houses disappeared from the Downtown District.

Education, mining, and agriculture have remained prominent in Boulder's identity. Boulder is the home of the first schoolhouse in Colorado, located on the corner of Walnut and 15th Street. Citizens successfully lobbied the state legislature in the 1860s to have the state university in Boulder; however, the site was not made available until 1872, when six Boulder citizens donated 44.9 acres for the project. In 1874, the state appropriated $15,000 to build the first building in the city. Community donations were gathered to match the project funds to complete the building. The "Old Main" building is located on the southern end of town in an area known as "The Hill" and still stands today. In 1877, the University of Colorado opened to forty-four students, one professor, and a President.

The first private school in Boulder, Mount St. Gertrude Academy, was opened in 1892. The City of Boulder, by then accessible to visitors by railroad, was known as a community with a prosperous economy, a comprehensive educational system, and well-maintained residential neighborhoods. The railroad recommended Boulder as a site for Chautauqua in 1897. Residents passed a bond issue when buying the land and raised the now-familiar Chautauqua Auditorium. Additionally, the growth of the University of Colorado at the turn of the century led to the development of parts of University Hill. For residents, one mark of elegance was the installation of flagstone sidewalks in the 1880s.

Visitation to Boulder has always had a connection to Chautauqua Park. In 1898, a group of Texans searching for a retreat decided on Boulder and ultimately built one of the nation's most beautiful vacation spots. Completed July 4th, 1898, Chautauqua was essential for the area as its creation marked the beginning of Boulder's parks and open space land purchasing for preservation. This type of effort became one of Boulder's top priorities and still is today. The day after Chautauqua's grand opening, the City of Boulder purchased the eastern slope of Flagstaff Mountain from the United States Government.

In 1908, Boulder hired landscape architect Fredrick Law Olmstead Jr. to consult on best city planning. The son of the creator of New York City's Central Park had recommendations that included putting wires underground and keeping streetlights beneath tree level. Most importantly, Olmstead Jr. also cautioned them about suburban developers, "dirty industries," and pandering to tourists. Olmstead Jr. stated that Boulder must be a beautiful,

prosperous town where people would spend their lives. Boulder would not be a place to make money before getting out.

With exceptional growth, sprawl seemed inevitable. After the city council scheduled an election for bonds to expand a water treatment plant, citizens asked the Council to create a Blue Line at 5,750 ft. elevation, beyond which water lines would not extend. Citizens petitioned the council and required them to put the item on the ballot. On July 21, 1959, the voters approved the Blue Line and defeated the water plant expansion. Above this line, the city would not provide water or sewer services to protect the view.

During this decade, new subdivisions, including the Highland Park-Martin Acres neighborhood on the historic Martin Farm and the North Boulder developments from Balsam North, originally part of the Tyler Farm, were planned. New neighborhoods brought the city's first two shopping centers, North Broadway and Basemar, to the northern and southern parts of the city. Science and tech industries had doubled Boulder's population from 1950 to 1960 and then jumped to 67,000 during the 1970s. In 20 years, from 1950 to 1970, the population grew by roughly 50,000 people.

The City of Boulder began a period of infill and re-use of its past architectural development after purchasing thousands of acres of open space beginning in 1967, adopting the BVCP in 1970, and the passage of the building height restriction ordinance in 1972. Residents instituted a remarkable 0.4 percent sales tax to purchase preserved land or "green space" around the city. With citizen advocacy, City Manager Ted Tedesco and the council put a one-cent sales tax on the ballot. Forty percent of the tax would go to open space, and 60% would go to transportation. The open space was a green belt to limit overdevelopment and protect the environment. Voters approved 61% of the voters, and it became the nation’s first voter-approved sales tax for open space.

Nature was protected, but this type of urban growth boundary hindered developers. Encircling the city with green space had several implications for emergency response. Due in part to the limited space, which caused real estate prices in Boulder to be as much as 1.5 times higher than the rest of the Denver-Metro area, and the city’s limited new housing (2 % per year), few emergency responders live within the city limits; this creates a significant staffing delay regarding personnel regarding the recall of personnel.

Many Boulder workers commute to the city, creating heavy traffic patterns each morning and evening. In-flow and out-flow traffic ultimately impede emergency response times. Moreover, the urban growth boundary surrounding Boulder's green space geographically isolates the city. Most surrounding fire agencies are too far away to provide immediate response support, and as a result, needs for assistance are accommodated by mutual aid requests rather than automatic aid agreements.

Despite exceptional growth and some issues associated with maintaining it, the Boulder community-maintained eccentricity and geographic beauty. Boulder is known today for its emphasis on environmental preservation, education, and outdoor quality of life. While great change has ultimately altered the city since its beginnings, breathtaking views, higher education, federal research, and entrepreneurial spirit are fostered throughout its transformation. Boulder’s charm is unrivaled among American cities, and it continues to maintain and promote these characteristics today.

Boulder Fire-Rescue is legally established and recognized under Title 2 Government Organization, Chapter Five of the City of Boulder Charter and Revised Code. Section 2-5-2 of the City of Boulder Charter delegates the authority of the fire department and directs the responsibilities of the fire department to include, without limitation:

> *“…the suppression or extinguishment of fires, the provision of rescue and emergency medical services, the provision of fire inspection and fire prevention services, the management of hazardous substance incidents as defined by state law, and the planning or response to public disasters and emergencies, including, without limitation, windstorms, and flooding.”*

Service Delivery Milestones

1875-1894 - Four hose companies are formed and placed in service around the city

1875 - Boulder Hose Company is established

1883 - A fire damaged or destroyed six buildings during a windstorm. The fire is Boulder's most damaging fire to date.

1898 – A decision is made to move to horsepower fire equipment

1913 – A Seagrave combination hose chemical truck with ladders is purchased. It is the first motorized fire truck put into service

1915 - Boulder Hose Company closes its doors. The City of Boulder Fire Department assumes the fire protection role

1958 - New Station 1 and Station 2 were constructed

1965 - Station 3 relocated and built

1976 - Station 6 was built to provide service to IBM

1977 - Station 4 put in service

1982 - A training accident takes the lives of Engineer Duran and Firefighter Smith (1/26/1982)

1991 – BFR increased staffing from two to three people on all apparatus 92. Station 5 relocated.

2000 - Station 7 built new firefighters hired

2008 - Contracted with AMR to provide dedicated

2008 - Implemented Blue Card Hazard Zone Management

2008 – Upgrade of Hazmat Unit to be a self-sufficient cross-staffed resource. The prior unit was a trailer that was limited in capability.

2010 - First original training center complete

2010 - Purchased and outfitted two new wildland response vehicles for local and regional response

2012 - Hired an Administrative Battalion Chief (BC) to help support Operations

2013 - Hired an Administrative Assistant for the Fire Safety and Training divisions

2013 - I began a pilot program for a Light Response Vehicle (LRV) at station one, following the City Council's goal of reducing the department's carbon footprint. After the pilot, the program was deemed ineffective; the program did not continue

2013 - Implemented ProQA, a prioritized emergency medical dispatch system with the hopes of limiting the number of vehicle responses to low-acuity medical calls.

2013 - Automatic Vehicle Location (AVL) device installation on all fire apparatus.

2014 - Implemented Smoke and CO detector install service for low-income customers

2014 - Implemented Citizens Fire Academy

2014 - Implemented Car Seat Install program

2015 - Completed the building of Station 8

2015 – Hired a Management Analyst

2015 - New computer-aided dispatch software

2017 – Begin First-In station alerting

2017 – Hired a second public educator

2018 – Hired a Sr. Budget Analyst and Project Manager of Data & Analytics

2019 – Evaluated the potential for ALS

2020 – BFR was awarded accredited agency status

2021 – Advanced Send Protocol and Fill the box

2022 - Nurse Navigator went live; EMS administrator hired

2023 - 1st ALS engines, RTXx2 ordered (first in hybrid type 1 pumpers), CARE program implemented

Government

The City of Boulder has a council-manager form of government where the 9-seat, at-large, elected City Council sets policies, and the council-appointed city manager administers them. The City Manager's Office consists of the city manager, one deputy city manager, one assistant city manager, a policy advisor, and support staff. The office ensures the proper management of city operations, public representation, and participation. Boulder Fire-Rescue (BFR) is one of the city's 19 departments that fall under the operational purview of the City Manager's Office. The fire chief reports directly to the City Manager. The mission of the City Manager's Office is to:

> *Champion an engaged, collaborative, and innovative organizational culture; Provide professional leadership in the administration and execution of city policy as established by the council; Establish relationships and partnerships to implement community priorities.*

Community Expectations

In 1970, the City of Boulder and Boulder County jointly adopted a comprehensive plan that guides land-use decisions in the Boulder Valley. The BVCP) provides a general statement of the community's desires for future development and preservation of the Boulder Valley. The principles of sustainability and resilience are part of the comprehensive plan's framework.

Five criteria surround determining the adequacy of proposed or existing urban facilities and services. The Urban Service Standards are within the framework of these criteria. They include responsiveness to public objectives, the sufficiency of financing, operational effectiveness, proficiency of personnel, and location/adequacy of equipment and facilities.

According to the most recent BVCP the Urban Service Criteria and Standards set the benchmark for providing a full range of urban services in the Boulder Valley. A basic premise of the BVCP is that "adequate urban facilities and services" are a prerequisite for urban development. Within the Boulder Valley, the City of Boulder is the provider of choice for urban services since it can meet all the service provision requirements embodied in the Urban Service Criteria and Standards. The BVCP goals are in the appendix.

Department Funding

As of the adoption of the 2024 budget, the Boulder Fire-Rescue Department (BFR) receives 94.33 percent of its $27.57 million in funding from the General Fund. The remaining 5.67 percent is sourced from the City's Government Capital Fund. From a citywide perspective, the General Fund supports 38.05 percent of the city's $515.4 million budgeted expenditures. In 2024, the General Fund is set to receive 38.30 percent of its $166.6 million in revenue from Sales and Use Tax, 13.30 percent from property tax, and the remaining 48.40 percent from a combination of fees, cost allocation transfers, and other miscellaneous taxes. As a General Fund department, BFR largely depends upon the city's sales and uses tax and property tax proceeds to fund its operations.

When considering BFR expenditures by category in 2024, personnel expenses account for 80.72 percent of the total budget, and operating expenses account for 7.16 percent. The remaining 12.12 percent of operating expenses are for interdepartmental charges and modest capital investments. With most of its annual appropriation allocated to personnel and interdepartmental charges, there is little opportunity to enhance existing programs through reallocation. New appropriation from the general fund or other city revenue sources is required for new programs or capital needs.

BFR works through the city's annual budget development process to secure expanded funding for new programs or initiatives and maintain funding for existing services. This process is a 9-month collaborative effort that begins with City Council-established work plan items set against the backdrop of economic conditions and the accepted prioritization of city programs and services. Council and community budget priorities filter down to the organization through the City's budget-making committee, the Executive Budget Team (EBT). The EBT is a city manager-selected subset of department directors that helps the city manager establish budget policies and provide the strategic budget vision for all city departments. BFR initially develops its annual budget independently and then engages with the EBT formally throughout the budget process. This results in an EBT-approved departmental budget that aligns with citywide priorities. These EBT-approved proposals ultimately get included in the annual budget that the City Manager submits to the City Council for adoption.

In 2018, BFR changed its internal budgeting method to program-based budgeting, providing programs with funding tied to performance measures. These measures are intended to support performance measures supported with specific funding streams. Departmental master planning aligns the design of departmental operations, programs, and annual spending plans with stated community priorities under the Sustainability + Resilience Framework.

In 2022, the City of Boulder introduced its new budget approach, Budgeting for Resilience. This is a three-year implementation endeavor, with the final building year culminating in developing the 2025 budget package. The first year of implementation was designed to identify functional programs within departments, with the second year focusing on developing KPIs, outputs, and outcomes – all of which are to be aligned with the newly updated Sustainability + Equity + Resilience Framework. In between the development of the 2024 and 2025 budgets, City leadership has developed and released a Citywide Strategic Plan that identifies fifteen Strategies tied to specific SER Goals (Safe, Healthy and Socially Thriving, Livable, Accessible and Connected, Environmentally Sustainable, Responsibly Governed, and Economically Vital). Each of the fifteen Strategies has between one and six Priority Actions. Year three of the implementation of Budgeting for Resilience will focus on aligning departmental budget proposals with the associated KPIs and outcomes of these Priority Actions.

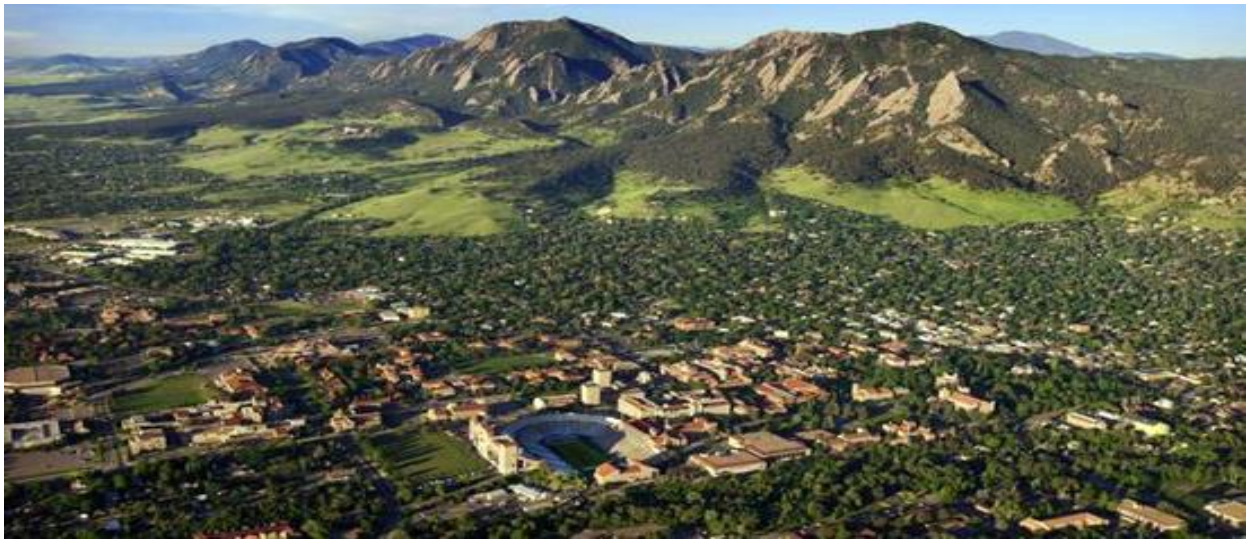
For additional reference support, please see the City of Boulder Budget website: Budget | City of Boulder (bouldercolorado.gov)

This is the primary blueprint for planning departmental investments. By designing new initiatives to serve the categories and objectives within the framework, BFR can ensure that planned activities support community priorities and are funded by stated city priorities.

Section II: Documentation of Area Characteristics

The City of Boulder is home to the University of Colorado, the National Institute of Standards and Technology (NIST), the National Oceanic and Atmospheric Administration (NOAA), and many other science—and technology-based companies. It is also the home training base for hundreds of world-class athletes.

Located along Boulder Creek at the base of the foothills of the Rocky Mountains, the city is roughly 18.5 miles east of the continental divide and 35 miles northwest of Denver. Canyons create steep, rugged terrain along the city's western edge along the transition from the foothills to the plains. The canyons also serve as a funnel for winds into the city.



Location

Boulder is at an elevation of 5,430 feet (1,655 m) above sea level, at the base of the foothills of the Rocky Mountains. The city is 25 miles (40 km) northwest of Denver. Boulder is the county seat of Boulder County, home to more than 300,000 residents, and includes some of the most diverse natural landscapes and sustainable development along the Northern Front Range of Colorado. Boulder is the 11th most populous municipality in the state of Colorado.

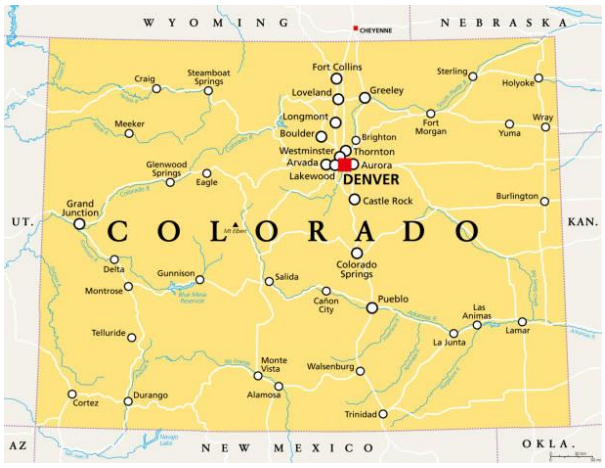


Figure 1: State of Colorado

Topography

The City of Boulder covers an area of 27 square miles in the Boulder Valley, where the Rocky Mountains meet the Great Plains, and is surrounded by over 45,000 acres of preserved and protected land. The city's Open Space and Mountain Parks manage wildlife habitats, unique geologic features, greenways, and 145 miles of hiking trails. West of the city are slabs of sedimentary stone tilted up on the foothills, known as the Flatirons. The Flatirons are a widely recognized symbol of Boulder.

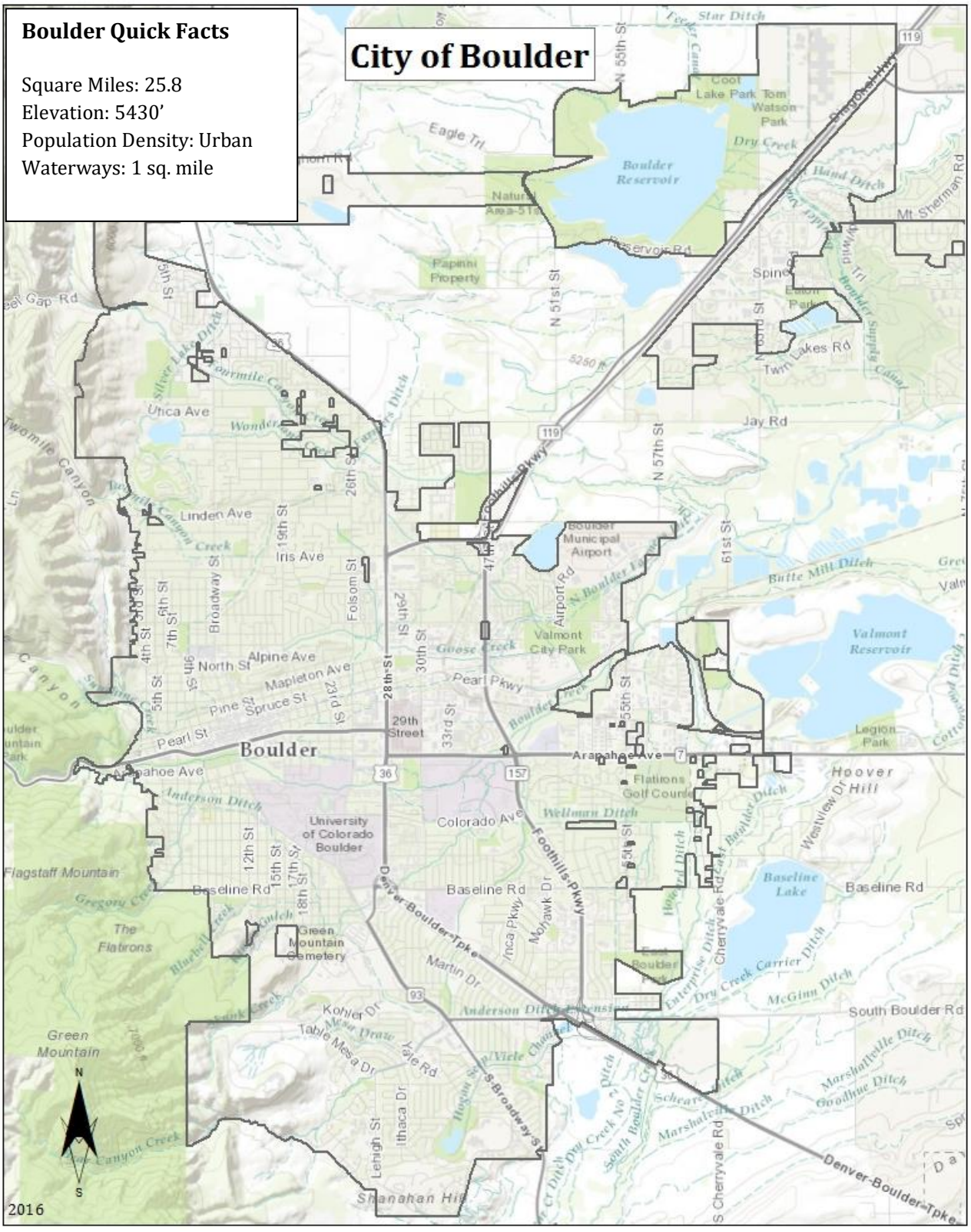


Figure 2: City of Boulder Map

Various fuel types are present in and around Boulder and are caused by elevation differences. The lower elevations consist of grasslands, tall-grass prairie remnants, and riparian vegetation (including cattails, cottonwoods, and other riparian hardwoods and shrubs) growing along watercourses and drainages. This fuel type exhibits the most aggressive burning, even at night. Above 7500', Ponderosa pine (*Pinus ponderosa*) and Douglas fir (*Pseudotsuga menziesii*) become more prevalent primarily on north-facing slopes. This area also has dense riparian shrub corridors and open-canopy woodlands broken by large grassy meadows. At this elevation, fire occurrence and fire behavior are lower.

At 8500', Lodgepole Pine becomes common. Fire occurrence here is rare and does not usually present control problems unless drought and wind are involved. Elevations above 9500' are predominantly short-needle conifers or a spruce-fir fuel type. Around 11,500' is the tree line, and the tundra begins. Fire occurrences here are infrequent.

Boulder Creek is the primary water flow through the city. The creek was named well ahead of the city's founding for the large granite boulders that have cascaded into it over time. Boulder Creek is believed to have given the city its name. Boulder Creek has significant water flow, primarily from snowmelt and minor springs west of the city. The creek is a tributary of the South Platte River.

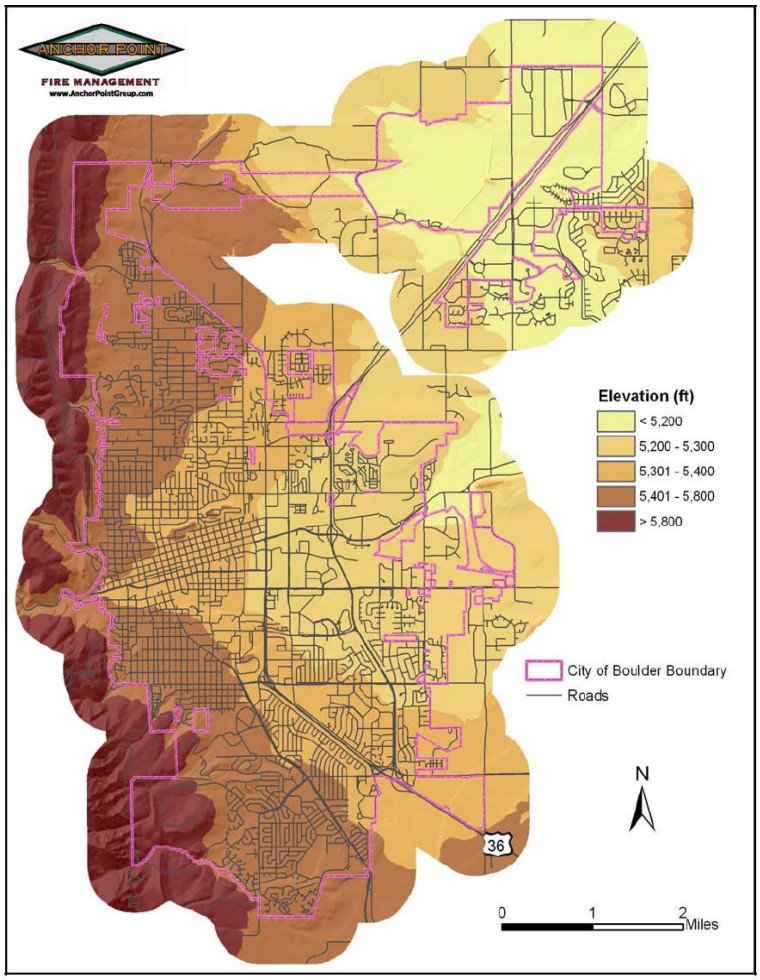


Figure 3: Boulder Topography Map

Climate

Due to its altitude and distance from any significant body of water, Boulder County is very dry. However, the climate is as varied as the topography. Summer temperatures frequently reach the upper 90 degrees with low humidity. Boulder receives an annual average of 18.17" of moisture. An average year brings 245 days of sunshine to the region.

Spring is typically windy and has highly variable weather—a blizzard, significant temperature changes, or gentle rain are all possibilities. Winters are usually dry, with some periods of heavy or windblown snow, some frigid Temperatures, and some surprisingly warm days. With wind and abundant sunshine, even heavy snow will melt within days, if not hours.

The proximity to the continental divide allows Boulder to experience some of the strongest winds in the continental United States, with 140 miles per hour or more gusts. The wind associated with weather systems pushing up and over the western side of the divide encounters relatively little terrain to disrupt their flow before reaching Boulder. Boulder's windiest months are January and December, but significant wind events occur every month of the year. Historically, large wildland fires reveal that most are wind-driven, fall or wintertime events.

Both Chinook and Bora winds have an impact on the climate in Boulder. Chinook winds form when a high-pressure system sits west of the continental divide and a low to the east. The more significant the difference in pressure between the low on the lee side and the high on the windward side, the more forceful and rapid the high pressure will flow to the low pressure. In Boulder, Chinook winds occur down the eastern slope of the Front Range. Chinook winds have been known to reach up to 140 miles per hour and regularly reach 70 miles per hour. Chinook winds are warm, drying winds typically driving relative humidity to single digits.

Bora winds are cold, dry winds originating in the northwest. They are usually associated with a passing cold front and are abundant in the fall and spring. Bora winds will affect a larger area than a Chinook wind but are not quite as strong. Typical gusts range from 50-60 mph. Because of the dry climate and winds associated with fall weather, wildfire activity in autumn is a concern. Still, Boulder treats its fire season as a year-round threat.

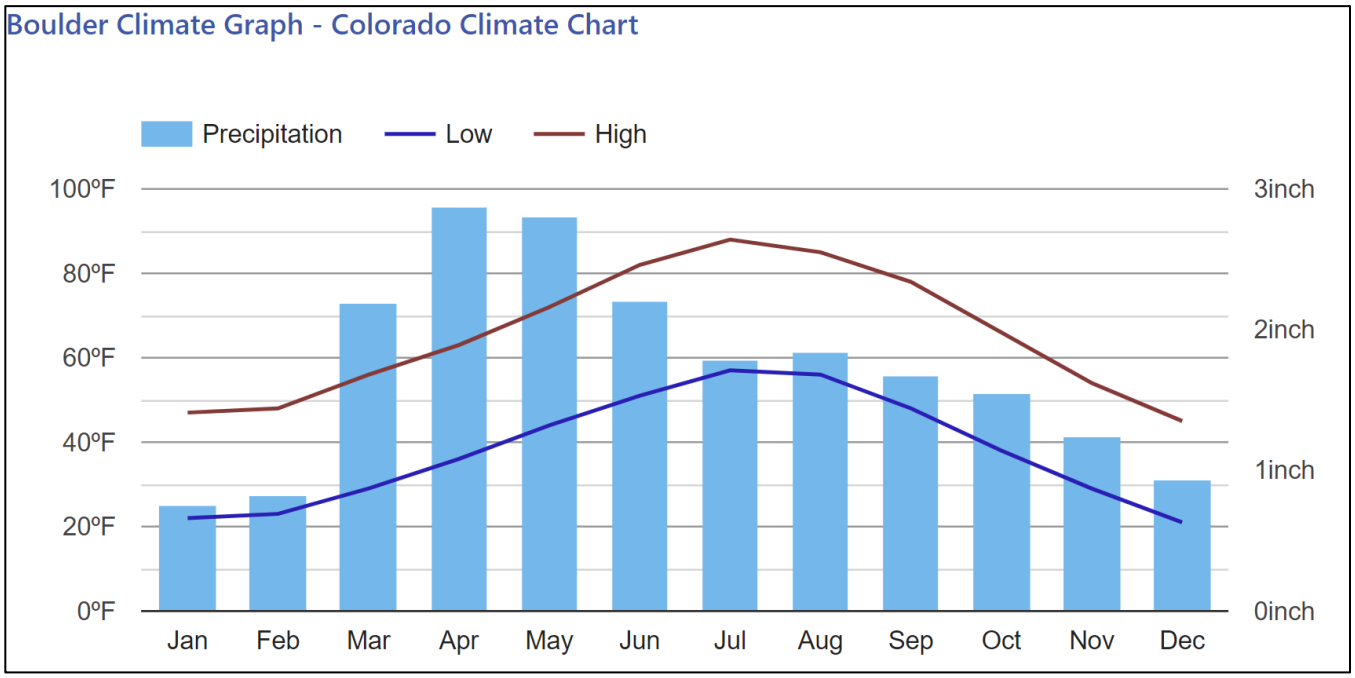


Figure 3: Boulder Climate by Month

Geology

Two geologic provinces meet in the Boulder area. The eastern province is the Great Plains, ranging from flatlands to rolling hills, and the western province is the Rocky Mountains. The north-south front where the two provinces meet is called the Front Range. Several active glaciers were in the mountains west of Boulder, and glacial deposits and erosional features can be seen in the mountains west of the city.

There are no active fault lines near Boulder; however, there are a few recorded earthquakes in the region. Several small quakes and one 5.3-magnitude earthquake occurred in the late 1960s just northeast of Denver. Earthquake Hazard Mitigation Council attributes these quakes to the deep injection of liquid waste at Rocky Mountain Arsenal, just southeast of Boulder.

Physiography

The varying fuels change within the elevation zones throughout the area and do so depending on the diverse aspects of the slopes. The difference in exposure produces marked variations in short horizontal distances, creating microclimates. A south-facing slope will support dryland plant forms such as juniper, mountain mahogany, bunchgrass, yucca, and cactus. At the same time, a nearby north-facing slope might harbor boreal forms such as Douglas fir, spruce, aspen, wild rose, and even mosses. The extreme terrain variations work to create many saddles, chimneys, and canyons. These features contribute to funneling wildfire events through the varied fuels combined with urban development. Weather extremes and wind events compound a complicated wildland/urban interface situation. The inverse of the wildfire scenario is severe flooding, particularly in burn scar areas. The City of Boulder has one of Colorado's most significant potentials for flash flooding.

The historic flooding of 2013 provided an extreme example of that potential. The vulnerability to flash flooding is due to the city’s geographical location at the base of the Rocky Mountains. It is perhaps the municipality's most probable community risk. Within the City of Boulder’s 100-year floodplain are thousands of people and approximately 3,600 structures, and the estimated valuation is almost $1 billion.

Development Within the Service Area

Boulder has a diverse economy. Industries with a significant presence in the area include aerospace, bioscience, data storage, light manufacturing, natural and organic products, outdoor recreation, photonics, professional and scientific services, renewable energy and energy research, software, and tourism. While most of the city’s employers are small businesses, several major corporations, including Amgen, Ball, Cisco, Emerson, Google, IBM, Lockheed Martin, Microsoft, and Northrop Grumman, have a presence in Boulder.

Research institutions include the University of Colorado Boulder and more than a dozen federally funded research laboratories, including the National Center for Atmospheric Research (NCAR), National Oceanic and Atmospheric Administration (NOAA), and National Institute of Standards and Technology (NIST). This diversity buffers the effects of economic downturns and contributes to the area’s economic vitality.

Responding to the loss of several important historic buildings in the 1960s and early 1970s, Historic Boulder, Inc. drafted a historic preservation ordinance, which the City Council unanimously adopted in 1974. The ordinance established an official municipal process to preserve and protect the historical, architectural, and environmental assets contributing to Boulder’s unique sense of place. With the adoption of the ordinance in 1974, Boulder became one of the first cities in Colorado with the authority to designate and prevent the demolition or destruction of historical, architectural, and cultural resources considered valuable to the community. Today, more than 30 communities in Colorado have similar historic preservation ordinances based on Boulder's model. Protecting significant buildings and neighborhoods helps maintain a connection between Boulder’s past, present, and future

generations. Community interest in preservation has resulted in more than 1,300 designated historic properties in Boulder, including 162 individual landmarks and 10 historic districts.

City Planning Areas

While the City of Boulder has many zoning areas, including residential, commercial, and mixed-use zoning, it also plans to use various other strategies. For example, it looks to neighborhoods, business districts, historical zones, and critical infrastructure before initiating significant planning efforts. Boulder has 99 neighborhoods, eight historic districts, and four business districts.

Colorado State Register of Historic Places

The Colorado State Register of Historic Properties lists the state's significant cultural resources worthy of preservation for the future education and enjoyment of Colorado's residents and visitors. Properties listed in the Colorado State Register include individual buildings, structures, objects, districts, and historical and archaeological sites. The Office of Archaeology and Historic Preservation within History Colorado administers the Colorado State Register program. History Colorado maintains an official list of all properties in the Colorado State Register. Properties listed in the National Register of Historic Places are in the Colorado State Register. They may also be nominated separately to the Colorado State Register without inclusion in the National Register. History Colorado provides an overview of Properties in Boulder County listed on the Colorado State Register of Historic Places.

Local Landmark Designation

Landmark designation honors the preservation and protection of buildings and areas with a unique character and historical, architectural, or aesthetic interest or value to the city. There are currently ten historic districts and 175 individual landmarks, totaling over 1,300 designated properties. The city's website has maps of the historic districts and a brief history.

Community Land Use and Zoning

The City of Boulder has 44 categories for planning. Land use and zoning can be broken down into the following general categories: agricultural, business, downtown, industrial, mixed-use, public, residential, mobile home, and "other" types of zoning. Zoning information for planning and development can be found on the city's website.

Parks and Open Space

As depicted on the City of Boulder Zoning map on the next page, most green space surrounds the city and is outside city limits. Zoning is not specific to any single area. Boulder's significant amount of Open Space has remained open partially due to the Blue Line—an unofficial north-south boundary on the city's west side. In 1959, the Blue Line determined the elevation above which Boulder could not provide water service and launched the city's modern environmental movement (2A.6). The Blue Line is depicted on the map below.

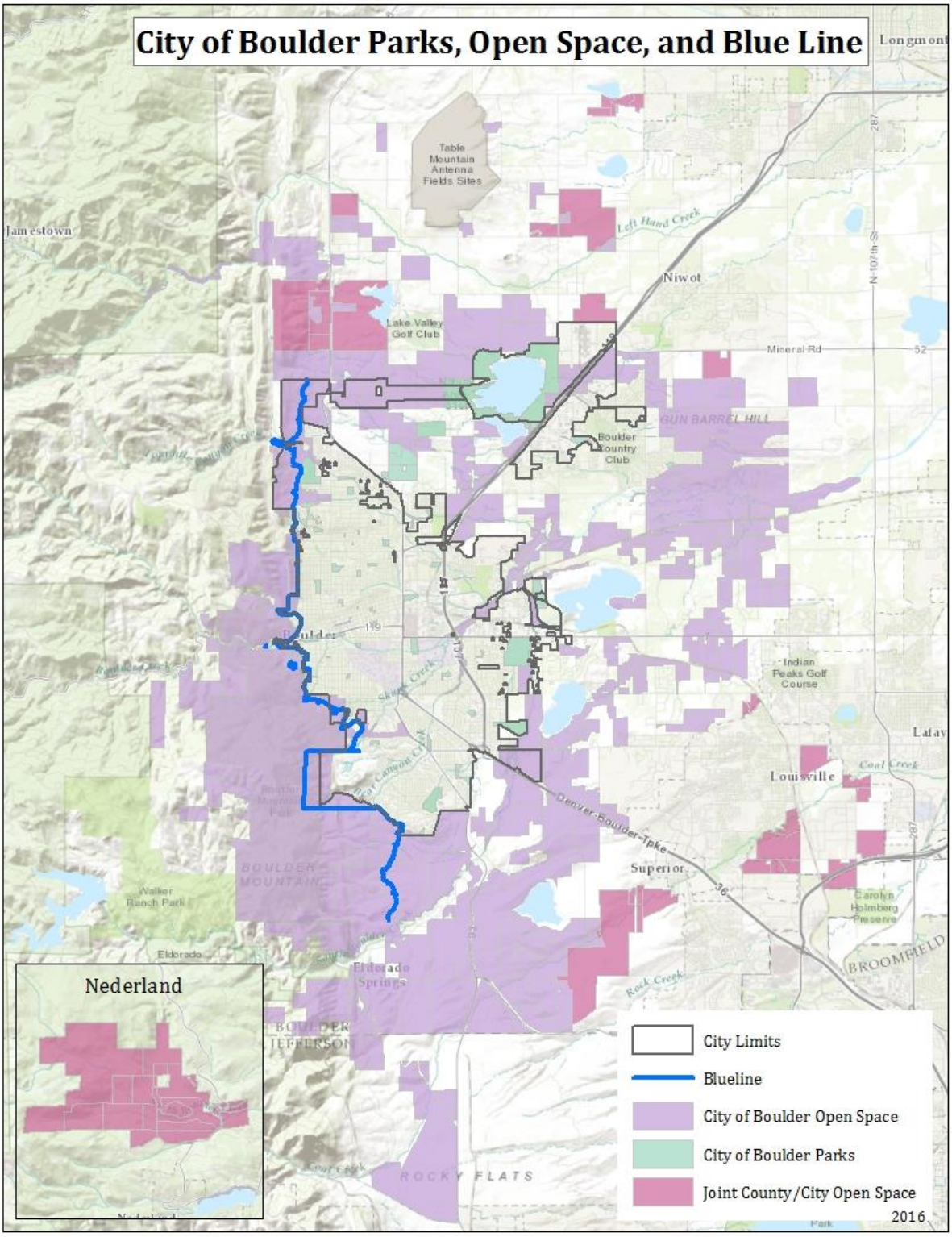


Figure 4: Blue Line and Open Space Map

Infrastructure

Critical infrastructures are systems or assists needed to maintain minimum services for the operation of a community. Critical infrastructure includes transportation, communications, water, power, and healthcare.

Transportation

Since 1976, Boulder has operated under residential growth control ordinances, and employment growth has outstripped population growth. Considerable road traffic enters and leaves the city since many employees live in surrounding communities. US 36 is the main highway feeding Boulder. City parking regulations have been designed to discourage commuter parking and encourage mass transit use.

The City of Boulder Transportation Division identifies roads, improvements, closures, and access points. According to the 2016 Transportation Master Plan (TMP) update, Boulder's Street system is classified by type, with local streets comprising 71 percent, collector streets comprising 12 percent, and arterial streets comprising 17 percent. Approximately half of the city's streets currently have an OCI rating in the Very Good and Excellent ranges. Nearly 80 percent of the street system is rated "Good" or better.

New jobs in Boulder and regional residential growth increase demand for the regional transportation system. Boulder continues to work with regional partners to improve travel options and the person-carrying capacity of all the significant corridors connecting Boulder to surrounding communities. These partnerships seek solutions that improve regional travel for everyone, including those using autos and transit.

The City of Boulder's annual traffic study found that approximately 49,000 vehicles enter Boulder during the morning rush from 6 to 10 a.m. That is an increase of 2 percent compared to 48,000 vehicles in 2014, but it remains below the peak year of 2004 when about 51,000 vehicles entered the city during the morning rush. The 2015 traffic study also found that about 20,000 vehicles leave the city daily during the morning rush hour.

Over the years, Boulder has made significant investments in the multi-modal network. The city is now well known for its grade-separated bicycle and pedestrian paths. These paths create a network of bicycle lanes, cycle tracks, and on-street bicycle routes. Boulder also provides an innovative community transit network that connects downtown, the University of Colorado campuses, and local shopping amenities. While the city has no rail transit, local and regional shuttle buses receive funding from various sources, emphasizing minimal headways, enhanced route identity, easy fare payment, and community input in the design. Due in part to these investments in pedestrian, bicycle, and transit infrastructure, Boulder has been recognized nationally and internationally for its transportation system.

Boulder has an extensive bus system operated by the Regional Transportation District (RTD). The HOP, SKIP, JUMP, Bound, DASH, and Stampede routes run throughout the city and connect to nearby communities. Regional routes, traveling between nearby cities such as Longmont, Golden, Fort Collins, Denver, and Denver International Airport, are also available. Over 100 scheduled daily bus trips on seven routes run between Boulder and Denver on weekdays.

Long-term transit plans call for a 41-mile RTD commuter rail route called the *Northwest Rail Line,* proposed to run from Denver through Boulder to Longmont, with stops in major communities along the way. These future transit plans and the current Flatiron Flyer Bus Rapid Transit route are part of FasTracks, an RTD transit improvement plan funded by a 0.4% increase in the sales tax throughout the Denver metro area.

Figure 5: Public Transportation in Boulder

Boulder, well known for its bicycle culture, boasts three hundred miles of bicycle-pedestrian paths, lanes, and routes that interconnect to create a renowned network of bikeways usable year-round. Boulder has 74 bike and pedestrian underpasses that facilitate safer and uninterrupted travel throughout the city. The city offers a route-finding website that allows users to map personalized bike routes around the city. Furthermore, in May 2011, B-cycle bike-sharing opened in Boulder with 100 red bikes and 12 stations.

Rail

One railroad line travels through the City of Boulder, the Burlington Northern and Santa Fe Railroad (BNSF). The city of Boulder has declared “quiet zones” at-grade railroad crossings. These crossings include physical infrastructure and warning systems, so train engineers are not required to sound the train horn at the crossing. While this infrastructure reduces the noise of passing trains, these safety measures also ensure citizens are aware of the crossings, reducing risk.

Airport

Figure 6: Aerial View of Boulder Municipal Airport

In addition to multi-modal ground transportation, Boulder Municipal Airport is located 3 miles (4.8 km) from central Boulder. The City of Boulder owns the airport; it is used exclusively for general aviation, with most traffic consisting of single-engine airplanes and glider aircraft. Boulder Municipal Airport is a general aviation airport providing business, private, recreational, and emergency aviation services to the City of Boulder and surrounding communities. Boulder Municipal Airport does not offer commercial airline service.

Water Supply

The Water Department manages the upkeep and maintenance of the water system, including hydrants and water mains, and identifies system issues, including outages and improvements. Boulder's water supply system includes storage, conveyance, hydroelectric, and treatment facilities. The city owns approximately 7,200 acre-feet of reservoir storage space in the North Boulder Creek watershed, 11,700 acre-feet of storage in Barker Reservoir on Middle Boulder Creek, and up to 8,500 acre-feet of storage space in Boulder Reservoir.

Boulder's two water treatment facilities are the Betasso Water Treatment Facility (WTF), with approximately 45 million gallons per day (MGD) of treatment capacity, and the Boulder Reservoir WTF at about 16 MGD. The city operates eight hydroelectric plants in the municipal water supply system and sells the electricity to Xcel Energy. Four of these hydro plants are on raw water pipelines, and four are on treated water transmission pipelines.

Operation of the city's water system involves intricate relationships between water rights, water quality, laws and legal agreements, streamflows, reservoir storage operations, transmission pipeline operations, treatment capacity, hydropower production, and water demand. Balancing and managing these factors assures the availability of a sufficient water supply. Watersheds on the eastern slope just below the continental divide feed the city's Middle Boulder Creek and North Boulder Creek. Boulder also owns water delivery rights from the Colorado-Big Thompson Project (CBT) and the Windy Gap Project. Both projects divert water from the western slope and deliver it through the CBT facilities operated by the Northern Colorado Water Conservancy District (NCWCD). Like most western communities, Boulder depends on stored water most of the year. High streamflow from melting snowpack occurs for only a few spring and summer months. Natural streamflow in late summer and the winter is insufficient to meet customer demands and is supplemented with previously stored water supplies. The amount of water available changes yearly, depending on how much snow falls in the mountains. Therefore, Boulder must store water in reservoirs during wetter years to carry over for dryer use. The city owns seven reservoirs and several natural lakes in the headwaters of the North Boulder Creek basin within the Silver Lake Watershed. The city also owns Boulder Reservoir northeast of Boulder and the Barker Reservoir facilities on Middle Boulder Creek.

Water Distribution

The City of Boulder is fortunate to have several high-quality water sources, including the headwaters of Boulder Creek and diversions from the upper Colorado River on the west slope (map below). The city's ability to obtain water from east and west-slope sources provides a measure of water service reliability in response to moderate, localized droughts or other events.

Boulder receives drinking water from three sources: Arapahoe Glacier and Silver Lake Reservoir (40%), Barke Reservoir (40%), and the Colorado River (20%) via the Colorado-Big Thompson Trans Basin Diversion Project. Water from the Arapahoe Glacier and Barker Reservoir feeds the Betasso Water Plant. The Feeder Canal connects water from the Colorado River. The treatment plant at 63rd Street Water treats the water; the water goes through a series of treatment steps, including coagulation, sedimentation, and filtration, before being distributed to homes.

Boulder's wastewater collection system consists of underground pipes that utilize gravity to transport untreated wastewater from residential, commercial, and industrial properties to the city's water resource recovery facility (WRRF) on 75th Street near Boulder Creek.

The WRRF is designed to treat more than 25 million gallons of wastewater daily in a 20-hour, multi-stage treatment process.

Approximately 13 million gallons of wastewater are treated daily, and high-quality effluent (treated wastewater) is returned to Boulder Creek. Wastewater is treated using several processes, including physical, microbiological, and chemical. Treatment includes the disinfection of harmful bacteria, viruses, and protozoa. Many samples are collected and analyzed to ensure that the final discharge meets or exceeds the permit [1] that the State of Colorado has issued.

Figure 7: City's Sourced Watershed

During the past nine years, the one-megawatt solar photovoltaic system WRRF has generated more than 13 million kilowatt-hours of electricity, saving utility ratepayers more than $500,000. The system began generating clean, renewable power in August 2010 and has operated efficiently and reliably ever since, producing about 14 percent of the facility's annual power needs.

Fire Flow and Available Water Supply

Like most Colorado communities, Boulder depends on stored water most of the year. High streamflow and runoff from melting snowpack only occur during a few spring and summer months. The runoff from snowmelt gets captured in a series of reservoirs. The amount of water available for community use varies yearly, depending on the snowpack in the surrounding mountains. Most of the city's annual water supply comes from Silver Lake and Lakewood reservoirs on North Boulder Creek, Barker Reservoir on Middle Boulder Creek, and Boulder Reservoir.

The city maintains more than 450 miles of water pipes that serve more than 29,000 customers. The water department also maintains and services about 4,700 (294 private) fire hydrants. Public Works inspects, repairs, and paints fire hydrants. The water department also routinely operates valves and flushes fire hydrants to ensure reliable, high-quality, potable water service.

The water system is highly reliable, and the volume and pressure are excellent during normal fire operations. Acquiring and maintaining adequate fire flows is typically straightforward.

According to the BVCP, fire hydrant spacing shall exceed 500 feet in single-family residential areas. No dwelling unit shall be over 250 feet from the fire department access distance from the nearest hydrant measured along public or private roadways or fire lanes that are accessible and would be traveled by motorized firefighting equipment in multiple-family, industrial, business or commercial areas, fire hydrant spacing shall not be greater than 350 feet. In all other areas, no exterior portion of any building shall be over 175 feet of fire department access distance from the nearest hydrant measured along with public or Private roadways or fire lanes that are accessible and would be traveled by motorized firefighting equipment. On divided highways, hydrants shall be on each side of the highway.

[1] Permit number CO-0024147 issued by the Colorado Department of Public Health and Environment (CDPHE).

Stormwater

According to the City of Boulder Comprehensive Flood and Stormwater Master Plan, the Boulder Creek Watershed encompasses roughly 440 square miles. It extends from the Continental Divide to the high plains east of Boulder. Boulder has 15 primary drainage ways (or creeks). Seventeen sub-basins have been delineated, and the tributary drainage ways eventually lead to Boulder Creek.

Regarding drainage, the collection system consists of various storm sewers and open drainage ditches that collect water and divert it to primary drainage ways. Irrigation ditches collect stormwater in many places in the city. Depending on the amount of rainfall, stormwater flows may exceed the capacity of the ditch and spill uncontrolled from the ditch. Rather than purely focusing on a structural solution, Boulder adheres to guiding principles to balance structural and non-structural solutions. These principles include maintaining and preserving natural draining, managing runoff, and eliminating drainage problems.

The stormwater quality program includes public education, monitoring, regulatory compliance, and source control. The city's municipal separate storm sewer system (MS4) permit requires these efforts. The city also participates in the Keep It Clean Partnership (KICP), a regional stormwater program providing public education and outreach. The stormwater quality program manages local activities to preserve, protect, and enhance water quality affecting Boulder's streams and drainages. Elements such as water quality regulation, sub-basin management, and stream enhancement contribute to a comprehensive framework for recognizing trends, philosophies, and standards while ensuring maximum effectiveness and cost-efficiency.

The Boulder Creek Watershed drains approximately 440 square miles on the eastern slope of the Rocky Mountains. The basin is bordered on the west by the Continental Divide, where headwater tributaries begin in the Indian Peaks Wilderness. Boulder Creek flows through the City of Boulder and out to the confluence with the St. Vrain River and eventually the South Platte River. The many activities associated with various land features and uses impact Boulder Creek.

The impacts include:

- sedimentation from highway maintenance and bank erosion.
- acid mine drainage from historic gold mines in the mountainous region of Boulder County.
- pollutants associated with urban runoff.
- stream channelization and reduced riparian habitat functions.
- pollutants from agricultural runoff.
- damage to riparian vegetarian and sedimentation from stream bank erosion from ranching practices; and
- point sources from industrial and municipal discharges.

To better understand the impacts on Boulder's surface water, the city regularly examines water quality to discover how the community's water resources are changing over time and to help identify and mitigate potential sources of pollution. A map of the City of Boulder Major Drainageways is on page 54 of the Comprehensive Flood and Stormwater Utility Master Plan.

Critical Infrastructure and Key Resources

Critical infrastructure is defined as the body of systems, networks, and assets essential to the city and the County of Boulder their continued operation is required to ensure the security of our community, its economy, and the public's health and/or safety. Assets such as government offices, utilities, wastewater facilities, water pumping stations, and schools are just a partial list of critical infrastructure in our community (2A.9). City of Boulder Critical infrastructure is identified in the ODM Hazard Mitigation Plan on page 244 – 245.

Population

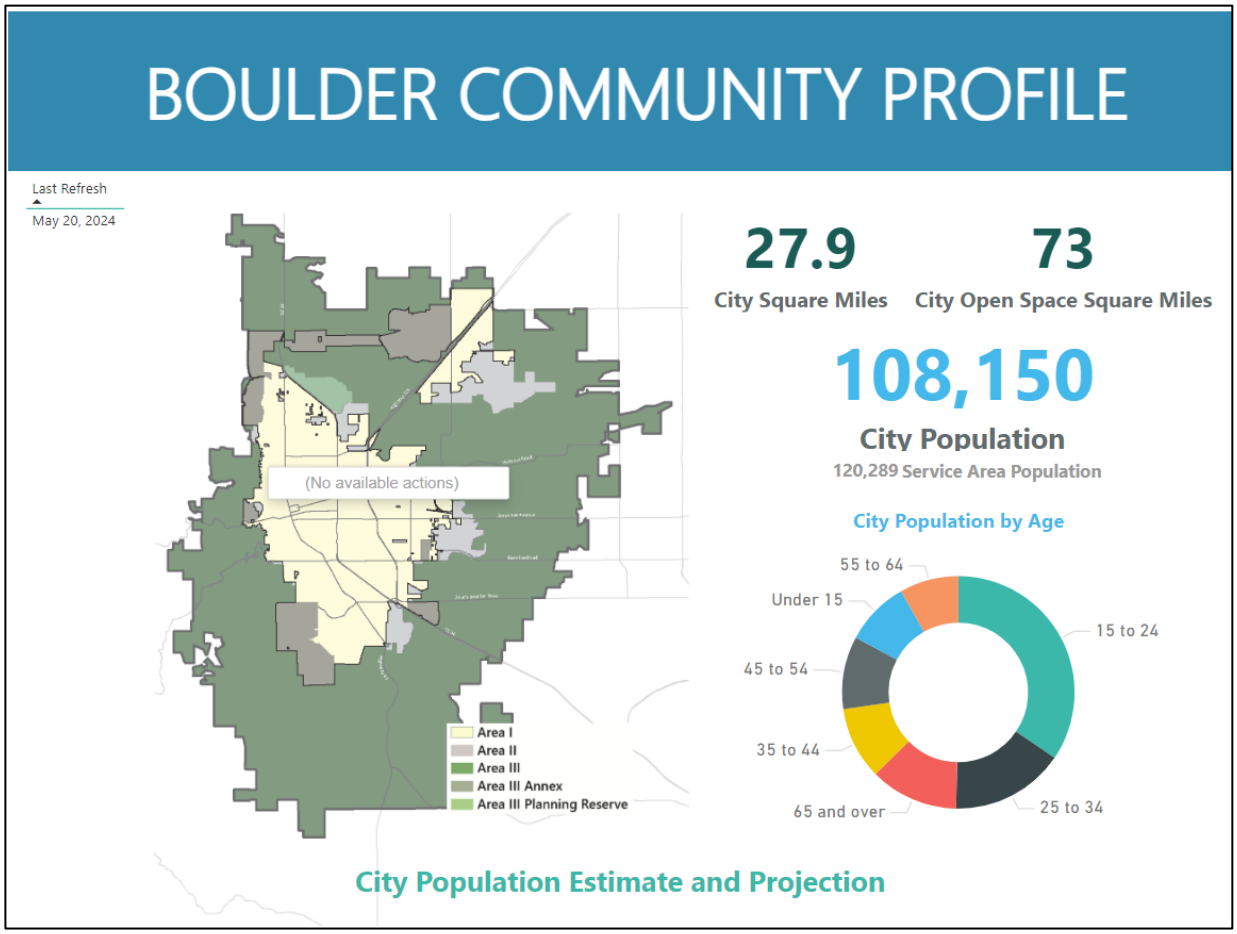


Figure 8: Boulder Community Profile

Boulder, located in a highly developed urban area surrounded by undeveloped wilderness and open space areas, has an estimated total population of 108,150, according to the 2023 Boulder Community Profile. This figure includes the University of Colorado (CU) students who live in Boulder, representing approximately 22% of the city's population. The university's presence significantly influences the demographic characteristics of Boulder residents, leading to a higher-than-average percentage of residents in the 18 to 24 age group, a high rate of renter-occupied housing, a relatively high percentage of residents with annual household incomes under $25,000, and significantly higher levels of educational attainment.

Boulder's population dramatically increased from 1950 to 1970, averaging nearly 12% yearly. However, the city took steps to slow down growth, and from 1970 to 2000, the population grew at an average annual rate of 1.6%. Since 2000, Boulder's population has remained relatively stable. From 2017 to 2018, the City of Boulder experienced a population increase of 68. A slight decrease in the local group quarter's population and a slight increase in completed housing units led to the 2017 population increase of only 0.1%. According to the 2010 US Census, Boulder's population is projected to increase to approximately 119,370, or 0.8% per year, by 2035.

In fall 2023, the University of Colorado (CU) student enrollment was 36,780, up from 34,510 in 2018. The presence of the university has a significant effect on the demographic characteristics of the city's residents, evidenced by a higher-than-average percentage of residents in the 18 to 24 age group, a high rate of renter-occupied housing, and a relatively high percentage of residents with annual household incomes under $25,000. The university influences the high educational levels of Boulder residents.

Boulder is the largest city in Boulder County, and approximately one-third of the county's residents live within city limits. Boulder County has an estimated 326,078 residents. Between 1970 and 2000, the county's population increased from 131,889 to 291,288, or an average of 4% annually. From 2000 to 2010, the county's population grew by 0.7%. Since 2010, the County has experienced minimal growth. The BVCP Housing Unit, Population, and Employment Estimates and Projections Methodology provides more detail on how the city estimates its current and future population. The city's population estimates include housing units and group quarters populations (e.g., dormitories, sororities and fraternities, jails, skilled nursing facilities, and group home shelters).

Population Density

The Department divided the city into five planning zones to assess risk within the city in Section IV: All-Hazard Risk Assessment. City limits and significant arterial roads determined these zones. Each zone was further divided into subzones to gather a manageable data set to determine risk in each zone. Each planning zone has assessed population density using Census estimates. The city has an urban population density.

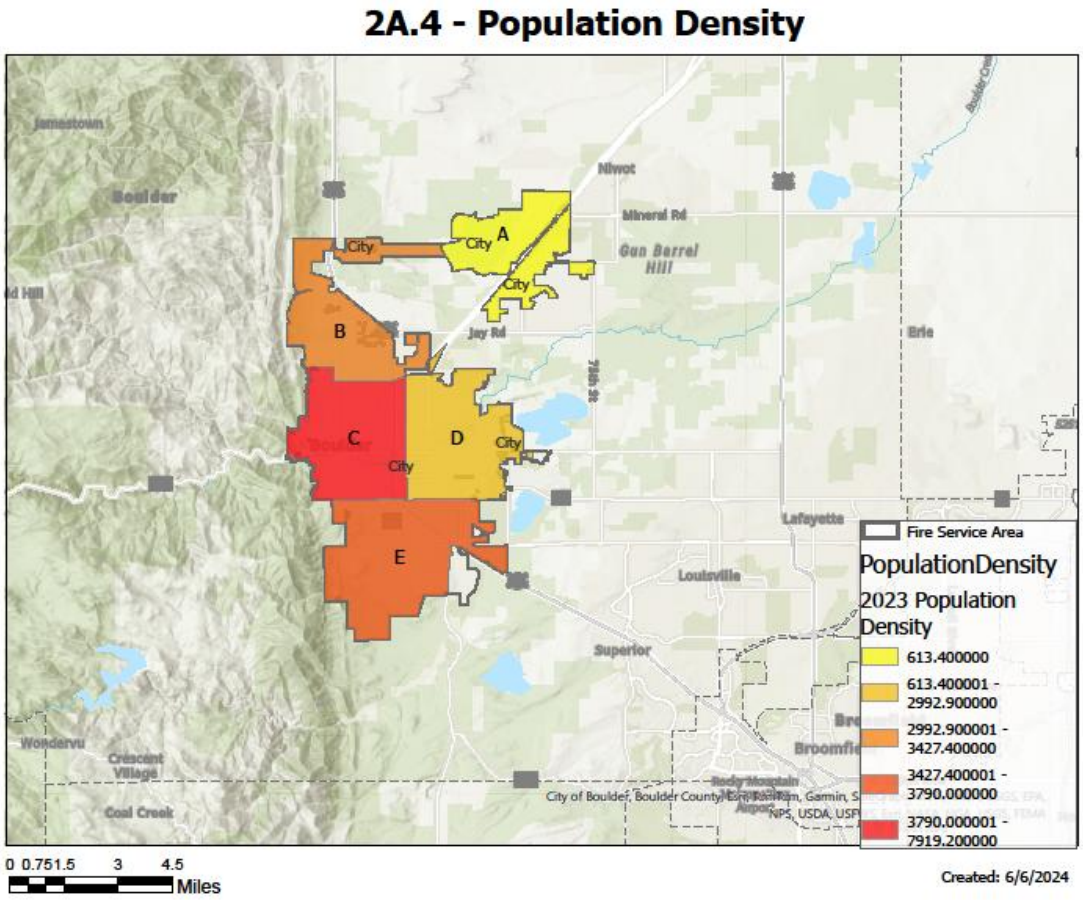


Figure 9: Population by planning zone

Demographics

Boulder's median age is 27.2, which is lower than the national median of 36.5. Boulder has a large population of young adults between 18 and 24, making up one-third of the city's adult population, reflecting the influence of the university. This contrasts to the 13% of adults in the United States who fall into the 18 to 24 age group. Boulder's population is highly educated, with the highest percentage of residents holding a bachelor's degree or higher in the nation. Ninety-four percent of city residents aged 25 and older have a high school diploma, and 67% have earned a bachelor's or advanced degree, which is more than twice the U.S. average of 28%.

Several factors contribute to the high number of area residents with college degrees, including the university, research labs, and a concentration of businesses in advanced technology. Most working residents in Boulder are

employed in white-collar occupations. Over 60% of the city's civilian workforce is engaged in managerial, professional, or related occupations, compared to 36% of the nation's workers.

Data from the Bureau of Labor Statistics Occupational Employment Survey shows a high concentration of employment in computers, mathematics, science, and engineering in the Boulder area. Boulder has a high concentration of computer software engineers (5 times the national average), physicists, hydrologists, chemists, and environmental scientists (3 to 6 times the national average), computer hardware engineers (8 times the national average), and aerospace, electronics, and materials engineers (4 to 5 times the national average). The Boulder area also has a higher-than-average percentage of residents employed in educational services, health care, social assistance, professional, scientific, management, and administrative industries.

The University of Colorado and the city's desirable location influence Boulder's comparatively high real estate values and percentage of renter-occupied housing. Census data indicates that 94% of the city's housing units were occupied in 2010. Owner-occupied housing represented 47% of occupied housing, and the median value of a home was $529,300. Renter-occupied housing represented 53% of occupied housing units, and the median rent was $1,082 per month. Additionally, almost two-thirds of the city's residents moved into their current homes in 2005 or later, showing significant change over the last decade. According to the 2013-2017 American Community Survey, 80.98% of the population are Caucasian, which reflects a 9.1% decrease from 2010. In comparison, Boulder County is 87.19% Caucasian. Colorado lacks diversity from Black or African American and Hispanic or Latino populations compared to national percentages. Furthermore, the City of Boulder has a similar representation in the percentage of foreign-born citizens compared to national statistics. Additional data is on the Census Reporter and MySidewalk CRAIG 1300 websites.

Boulder Fire Service Area Boundaries

The Boulder Fire-Rescue (BFR) is the governing authority for fire protection within the city limits of Boulder, Colorado. The city is 27 square miles and is surrounded by a clear border. It is classified as a highly developed urban area with some undeveloped wilderness and open spaces. While the city owns the land, fire protection is managed by various other jurisdictions. BFR is responsible for safeguarding over $21 billion worth of property, covering 25.8 square miles of land and 312 road miles. BFR also protects 70.8 square miles of city Open Space and Mountain Parks (OSMP) adjacent to the City of Boulder. Every year, over 5 million people visit and use the 150 miles of trails in the 45,000 acres of open space.

The wildland program is responsible for managing fires on city-owned lands. However, managing fires on these lands is complex due to the involvement of multiple agencies. The city lands stretch into Boulder and Jefferson Counties and are covered by twelve responding agencies. While this complexity doesn't usually impact manual fuel treatment, it does complicate the use of prescribed fire due to differing views on its use for risk reduction. Additionally, there is no standardized notification process for wildland fire ignitions on city land. The BFR (Boulder Fire Rescue) aims to revise mutual and auto-aid agreements to address notification processes and streamline response efforts. Another complicating factor is that all the jurisdictions covering city land are outside the city's authority. These agencies are dispatched through a separate agency, the Boulder County Communications Center, which further delays the notification and dispatching of city resources to an incident.

BFR Planning Zones

The department's planning zones were created by dividing the city into five (5) areas. The zones were determined based on similar occupancy types and risk levels. The city limits and major arterial roads within the city outline the zones. Each zone was further divided into subzones to create a manageable data set to determine risk in each zone (2A.3). A map of the geographic planning zones can be found on the next page. A subzone map is in Appendix F.

Area	General Description	Area Description	Sub-Area
A	Gunbarrel Area	The boundary is the city limits	01-05
B	North Boulder	North of Iris/Linden West of Foothills Hwy (28th St.)	01-04
C	Central Boulder – West	South of Iris/Linden North of Baseline West of 30th	01-08
D	Central Boulder – East	East of 30th North of Baseline City limit boundary to the north and east	01-07
E	South Boulder	South of Baseline City limit Boundary to the west, south, and east	01-07

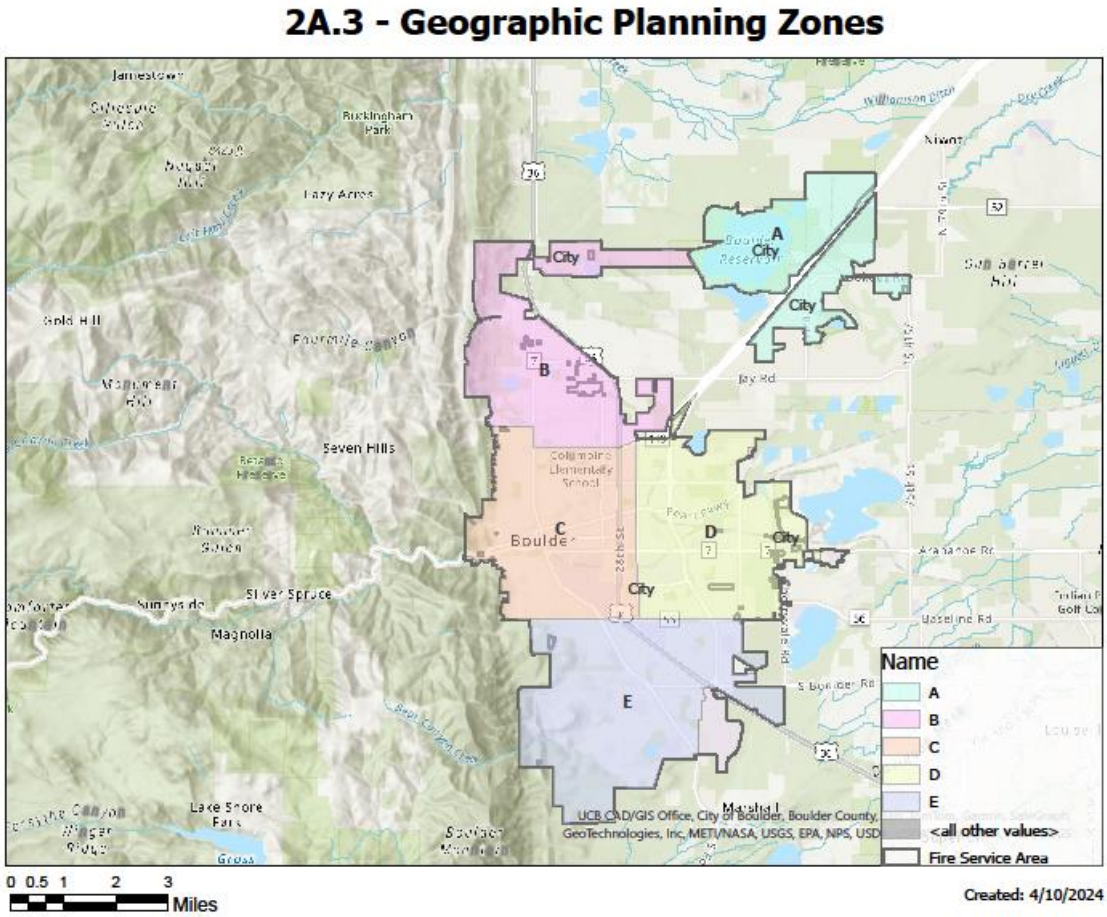


Figure 12: BFR Planning Zones

Boulder County Jurisdictions

Boulder Rural Fire Rescue Boulder Rural Fire Rescue (BRFR) is a full-service emergency services provider in parts of north, west, and eastern unincorporated Boulder County. BRFR covers around 25 square miles, serves 17,000 residents, and responds to over 800 calls annually. The team at BRFR consists of 19 career firefighters and two fully certified volunteer firefighters. In case of an emergency, calling 9-1-1 will dispatch a team comprising a Fire Captain, an Engineer, a Firefighter/Paramedic, a Firefighter/EMT on the fire engine, and two Firefighters/Paramedics on the ambulance.

Four Mile Fire Department (FMFD) is a combination fire department located west of the city. FMFD responds to approximately 95 calls annually and has 30 members who regularly respond to emergencies.

Boulder Mountain Fire Protection District (BMFD) is northwest of Boulder. This combined fire department responds to structure fires, wildland fires, medical emergencies, motor vehicle accidents, and other community disasters. BMFD has a full-time chief, three full-time wildland specialists, and approximately 50 volunteers operating out of three stations.

Lefthand Fire Protection District (LFPD) is 52 square miles of rugged ridges, canyons, and plains protected by 30 volunteer firefighters. This unique urban interface environment includes five subdivisions and several mountain neighborhoods.

Mountain View Fire Protection District (MVFPD) is in Weld and Boulder counties, covers 250 square miles, and has approximately 85,000 people. MVFPD is a full-service fire department that provides fire and emergency medical services. It serves the communities of Dacono, Erie, Mead, Niwot, Superior, and unincorporated areas of Boulder and Weld counties. MVFD operates out of eleven stations.

Automatic and Mutual Aid

Aside from the State-Level Mutual Aid Agreement, BFR has developed reciprocal mutual aid and cooperative agreements with fire departments in surrounding communities. BFR has automatic aid agreements with Boulder Rural Fire Protection District and Mountain View Fire Protection District. BFR has cooperative agreements throughout the State of Colorado and with the federal government in the event of more widespread emergencies such as significant wildland fires. BFR is also part of the Intergovernmental Agreement for Emergency Management and the Intergovernmental Agreement for Participation in the Boulder County Hazardous Material Response Plan. There are specific mutual aid and automatic aid agreements in the form of letters of understanding (LOU) and contracts with the following districts for various emergency services:

- Joint MOU between Boulder Valley Fire Consortium (BVFC) fire departments
- Contract between the city of Boulder and the Boulder County Hazmat Team
- Contact between the city of Boulder and the Boulder Emergency Squad
- Letter of Understanding between BFR, Boulder Rural, and Mountain View Fire Protection District.
- Letter of Understanding between BFR and Boulder Rural Fire Protection District (BRFPD) (2007)
- Mutual Aid Agreement with Denver Metro
- Colorado Mutual Aid System (CMAS)

The letters of understanding between BFR, Boulder Rural, and Mountain View Fire Protection District impact operations daily. BFR responds automatically to most of BRFPD's incidents. Below is a map of the Automatic Aid

response areas. For further information about the Boulder County fire response areas and stations please visit the highlighted text.

Boulder County Response Partners

Rocky Mountain Rescue Group

To provide medical and rescue assistance within the Boulder OSMP, the City of Boulder has a contract with the Rocky Mountain Rescue Group (RMR), an all-volunteer organization trained and equipped for search and rescue operations in mountainous terrain in all weather conditions. Established in 1947, RMR is one of the country's oldest mountain rescue teams and has a contract with the Boulder County Sheriff's Office and City of Boulder OSMP as the primary mountain rescue agency for the county.

Boulder Emergency Squad

Boulder Emergency Squad (BES) is a volunteer incident support agency serving Boulder County. BES is the primary dive rescue agency for Boulder County and is funded by the County Commissioners and individual agency contracts. BES is 100% volunteer-supported; it has over 40 members. BES may be utilized to support BFR incidents with traffic control, scene lighting, SCBA air cascade, dive and Swiftwater response, and Unmanned Aerial Systems (UAS) support.

Office of Disaster Management

The Boulder Office of Disaster Management has emergency management responsibilities for the City of Boulder and Boulder County. ODM coordinates with state and federal partners, city and county departments, public safety agencies, municipalities, non-governmental organizations, and private businesses throughout Boulder County to facilitate coordinated emergency planning and response.

The mission of the ODM is to develop, coordinate, and lead a comprehensive emergency management program. ODM seeks to enable adequate preparation for, efficient response to, and effective recovery from emergencies and disasters to save lives, reduce human suffering, protect resources, and develop a more resilient community.

During large-scale disasters, Boulder Fire-Rescue works with other agencies and organizations, such as the City of Boulder/Boulder County ODM). The ODM coordinates with local, state, and federal partners to facilitate emergency planning and response. Given the importance of emergency response and recovery planning, the city continuously reviews the coordination with ODM to identify any areas of improvement.

Section III: Description of Agency Programs and Services

Boulder Fire-Rescue is a medium-sized, all-career department that provides comprehensive emergency services, including wildland fire management. The department's mission is to ensure safety and reduce human suffering caused by fires, accidents, sudden illnesses, hazardous material releases, or other disasters. The department protects over 21 billion dollars' worth of property within 25.8 square miles and responds to an average of 13,000 incidents annually. It has established external agency agreements to provide additional resources if needed, ensuring that its level of service meets the community's expectations. An urban population density informs the department's response and deployment standards. The targeted service level objectives, which relate to industry standards and best practices, are outlined in the standards of cover benchmark statements. Each apparatus has both GPS technology and a Mobile Data Terminal. The terminals, GPS, and software help centralize the department under one system by linking all the apparatus to the county's computer-aided dispatch system to dispatch the closest apparatus.

The department provides fire (structural and wildland), basic life support (BLS), and emergency medical services (EMS) to the City of Boulder. It also supports a HazMat team and a water rescue team. In addition to its emergency response, the department provides fire safety education programs for all age groups. These programs include inspections for child passenger safety, a Citizen's Fire Academy, an elementary school smoke alarm program, and building inspections for fire prevention code compliance.

Boulder Fire-Rescue has eight strategically located stations, seven of which are dedicated to response and the eighth to wildland. BFR operates one ladder truck and seven engines, with three firefighters per company. The department also coordinates with the city's Office of Emergency Management and acts as the designated emergency response authority for hazardous materials incidents.

The dedicated wildland station (station 8) is located at the Boulder County Regional Fire Training Center and serves as the wildland mitigation, suppression, and education base. The department has a water rescue vehicle with a boat and Type 6 and Type 3 brush engines. The Hazardous Materials unit, operated by the Boulder County Hazmat Team, is based at Station 7.

In 2015, BFR received an ISO rating of 03/3X during the Evaluation of the Insurance Services Office (ISO) Fire Suppression Rating Schedule (FSRS). The FSRS is a manual ISO used to assess individual communities' fire prevention and fire suppression capabilities or fire protection areas. The schedule measures the key elements of a community's fire protection system and assigns a numerical grading system called a Public Protection Classification (PPC™) based on credits. The FSRS follows nationally recognized standards to determine the PPC.

The PPC ranges from Class 1 to Class 8 and represents fire suppression systems, including an FSRS credible dispatch center, fire department, and water supply. Class 1 applies to properties more than 1,000 feet away from a hydrant or alternate water supply in a split classification. Class 2 applies to properties more than 1,000 feet away from a fire hydrant but within five road miles of a recognized fire station. Additional detailed information about the rating can be found in the appendix.

Organization

The fire chief oversees that department and reports directly to the City Manager. In this capacity, the Chief provides for the overall strategic direction of the department and maintains external agency relationships. The fire department is staffed by 128 FTE sworn personnel and nine civilian employees assigned to two administrative branches: operations and support. Each branch is led by a Deputy Chief, who, in addition to the Fire Chief, comprises the department's executive leadership. The department is divided by function into two branches. One

provides external customer support (operations), and the other provides internal customer support (support). Each branch is staffed to support the agency's mission. Three administrative professionals provide administrative support; their assignments are in the office of the fire chief, operations division, and support division. Department organizational charts can be found in Appendix A.

Community Risk Reduction

The Division Chief/Fire Marshal oversees the Community Risk Reduction (CRR) Division, which includes three sworn personnel and six civilian employees. The CRR Division strives to identify and prioritize risk within the City of Boulder to improve public safety and prevent the loss of property and life for the community's residents and workers.

The 2018 International Fire Code (IFC), with amendments, is the governing document for fire-related inspections within the city. Each of the approximately 5,000 businesses in Boulder has a fire code inspection once every other year; engine crews perform the inspections. The inspection checklist used is from the IFC.

Fire Inspectors conduct specialty inspections on the following occupancies: marijuana, group H occupancies, hazardous material users, food trucks, and educational and daycare centers. Crews perform occupancy inspections. Occupancies get divided by the building address: odd addresses completed during the odd years and even addresses completed during the even years. The occupancies are totaled and divided evenly amongst the station territories and crews. Breaking up the territory is done automatically through ESRI software. “A fire inspector does h” occupancies (fraternity sorority, schools, food trucks). 2018, the department built an ESRI Operations Dashboard to monitor crew progress.

BFR currently do not require pre-fire plans. Crews collect and view data in Active 911. In the future, we would like to implement a formal pre-planning program and make pre-plans available on each MDT. Additionally, the Division works with local businesses and organizations by inspecting buildings, reviewing construction plans for fire prevention (2A.8), and enforcing the adopted fire code. Through the fire code, CRR reviews and approves plans for new and remodeled buildings. Permits are issued, and follow-up inspections are performed to ensure the business meets the permit's terms and conditions. Inspections of existing businesses are conducted to mitigate hazards and educate the business owner on reducing risk to customers, employees, and emergency responders.

Fire investigations also fall under the purview of CRR. Fire investigators investigate the causes of fire to identify risks and current trends that require the attention of the education or enforcement staff.

Community Risk Reduction programs are based on identified and prioritized local and national risks; local risks include wildfire mitigation education for WUI homeowners and fall prevention; national risks include a smoke and CO alarm initiative, a child passenger safety program, stop the bleed, and safety programs for people with access and functional needs. The division partners with local stakeholders, university students, and non-profit organizations invested in the same issues, working directly with the community. Additional details on risk reduction activities are in Section V.

Staffing

BFR has a traditional organizational structure for a department its size. The department has two major divisions, and within those two are four primary sub-divisions, which comprise the operational structure of the department. A portion of the FTE positions includes six full-time personnel in the Wildland Division. The four divisions within the department under Support Services and Operations, respectively, are the community risk reduction, training, response, and wildland divisions.

The International Association of Firefighters Local # 900 represents fire personnel. The current two-year collective bargaining agreement went into effect on January 1, 2024, and expired on December 31, 2025. Chief officers are selected based on city-supported promotional processes, and the Fire Chief is appointed. The daily minimum staffing is 24 firefighters and one Battalion Chief. Staff includes 102 EMT-Basics and 16 Paramedics, providing staffing and deployment options for meeting care goals.

Figure 10: Daily Minimum Staffing

Daily Min. Staffing (25)		Stations	Car	Engines	Quints	Ladders
25 FF	**1 BC**	7	1	5	2	1

Operations

The Operations Division, directed by the Deputy Chief of Operations, oversees the Community Risk Reduction Division, EMS Division, Wildland Division, three response Battalion Chiefs, specialty teams for technical rescue and hazardous materials response, and an administrative assistant. The department staffs five engines, two quints, and one ladder truck operating out of seven fire stations, working a 48/96-hour, 3-shift schedule. The minimum staffing on each front-line apparatus is three personnel, with the Battalion Chief having a minimum staffing of one. Each shift has one roving Lieutenant, an Engineer, and six roving Firefighters assigned to vacancies or to increase staffing above minimums.

Emergency Medical Services

By charter, BFR has primary responsibility for “the provision of rescue and emergency medical services” within city limits. It does so through a combination of fire department response for BLS and third-party ambulance contractor response, which provides ALS care and patient transport. The fire department operates eight first-line emergency response EMS units out of seven fire stations. In addition to those units, the Battalion Chief command and Division Chief vehicles carry EMS equipment and are available for emergency response. All emergency response units currently carry basic life support equipment. In February 2023, all the emergency response units transitioned to carrying complete advanced life support equipment.

The city uses a comprehensive service network that begins with emergency care through a 911 call center operated by the city's Police and Fire Communications Center. Fire department personnel and AMR units communicate on a shared radio channel and are dispatched to incidents through the city's 911 Communication Center. BFR provides EMS with the first response on the University of Colorado campus with support from campus police.

All Boulder Fire-Rescue operations employees maintain at least a State of Colorado Emergency Medical Technician (EMT) certification, Basic Life Support CPR certification, and Intravenous Therapy certification as a condition of employment. In addition to the above, the department currently has 13 State of Colorado Paramedics. In February 2023, Boulder Fire-Rescue will begin implementing advanced life support (ALS) Engines to provide ALS-level care.

American Medical Response (AMR) is the contracted ambulance transport provider in Boulder. A paramedic and an EMT staff each ambulance. In response, they utilize a system status management posting plan throughout the city. Boulder Fire-Rescue’s EMS administrator manages the AMR contract.

Almost all emergency patients are transported to Boulder Community Health (BCH), a 265-bed Level II Trauma Center, the highest locally available level. BCH is also nationally certified as a Primary Stroke Center for providing high-quality, specialized care and better outcomes for stroke patients. If a level 1 Trauma Center is needed, BCH will transfer patients to Denver Health. BCH offers 24-hour access to an interventional cardiac catheterization lab, surgery department, imaging, and an 18-bed intensive care unit. BCH is the only facility in Boulder County that performs open-heart surgery.

Specialty Teams

Hazmat

Hazardous materials response is a locally provided service mandated by federal law. The law requires Colorado to develop a hazardous materials response system, which was delegated to local jurisdictions by statute. The statute requires local governing bodies to appoint a Designated Emergency Response Authority (DERA) to respond to hazardous materials emergencies.

For minor hazardous materials incidents, BFR sends personnel to evaluate the scene. If incidents escalate or are major spills or emergencies, the Boulder County Hazmat Team (BCHT) sends personnel for assistance. BCHT members include personnel from Boulder, Longmont, Lafayette, Louisville, and the Boulder Rural, Rocky Mountain, and Mountain View Fire Protection Districts. Resources from each partner entity staff the BCHMRA and provide DERA services throughout Boulder County. According to the BCHT IGA, a minimum of 13 Colorado Certified Hazardous Materials Technicians will be available to respond 24 hours a day, seven days a week, and the following guidelines shall be followed:

The BCHMRA will arrive within 90 minutes of the initial dispatch of the BCHT to each of the following response areas:

- East of Broadway/Hwy 93/U.S. 36
- North of Hwy 128
- South of Hwy 66
- West of East County Line Road
- All other areas within the BCHT Response will provide coverage within 120 minutes of the initial dispatch of the BCHT

The BCHT will be dispatched after the Fire/Police conduct an initial assessment and the on-scene IC requests a BCHT response or consultation call. The BCHT will enter the scene after all team positions are filled and it has been deemed safe to begin rescue or mitigation efforts. The jurisdictions that sign the Authority Agreement will ensure enough staff to support a 24/7/365 response from the 13 qualified Technician-level positions. Medical support will be provided by the hosting jurisdictions' EMS or County EMS system, and BFR will support the BCHT through its staff of 24 hazmat technician-certified personnel. To meet the response time goals of the IGA, BFR will have a minimum of 3 technicians on shift per day.

All staff are trained to at least Hazmat Operations level. A full Hazmat Team call initiates a response from The Boulder County Hazardous Materials Response Authority. BFR is a Boulder County Hazardous Materials Response Authority (Authority) member. The Authority comprises five agencies (Cities of Boulder, Longmont, Louisville, Lafayette, and Boulder Rural Fire Protection District). The Authority is governed by a Board of Directors and an Advisory Board. The Board of Directors handles legal and financial operations, approves the annual budget the Advisory Board manages, and ensures all necessary agreements for interagency operations are in place and current. The Advisory Board comprises one person from each agency in the Authority. The Advisory Board establishes Standard Operating Guidelines (SOGs) and handles the Authority's day-to-day response-level operations. The Authority maintains a list of responders, training records, and an equipment inventory.

Technical/Water Rescue

BFR has a well-defined technical rescue program. Technical rescue is defined as any rescue requiring a specialized team; at BFR, this includes dive, subsurface, ice rescue/recovery, high-angle rescue, machine extrication, etc. All BFR members have received basic training for structural collapse, trench and excavation, confined space, and rope rescues. BFR works with the Boulder Valley Fire Consortium (BVFC) agencies to provide technical rescue response across the consortium for structural collapse, confined space, trench/excavation collapse, and rope rescue incidents. The water rescue program trains and explores response models with the North Area Water Rescue Team (NAWRT) to enhance swift water and sub-surface capabilities.

BFR's water rescue team currently has 15 members, with three vacancies. Team members are certified in Swift Water I, Surface Ice Rescuer, Public Safety Diver, and Dive Rescue within the first year of joining. In the subsequent years, Swiftwater II, SONAR operator, Ice Dive Operations, Critical Skills Diver, and Light Salvage and Recovery. The technical rescue team is comprised of 24 members who have been trained in structural collapse, vehicle accidents, confined space, cave-ins, trench collapse, and high and low-angle rope rescue. Seven members are Structural Collapse Technicians and Trench Rescue Technicians. Three members have completed the Level 1 and 2 Rope Rescue Technician courses. Eleven members have been to a four-day Rigging for Rescue course.

The water rescue unit (2523) is centrally located at Station 3. Rope rescue equipment, hydraulic extrication equipment, and Rescue 42 struts used for vehicles and light structural stabilization are carried on one engine (2502) and the three front-line aerial apparatus (2516, 2506, and 2507). Rope rescue, confined space, structural collapse, and trench rescue equipment are carried on the rescue vehicle (2527) at Station 7. Additional structural collapse and trench rescue equipment are in an 8' x 24' trailer at Station 7.

BFR and the BVFC train with the North Area Technical Rescue Team (NATRT). The team is made up of 10 different fire departments in Adams, Jefferson, and Weld counties and has been in existence for 13 years. The three dispatch centers in Boulder County, the City of Boulder, Boulder County, and the City of Longmont dispatch a USAR response for each of the tech disciplines: water rescue and recoveries, rope rescue, structural collapse, confined space, heavy vehicle and trench/excavation collapse. This response buildout follows the model of the Boulder County Hazmat Authority.

Wildland Division

The Wildland Division provides planning, mitigation, training, and suppression of wildland within the City of Boulder and its managed lands. It has seven employees who specialize in wildland fire and large incident management.

The Division provides incident response plans, pre-plans, fuels reduction prescriptions, prescribed fire planning, Wildland mitigation plans, and other associated documents to fire department management and other City departments that own and manage lands throughout the county (OSMP, Utilities, parks, and rec). Along with preplanning, the Division implements various fuel reduction projects throughout the city system through thinning and prescribed fire.

The Wildland Division also provides fire and incident management training to the fire departments' front-line responders and support staff. This includes basic wildland fire fighting through advanced fire tactics, annual refresher training (including administration of annual work capacity testing), incident management, and various other training modules.

The training goes beyond the city boundaries and includes external cooperative partners with city-managed land within their response areas. The Division tracks all wildland-specific training and qualifications for all city employees through the state-sponsored IQS database system.

The Division also manages the wildland fire apparatus's repair, maintenance, and readiness. BFR operates 3 Type 6 engines and 3 Type 3 urban interface pumpers. Front line response is with either a Type 6 from station 5 or a Type 3 from station 2. The balance of the wildland-specific apparatus is at Fire Station 8. This equipment is maintained in readiness for surge capacity and severity staffing or sent on regional or national deployments.

The Wildland Division Chief oversees six Wildland Operations Specialists. The Wildland Division provides planning, mitigation, training, and suppression of vegetation fires within Boulder and outside the municipal boundary on its owned and managed lands. All personnel within the Division have extensive national experience and hold certifications through the National Wildfire Coordinating Group (NWCG).

The Division's operations staff is at fire station 8. Various career and volunteer fire departments make the initial attack on city-managed lands outside of the municipal boundary. These agencies maintain agreements for services with the City of Boulder. The Wildland Division provides a secondary response to any wildfire on or threatening city property. Division staff provides incident management and coordination of resources and co-manages the regional type three incident management team in collaboration with the Boulder County Sheriff's Office. Division staff typically serve as incident commanders, division supervisors, or other command and general staff positions on said IMT and various positions on regional Type 1 and 2 Incident Management Teams (IMT).

Support Services

The Support Services Division is staffed by five sworn personnel and three civilian employees who provide support for all line services within the department and are directed by the Deputy Chief of Support Services. The Division is responsible for overseeing the department's budget process, maintaining fleet and facilities, acquiring and renovating fire stations and facilities, overseeing the IT needs of the department, providing departmental training, and providing support for department initiatives such as accreditation and special research projects. The Support Services Division includes an Administrative Battalion Chief, a Training Division Chief, a Health and Safety Captain, a Training Captain, an Administrative Specialist, a Senior Data Analyst, and a Senior Budget Analyst. Support Services also provides human resources activities by partnering with the city's HR department and providing legal support through the city attorney's office.

Data Analysis

The Manager of Data and Analytics is responsible for data analysis, project management, process improvement, gap analysis, and strategic planning efforts. The project manager of data and analytics manages the accreditation process, authors the CRA/SOC, and leads the fire department's data management and analysis efforts. This role is a lead resource in cross-departmental and community partnership efforts related to data and policy analysis, process facilitation, and problem-solving. The Manager of Data and Analytics is a key resource in the fire department for developing actionable strategic and contingency plans, performance metrics for assessing progress toward outcome measures, and data tools and dashboards to help executive leaders identify and manage emergent problems.

BFR uses multiple data gathering and analysis tools to collect and evaluate incidents. Each 911 call generates two data sets: what the caller perceives is happening (CAD data) and what emergency personnel report (RMS data). Both data sets share an incident number and all-time segments. Data systems are listed in the Manager of Data and Analytics program appraisal.

ESO is the current records management system (RMS), National Fire Incident Reporting System 5.0 (NFIRS 5.0), and NEMSIS-compliant incident reporting software package. It allows users to record, store, archive, and recall incidents and EHR records and retrieve reports regarding them (2B.2,2B.3). The incident module within ESO records all fires. It includes information about fire loss, injury and life loss, property loss, and other associated losses. The company

officers are still responsible for guaranteeing the completion of NFIRS and EHR reports, for which BFR was the lead. Battalion Chiefs are expected to check reports for content.

BFR uses First In, a product created by West Net. First In is a fire station alerting system that utilizes a series of remote units placed strategically throughout the fire station to notify fire personnel of an emergency call. The system is alerted by the CAD system. It features pre-alert tones and Automated Voice Dispatch, selective alerting by company assignment, dorm remotes for individual dorm room alerting, heart-friendly ramping tones, video messengers for displaying call information on station monitors, back-up alerting as well as red safety lighting to ensure safety throughout the firehouse.

Finance

The Senior Budget Analyst is responsible for coordinating all departmental financial activities. Primary duties include developing and ongoing monitoring of the annual budget, establishing and maintaining sound internal financial policies and processes related to purchasing and revenue collection, and ensuring adherence to citywide financial and accounting policies. Additionally, the Senior Budget Analyst serves as a strategic adviser to Boulder Fire-Rescue's Executive Leadership Team for matters including, but not limited to, budget development, master planning, collective bargaining agreement negotiations, and financial reporting and analysis.

Fleet and Facilities Liaison

The Logistics Division Chief is the liaison and principal department advocate between two Internal Service Departments (Fleet and Facilities) that assist the department in managing the purchasing, operating, maintenance, and repair of our station and apparatus capital assets, equipment needs, and replacement cycles. The division chief works with Fire Finance to verify current funding adequacy and provides long-term needs information and forecasting to support financial strategy modeling for capital sustainability and resilience. Still, managing these assets primarily lies in a centralized city support system. Detailed information about each station and apparatus can be found in Appendix B and on the City of Boulder's website.

Training Division

The Training Division is responsible for developing and providing comprehensive job-related instruction to department members. This includes annual and in-service training to maintain certifications and cover critical areas such as emergency medical services, live-fire training, aerial ladder operations, elevator rescue, rail car rescue, gas and electrical utility control, water rescue, vehicle extrication, firefighter safety and survival, low-angle rope rescue, confined space rescue, wildland training, forcible entry, hose management, search and rescue, and other fire ground operations. The division also covers essential topics such as firefighter safety, ground preparation, hazards and hazards, health and wellness, and emergency vehicle operations to ensure personnel are prepared, safe, and efficient. Additionally, the division is responsible for training all new members entering the Department by ensuring proper onboarding and department familiarization. The Training Division staff includes a Chief, a Captain, and a Safety Captain.

Recruits are hired as either entry-level or lateral-entry firefighters. Lateral entry firefighters already possess the required certifications and undergo a 4-week internal onboarding program at the fire academy. Entry-level firefighters undergo a 16-week Firefighter Recruit Training Academy that meets all National Fire Protection Association (NFPA) Standards for Firefighter I certification. Upon completing the academy, recruits are certified as Firefighter I or II, Hazard Materials Operations, and Car Seat Technicians. In addition, they receive training in a variety of fire-related operations, such as water rescue, vehicle extrication, firefighter safety and survival, low-angle rope rescue, confined space rescue, wildland training, forcible entry, hose management, search and rescue, and other fire ground operations.

External Partners

Facilities and Fleet

The Facilities division coordinates and manages city facilities and equipment maintenance. BFR designs and purchases apparatus according to a defined replacement schedule. Annual budget contributions are made to an apparatus replacement fund managed jointly by BFR and the fleet services department. Apparatus is designed and specified by the department's Apparatus Specification Committee. Apparatus and vehicles are designed to meet all safety and performance standards outlined in NFPA 1901: Standard for Automotive Fire Apparatus. A replacement schedule exists for all apparatus and support vehicles. The replacement schedule is primarily based on the age of the vehicle and informed by applicable standards, the condition of the vehicle, and department needs. BFR will take delivery of its first electric Firetruck in 2024, Rosenbauer RTX, and received a grant to purchase a second one.

Human Resources

The human resources manager for BFR is the city's director of human resources (HR). This position oversees and coordinates all human resources functions for the entire organization. The HR department assigns a business partner to BFR as the primary contact for day-to-day human resources issues. The deputy chief of support serves as the primary liaison to the HR department and provides strategic coordination of HR functions.

Boulder Police and Fire Communications (BFPC)

The City is a member of the Boulder Regional Emergency Telephone Service Authority (BRETSA), which was formed in 1987 through a countywide Intergovernmental Agreement (IGA). BRETSA has the authority to set fees for 911 service and uses the money collected through the 9-1-1 surcharge to bring Enhanced 911 (E-911) telephone and dispatching services to Boulder County, including the cities, towns, and fire protection districts within the county. BRETSA's governance is defined by the Colorado Statutes and an IGA, with management oversight provided by a Board consisting of four permanent members and one rotating member with a one-year term. Although BRETSA contracts out needed services and support, it has no direct employees as an emergency telephone service authority.

Boulder County operates four public safety answering points (PSAP) at the Colorado University, BFR/BPD, Longmont FD/PD, and Boulder County. Boulder County dispatches 24 of the 26 fire agencies in the County, with the Boulder Police Department responsible for all 911 access and communications services, including police, fire, and EMS dispatching. The Communications Center, overseen by the Support Services Division of the Police Department, is managed by a non-uniformed communications manager and has 26 authorized dispatchers, 4 Dispatcher Supervisors, a System Administrator, and an Administrative Assistant. The center maintains a minimum staffing of four personnel: one for the police radio channel, one for fire and EMS, one for the data channels, and one dedicated 911 call-taker, with the supervisor available to fill in at any position if necessary.

For medical emergencies, the dispatch center uses Emergency Medical Dispatch (EMD) with Priority Dispatch ProQA software, which guides the dispatcher through collecting vital information from the caller, obtaining the patient's status, choosing an appropriate dispatch level, and instructing the caller with medically approved protocols until the dispatched units arrive at the scene. Once the incident is EMD'd, the level of concern can be determined by using the answers to critical questions and additional information. After this, the appropriate dispatch determinant can be selected using the Dispatch Determinant Theory. There are six dispatch determinants to consider A = Alpha, B = Bravo, C = Charlie, D = Delta, E = Echo Ω = Omega.

Information Technology

The Boulder Fire-Rescue (BFR) and Innovation & Technology (IT) departments have implemented a new model to enhance public safety through innovative technology services. BFR command staff have functional ownership, and IT leadership has technical ownership, creating a balanced approach to technology priorities and resources. The model minimizes single points of failure for crucial technologies and establishes accountability through the Public Safety Innovation Manager, who reports to senior IT leadership and BFR command staff. Quarterly reviews and monthly meetings between BFR and IT leadership ensure proper alignment.

The Public Safety Innovation & Technology Team, led by the Manager and an IT Program Manager, delivers top-notch support services and executes project work. They submit a monthly report to BFR and IT leadership on progress, risks, issues, and milestones. The team's responsibilities include:

- Collaborating with the IT Device Support Team on in-apparatus technology (MDTs, tablets), cell phones, Cradlepoints, hazmat technology, cardiac monitors, and Knox Box secure keys SLAs and preventive maintenance schedules.
- Working with the IT infrastructure and security teams to secure and maintain BFR application-supporting databases and infrastructure.
- Supporting end-user applications in partnership with IT applications support.
- Acting as liaison to the city's radio team and ensuring alignment with technical standards and roadmaps.
- Developing and maintaining compliant applications that meet technical and security standards.

Public Information Officer

The Communication and Engagement Department facilitates effective communication and engagement among residents, staff, and the council; a Public Safety Communications team has been established in collaboration with the Communications and Engagement Department. This team includes two public information officers (one specifically assigned to BFR) and a public safety communications manager, providing redundancy and capacity. Their purpose is to increase support for city programs, policies, and projects by ensuring timely and accurate dissemination of information through traditional and digital media. In addition to external communication, the team supports internal communication within the fire department and handles city-wide communication about employee benefits, compensation systems, city projects, staff development and training, and updates on council work plans.

Fire Facilities and Apparatus

The department operates out of ten facilities, seven of which are primary response stations. The average age of the fire stations is 46 years. The other three facilities provide various services to the department, including apparatus maintenance, training, and facility maintenance. The training center is a regional facility shared with other county departments for training purposes. Most of the Department's management and administrative functions are at Fire Headquarters, temporarily housed at the Atrium while Station 3 is being constructed.

All stations have one engine/pumper. The minimum staffing on the front-line apparatus is three personnel: one officer, one fire engineer, and one firefighter. The role of the engine company during fire suppression operations is to pump water onto the fire through various fire hoses and associated appliances to lower the temperature of the fuel below its ignition temperature, thereby extinguishing the fire. The engine provides BLS, operates hose lines, conducts search and rescue, and performs any other duties conducive to quick and effective fire containment that contributes to saving lives and protecting property.

Station	Radio Name	Apparatus #	Personnel	Type
Station 1	2516	5045	3	Type I
	2501	5049	3	Type I
	2570	3464	1	Pick-Up
	2531	3753	0	Brush Truck
Station 2	2502	5054	3	Type I
	2538	5042	0	Type III
Station 3	2503	5043	3	Type I
	2521	4244	0	Dive Van
Station 4	2504	5048	3	Type I
Station 5	2505	5052	3	Type I
	2532	5055	0	Type VI
Station 6	2506	5051	3	Type I
Station 7	2507	5050	3	Type I
	2523	5041	0	Hazmat Van
Station 8 (Wildland)	2531	3753	0	Type VI
	2535	5053	0	Type VI
	2539	3602	0	Type III
	2551	3571	0	Pickup
	2552	3572	0	Pickup
	2553	3658	0	Pickup
	2554	3573	0	Pickup
Total Apparatus Minimum Staffing		**25**		

Boulder Regional Fire Training Center

The Boulder County Regional Fire Training Center (BCRFTC) is located on approximately 10 acres east of the Boulder Reservoir. It was opened in 2010 under a cooperative agreement between the City and Boulder County and is operated under an intergovernmental agreement. The mission of the BCRFTC is to promote safety through training and provide facilities to foster education, practice, and the promotion of skills for fire service personnel.

The facility includes a classroom building, a training tower, and a burning building. The main building has two classrooms, two conference rooms, offices for the training staff, kitchen facilities, restrooms, locker room facilities, a weight training area, and a large apparatus bay that can be used for inside training space or parking fire trucks inside during inclement weather while crews attend training sessions. The training center has a seating capacity of 230 people, which can be expanded by an additional 250-300 in the apparatus bay if needed. The building also houses training support functions such as laundry and breathing air refill.

The training tower is a five-story building that provides numerous props and training opportunities, including ladder training, high-rise operations, rappelling, roof smoke ventilation, and confined space rescue. The burn building simulates fire attack, search and rescue, smoke ventilation, and other firefighting skills. Clean wooden pallets are burned to create fire and smoke for training.

Other features of the training center include a pump test area for annual pump training, vehicle extrication areas for crews to become proficient in automobile extrication, a propane car fire simulator for crews to practice proper vehicle extinguishment techniques, and a large driving area for cone course for apparatus operation.

Section IV: All-Hazard Risk Assessment and Response Strategies

Risk, as defined by the Federal Emergency Management Agency (FEMA), is a combination of hazard, vulnerability, and exposure. It is the impact of a hazard on a community's people, services, facilities, and structures, and refers to the likelihood of a hazard causing injury or damage.

The risk assessment process guides the department in making resource allocation and deployment decisions to minimize the loss of life and property from local threats such as fire, medical emergencies, floods, earthquakes, tornadoes, terrorism, dam failures, and hazardous material spills (2B.4, 2B.5, 2B.6). The department needs to differentiate between the ability to handle an emergency in different types of buildings, such as detached single-family dwellings, multi-family dwellings, industrial buildings, and high-rises when assessing risks. Each type of building should be assessed separately in the community risk model. The rule is: Increased Risk = Increased Concentration.

When assessing risks, it is important to consider two main components: probability and consequence. The likelihood of an event occurring (probability) and the potential consequences, ranging from insignificant to significant, are influenced by external factors. A matrix is used to display the various combinations of the likelihood of an incident (probability) and the result (consequence) for each of the four risk categories (low, moderate, high, and maximum). To understand the fire risk in the community, BFR conducted a fire risk assessment for each occupancy within the city limits.

There are four relationships between an event's probability and consequence: low probability, low consequence; low probability, high consequence; high probability, low consequence; and high probability, high consequence. The probability and consequence matrix from the CFAI Standard of Cover Manual is used to classify risk.

Low Risk = low probability, low consequence

Moderate Risk = high probability, low consequence

High Risk = low probability, high consequence

Maximum Risk = high probability, high consequence

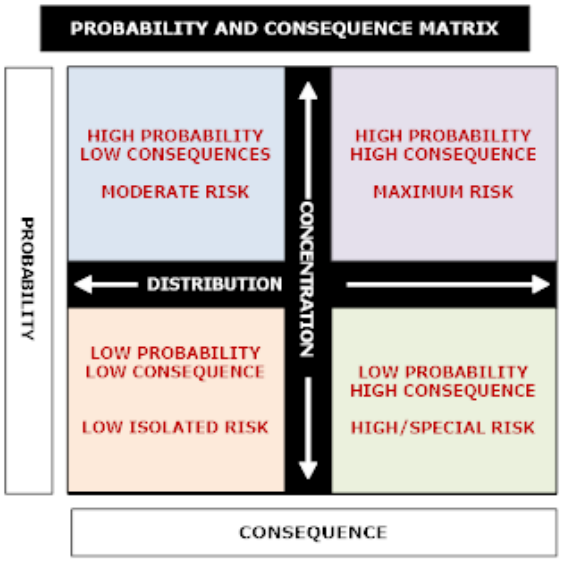


Figure 11: Probability and Consequence Matrix

Natural and Community-Wide Hazards

The city of Boulder is at the base of the Rocky Mountains and is prone to severe weather events, including thunderstorms (including hail), lightning, and winter storms. These precipitation-oriented events can also lead to wide-scale flooding. The region also experiences high wind events, particularly in late winter and early spring.

The community is home to several governmental facilities, including the National Institute of Standards and Technology (NIST) laboratories, offices of the National Oceanographic and Atmospheric Administration (NOAA), the University of Colorado, and several defense-oriented technology companies such as Ball Aerospace, McDonnell Douglas, and Lockheed Martin. These facilities are subject to the risk of terrorist attacks and represent a large economic driver in the community.

Hazard	Geographic Extent	Probability of Future Occurrences	Magnitude/Severity	Significance
Avalanche	Limited	Unlikely	Negligible	Low
Dam Failure	Significant	Unlikely	Catastrophic	High
Drought	Extensive	Likely	Critical	High
Earthquakes	Significant	Occasional	Limited	Medium
Floods	Significant	Occasional	Catastrophic	High
Human Health Hazards:				
Pandemic Flu	Extensive	Occasional	Critical	High
West Nile Virus	Extensive	Likely	Negligible	Low
Landslides & Rockfalls	Limited	Occasional	Negligible	Low
Severe Weather:				
Extreme Temperatures	Extensive	Highly Likely	Negligible	Low
Fog	Significant	Unlikely	Negligible	Low
Hailstorms	Extensive	Likely	Limited	Medium
Thunderstorms	Extensive	Highly Likely	Limited	Low
Lightning	Extensive	Highly Likely	Limited	Medium
Tornadoes	Limited	Occasional	Negligible	Low
Windstorms	Extensive	Highly Likely	Limited	Medium
Soil Hazards:				
Expansive Soils	No Data	No Data	No Data	Low
Land Subsidence	No Data	No Data	No Data	Low
Volcanoes	Limited	Unlikely	Negligible	Low
Wildfire	Limited	Likely	Critical	High
Winter Storms	Extensive	Highly Likely	Critical	Medium

Geographic Extent
Limited: Less than 10% of planning area
Significant: 10-50% of planning area
Extensive: 50-100% of planning area

Probability of Future Occurrences
Highly Likely: Near 100% chance of occurrence in next year, or happens every year.
Likely: Between 10 and 100% chance of occurrence in next year, or has a recurrence interval of 10 years or less.
Occasional: Between 1 and 10% chance of occurrence in the next year, or has a recurrence interval of 11 to 100 years.
Unlikely: Less than 1% chance of occurrence in next 100 years, or has a recurrence interval of greater than every 100 years.

Magnitude/Severity
Catastrophic—More than 50 percent of property severely damaged; shutdown of facilities for more than 30 days; and/or multiple deaths
Critical—25-50 percent of property severely damaged; shutdown of facilities for at least two weeks; and/or injuries and/or illnesses result in permanent disability
Limited—10-25 percent of property severely damaged; shutdown of facilities for more than a week; and/or injuries/illnesses treatable do not result in permanent disability
Negligible—Less than 10 percent of property severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid

Significance
Low: minimal potential impact
Medium: moderate potential impact
High: widespread potential impact

Natural disasters

The number of natural disasters in Boulder County is 13, at the US average of 13. There have been five presidentially declared major disasters and four declarations of emergencies in most recent history. Causes of natural disasters: Fires: 5, Floods: 5, Storms: 4, Landslides: 3, Mudslides: 3, Snows: 2, Heavy Rain: 1, Hurricane: 1, Snowstorm: 1, Tornado: 1 (Note: some incidents may are in more than one category).

Drought

Unlike other weather events, drought does not occur quickly but gradually. Droughts differ from typical emergencies. Most natural disasters, such as floods or forest fires, occur relatively rapidly and afford little time to prepare for disaster response. Droughts occur slowly, over a multi-year period, and it is often not prominent or easy to quantify when a drought begins and ends.

Drought impacts are wide-reaching and may be economic, environmental, and societal. The most significant impacts associated with drought in Colorado are those related to water-intensive activities such as agriculture, wildfire protection, municipal usage, commerce, tourism, recreation, and wildlife preservation.

The City of Boulder's Drought Plan guides recognizing droughts affecting water supply availability and responding appropriately. The city uses rules and regulations to provide specific details that the city manager, in consultation with the City Council, may use to declare or lift a drought alert stage and guide an appropriate response to a drought event.

Earthquake

Boulder-area historical earthquake activity is slightly below Colorado's average and 40% greater than the overall U.S. average.

Flooding

Boulder, Colorado, has the highest flash flood risk because it sits against the mouth of Boulder Canyon. Boulder Creek flows down Boulder Canyon and through downtown Boulder. Boulder Creek is a 31.4-mile-long (50.5 km) creek draining the Rocky Mountains west of Boulder. Two tributaries form the creek rising along the Continental Divide: North and Middle Boulder Creek, which South Boulder Creek later joins. In addition to Boulder Creek, 11 additional drainages flow into the city.

Severe floods affected downtown Boulder in 1894, 1896, 1906, 1909, 1916, 1921, 1938, and 1969, with the worst being those of May 31-June 2, 1894, and May 7, 1969. The flood of 1969 was the result of four days of almost continuous rainfall: 11.27” measured in Morrison and 9.34” at the Boulder Hydroelectric Plant. One death was reported, and thousands of dollars worth of damage, including two bridge washouts, was caused.

In 2013, an all-time 24-hour record rainfall of 9.08” deluged the city of Boulder, resulting in widespread flash flooding and the death of three people. 12.27" had accumulated from September 9th through September 12th. This accumulation surpassed most tropical storm events. Other Boulder and Rocky Mountain Front Range locations picked up over 11” of precipitation in just 24 hours. Flash floods occur quickly and without warning, and there is an immediate danger from the strength of the current, debris injury/drowning. Flash floods typically occur from heavy rainfall – overflow stream banks. On the next page is a map of the floodplains in Boulder.

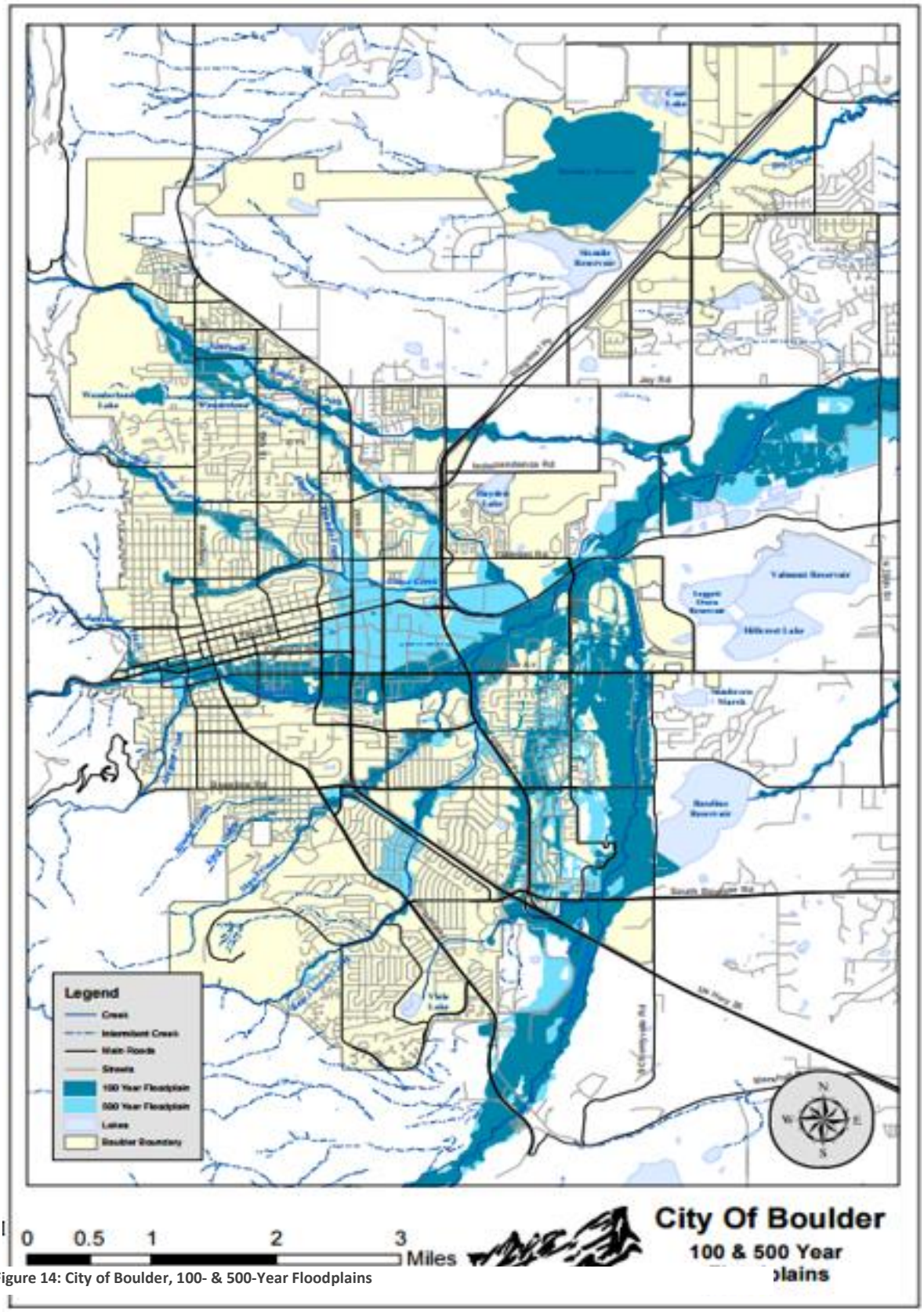


Figure 14: City of Boulder, 100- & 500-Year Floodplains

Figure 13: City of Boulder Floodplains

Tornado

Boulder County's historical tornado activity is above the Colorado state average and 7% greater than the overall U.S. average. Both tornados in recent history were over 25 miles away from the city center.

Terrorism

Terrorism definition, according to the Federal Emergency Management Agency, is the use of force or violence against persons or property in violation of the criminal laws of the United States for purposes of intimidation, coercion, or ransom. The most frequently used terrorist methods in the U.S. are Chemical, Biological, Radiological, Nuclear, and Enhanced Explosive threats (CBRNE), which could be used during terrorist attacks.

Traditional weapons, such as guns, are also used by terrorists worldwide but demand fewer resources when these incidents occur. Although not listed in the acronym, Cyberterrorism is also a threat to our infrastructure. Cyberattacks could disrupt communications, banking systems, power systems, and emergency networks. Since terrorist activities cannot be predicted, all city areas are at risk and susceptible to the hazard. High-risk areas include main thoroughfares and interstates, railroads, airports, and chemical companies throughout the city.

Pandemic

Pandemics have become less frequent, but they will likely affect more than one city or county. As we have seen with COVID-19, a pandemic can have significant and long-lasting consequences. Research shows that the probability of experiencing a pandemic with a similar impact to COVID-19 is around 2% per year. This means the chance of experiencing a pandemic like COVID-19 in one's lifetime is approximately 38%.

During the COVID-19 19-pandemic, the city of Boulder made it its primary goal to ensure the well-being of all community members. To achieve this, the city established a COVID-19 Recovery Center (CRC) to provide a safe place for individuals without homes to isolate and recover from COVID-19. The CRC was established four days after the facility's funding was approved in late March. With the CRC and targeted testing and vaccination programs at homeless shelters, COVID-19 rates among Boulder's unhoused community remained low. The city's efforts to care for its residents during the pandemic have been commendable. Additional COVID-related programs are detailed on the Housing and Human Services website: Housing and Human Services Reflects on the Pandemic’s Two-Year Mark.

To better understand and respond to the impacts of the COVID-19 pandemic on the business community, the City of Boulder conducted surveys of local businesses and nonprofits in April and October 2020. The results can be found here: City of Boulder Business Impact Survey.

Medical Risk

Emergency medical events are the most common incidents that BFR handles annually. Over 80% of the incidents BFR responds to involve the potential for treating and transporting individuals experiencing illness or traumatic injury. These injuries or illnesses can range from minor to life-threatening in nature. Most EMS incidents involve a single patient, but they can have a ripple effect, impacting the patient's family, employer, and community. Some incidents, however, can affect multiple patients, such as motor vehicle accidents, workplace accidents, and infectious diseases.

EMS Risk Categories

Low Risk

A low-risk EMS event typically affects one patient. In the priority dispatch systems, a low-acuity incident has a determinant code, including ‘A’ or ‘B.’ These events vary but are considered non-life-threatening in nature.

Moderate Risk

A moderate-risk EMS event typically affects one patient. A moderate acuity incident has a determinant code, including ‘C’ or ‘D’. These events are considered non-life-threatening but higher priority.

High Risk

A high-risk EMS event typically affects one patient. These medically severe events include cardiac and respiratory arrest. A high-acuity incident has a determinant code, including ‘E’. These events are considered life-threatening.

Special Risk

A special-risk EMS event affects multiple patients. As with most agencies, the highest EMS risk is that of a Mass Casualty Incident (MCI). An MCI is any incident in which emergency medical services resources, such as personnel and equipment, are overwhelmed by the number and severity of casualties. These events can result from various causes; however, this category focuses on medical/traumatic injury risk. Within the category of MCI, the most common would be a multi-patient motor vehicle accident, the second would be an active shooter event, and the third would be an outbreak of an infectious disease.

Historical EMS Incidents

Requests for EMS have increased steadily. BFR experienced a 17% increase in EMS calls between 2006 and 2011 and an 11% increase between 2015 and 2018. In 2018, changes were made to the EMS system, including increasing the number of ambulance-only incidents. In 2019, it was estimated that EMS incidents would increase with the population and employment projections; however, due to the COVID-19 pandemic, there was a decrease in EMS incidents in 2020. In 2022, BFR implemented the nurse navigator program. This program intends to reduce low-acuity 911 calls. There have been almost 800 incidents diverted to this program since its inception. Moderate-risk EMS incidents comprise just under 43% of EMS calls to the 911 center. The top five call types are sick, unconscious/fainting, breathing problems, chest pain, and convulsions/seizures.

The EMSF call type is used for any fire incident requiring an ambulance. Some of these calls are put through ProQA, our medical dispatching protocol set, and given a more specific call type and determinant code. When the incident cannot be put through ProQA, it remains an EMSF call type, which recommends a fire engine and ambulance response. Common reasons an incident would not be put through ProQA are field requests and callers who cannot give enough information about the case to complete the ProQA process.

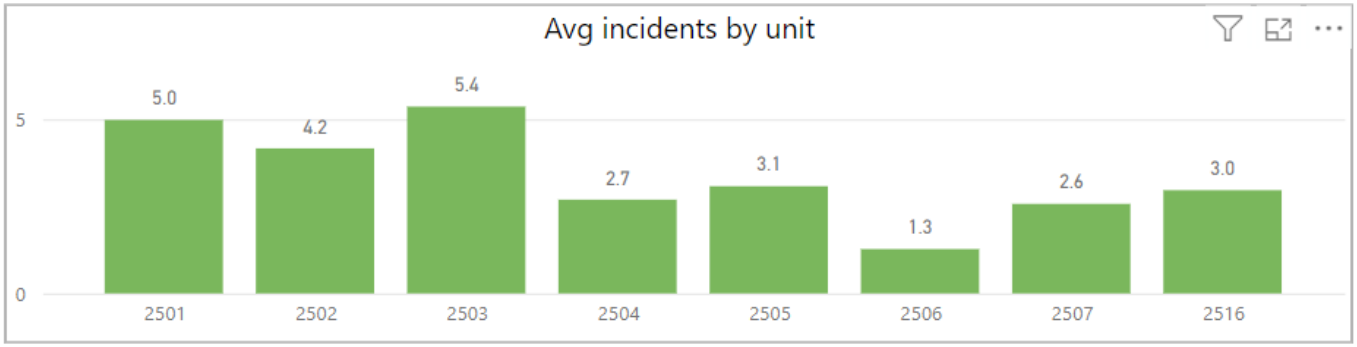


Figure 16: Avg EMS Incidents by unit

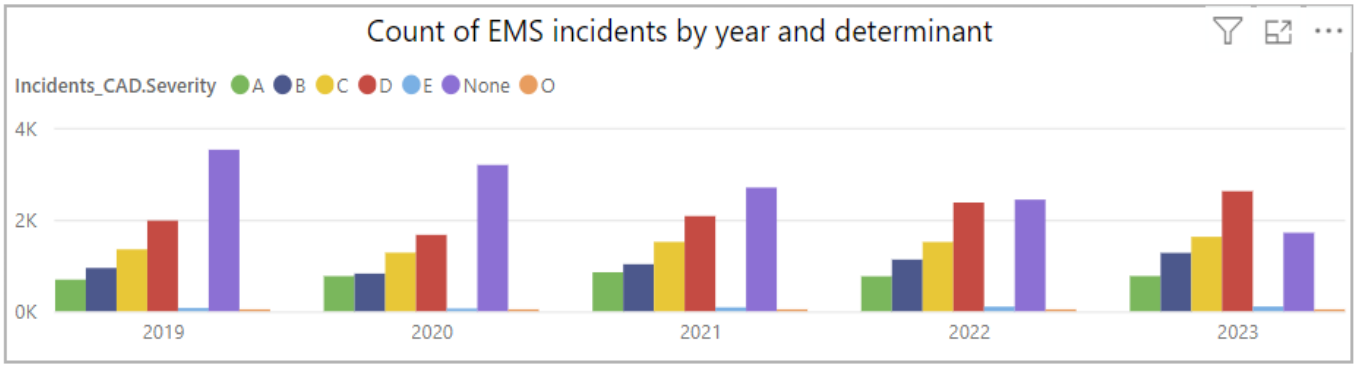


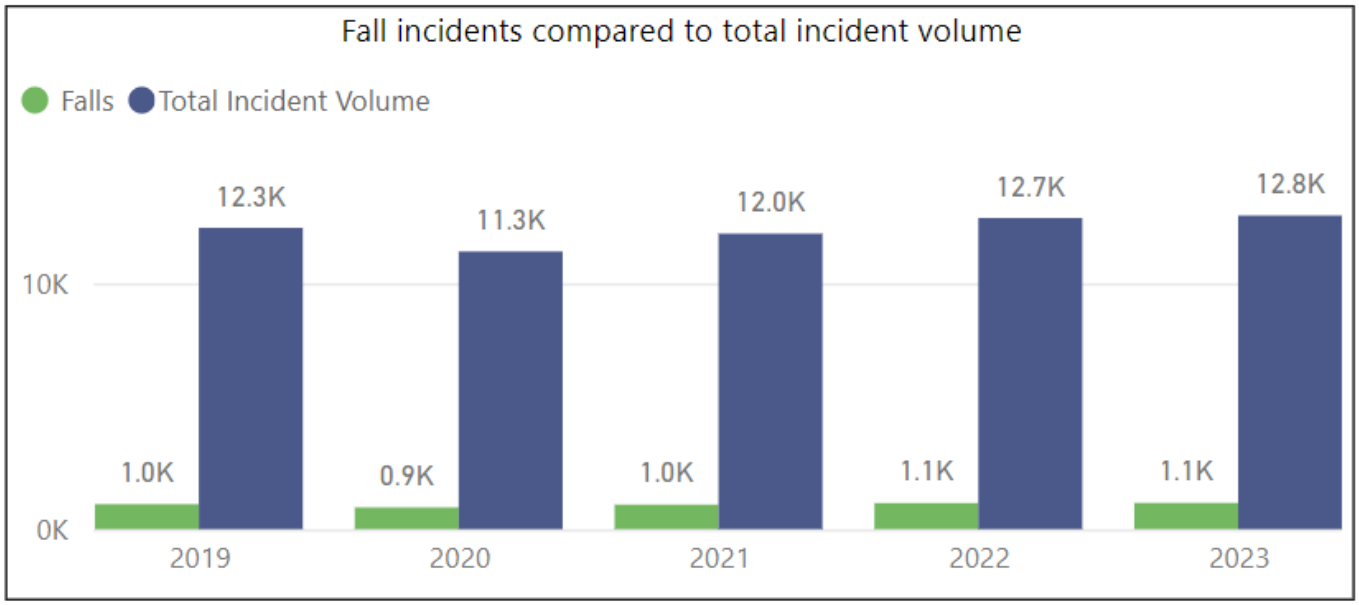
Figure 17: EMS Acuity

Falls

In 2024, the CRR division launched several older adult programs targeting fall risks in our community. Recognizing that falls are a leading cause of injury among older adults and hospitalization for seniors, we prioritize prevention to enhance safety and well-being. According to the Boulder County Area Agency on Aging (AAA), the proportion of older adult residents (60 and older) in Boulder County is growing faster than ever. Between 2020 and 2050, the county's older adult population is forecasted to increase by 58%, and the 80+ population will increase by 244%. The number and rate of older adults in the county's population will continue to rise until around 2040, when it will hold steady for the foreseeable future.

Demographic data projections for Boulder County involve our population's "older old" segments. In volume and growth, the County is on the cusp of a dramatic increase in older adults age 80+, many of whom wish to remain in their Boulder County homes and communities for the remaining years. In 2023, falls accounted for over 13% of the department's EMS calls. Of the 1,162 calls dispatched as "Fall", at least 62% were adults over 60. In addition, 44% of our top call locations are independent and skilled nursing facilities that serve older adults in our community.

CRR sets measurable goals and tracks progress in reducing falls, improving physical strength and balance, and increasing home safety modifications. This structured and evidence-based approach allows us to identify areas for improvement and make data-driven decisions to maximize program impact. Falls among adults aged 65 and older are a significant problem. Key factors include decreased strength and balance, home hazards, medication side effects, and social isolation. The program aims to reduce falls through education, assessments, and interventions. Objectives for the program include reducing fall calls by 10% in facilities on our top 25 call list and increasing the number of home safety visits for older adults by 20%. The department currently does roughly 30 home safety visits to older adults annually. Educational resources, training manuals, and assessment tools were developed based on feedback from older adults and local organizations to ensure our program is effective and targeted. Below is a chart of fall incident volume compared to annual call volume. Injury incidents are one of BFR's top five incident types; falls make up about 8% of the annual incident volume.



Fire Risk

The City of Boulder, like all communities, has a risk of fire within the jurisdictional boundaries. Fires make up approximately 2% of our incident response calls. Although the probability of fires in the city is low, the consequence of a fire within a building is high utilizing a more extensive emergency response. The largest percentage of building fires occur in residential occupancies, which increases the likelihood of injury or loss of life when a fire occurs.

Fire Risk Categories

Low-Risk Fire

A low-risk fire incident is typically isolated from population centers and has few buildings. These structures present the same strategic and logistical issues, with low life loss potential and minimal financial impact on the local community, if any.

Examples of low-risk areas are:

- undeveloped land/parking lots
- recreational areas (federal, state, and local parks)
- unoccupied structures (barns and small outbuildings, detached residential garages, dumpsters)
- rural land with no occupied structures
- single-family homes with more than 2 acres of surrounding property

Moderate Risk Fire

A moderate-risk incident will be in developed areas of average size. Structures have a significant fire risk, but the consequence of a fire would be minimal to the community. Structures could have built-in fire suppression capabilities. The likelihood of fire is low, but the consequence of a fire would be significant and include high life loss. However, the built-in fire protection and suppression dramatically reduces the potential for a significant fire. Examples of medium-risk areas might include:

- detached, single-family housing, including areas of suburban, terraced, semi-detached, multi-occupancy residential properties, mobile homes
- mixed low-risk industrial and residential areas
- Industrial or commercial areas of less than 5,000 sq. feet without high-hazard or high fire-load contents

High-Risk Fire

High-risk occupations include large commercial structures, shopping and business complexes, multi-story hotels, apartment buildings, theatres, schools, hospitals, and infrastructure facilities. Examples of such areas might include:

- Mercantile facilities, strip shopping centers, and business areas consisting of either single- or multi-story properties with a concentration of structures
- buildings with built-in fire suppression systems but whose occupants are non-ambulatory or restrained (hospitals, medical facilities, personal care homes, and prisons)
- buildings with low occupant load, but these store high fire load materials or high-hazard materials
- infrastructure facilities, such as city halls, fire and police stations, schools, and city, state, or federal buildings
- industrial areas containing some high-risk occupancies
- aircraft off-airport property (hangars, operations facilities)

Special Risk Fire

Special-risk areas are typically commercial structures without built-in fire suppression systems. Occupancies include large shopping areas, multi-story hotels, office complexes, and commercial facilities with high fire loads or hazardous materials.

These locations have the highest potential for life loss and community impact; additionally, they have the most significant fire risk due to the lack of fire protection and suppression systems. Risks such as these frequently increase a fire department's need to have multiple alarm capabilities and accurately assess its ability to concentrate resources. Failure to identify these risks often results in a department's inability to control the loss once a fire has occurred. These risks also create a fundamental need to assess mutual and automatic aid requirements to support the department's operations through assistance from other fire departments. Examples of maximum risk might include:

- the extensive shopping and business centers, large department stores, shopping malls, multi-story hotels, and office properties
- concentrations of theaters, cinemas, clubs, dance halls, and other entertainment centers
- concentrations of high-risk industrial or commercial property

- high-rise buildings, especially those without built-in fire suppression systems or those without service systems
- commercial buildings of more than 15,000 square feet with occupants who may require assistance.

Structure Fire Risk

According to the FEMA Geospatial Resource Center, Boulder County is at low risk for structure fires.

Housing Density

Structures that contain 50 or more housing units present an increased fire risk due to the number of people per building and square footage per structure. Identifying (and keeping tabs on) these buildings can be vital in maintaining efficient community safety measures. Below is a chart that shows the breakdown in strructure types in the City of Boulder.

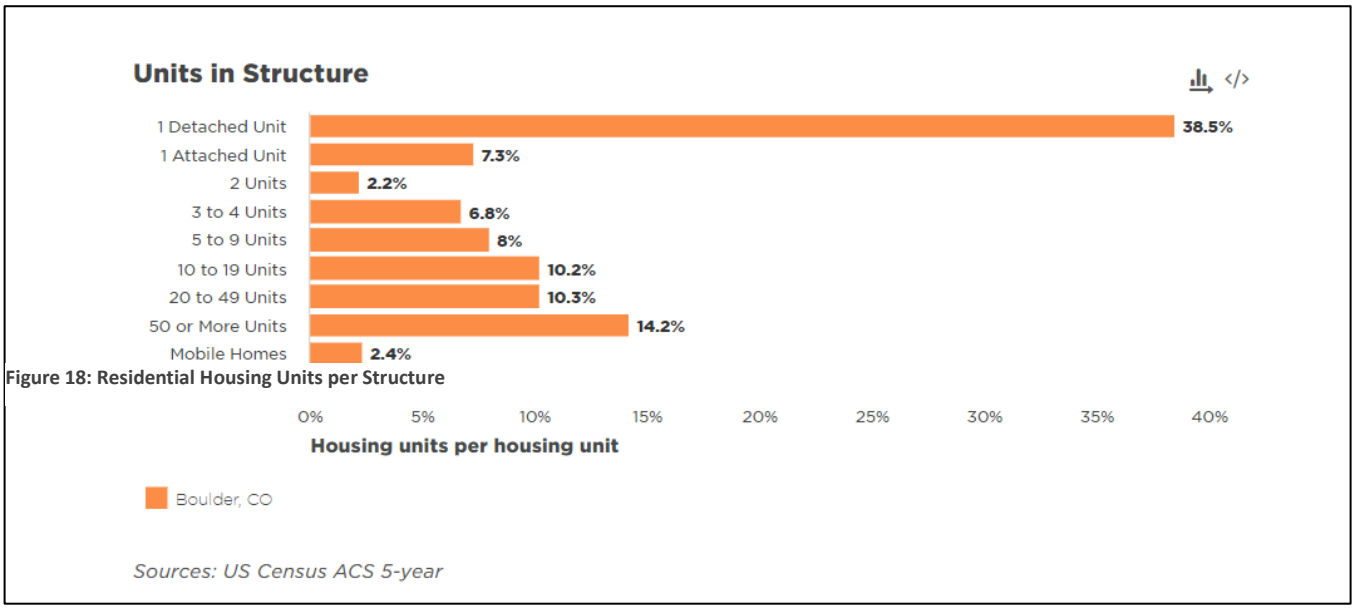


Figure 18: Residential Housing Units per Structure

Age of Housing Units

The U.S. Fire Administration reports socioeconomic factors and the incidence of Fire and found evidence that the age of housing units is related to an increased fire risk. The bar chart below shows the percentage of housing units in different age categories. Over half of all homes in Boulder were built in the 1970s, 54.9%, and the median home age is 47.

The City of Boulder has adapted the 2018 International Existing Building Code (IEBC), which regulates the repair, alteration, change of occupancy, addition to, and relocation of existing buildings (including single-family dwellings). Most changes to an existing home that requires a permit will require the home to be upgraded with smoke alarms per the International Fire Code or the International Residential Code.

Since 2019, 2,686 permits have been issued to single-family attached dwellings, single-family detached dwellings, or townhomes for some type of construction work. Any addition to the home or work that involves a sleeping area requires smoke and carbon monoxide alarms. How many of the 2,686 permits required the addition or verification that the home has a working smoke alarm cannot be determined.

Likewise, Boulder is a “University” City and has many rentals. All licensed rental properties must comply with the City of Boulder Rental License Code, which requires smoke and carbon monoxide alarms. There are approximately 8,800 active rental licenses issued within the City of Boulder.

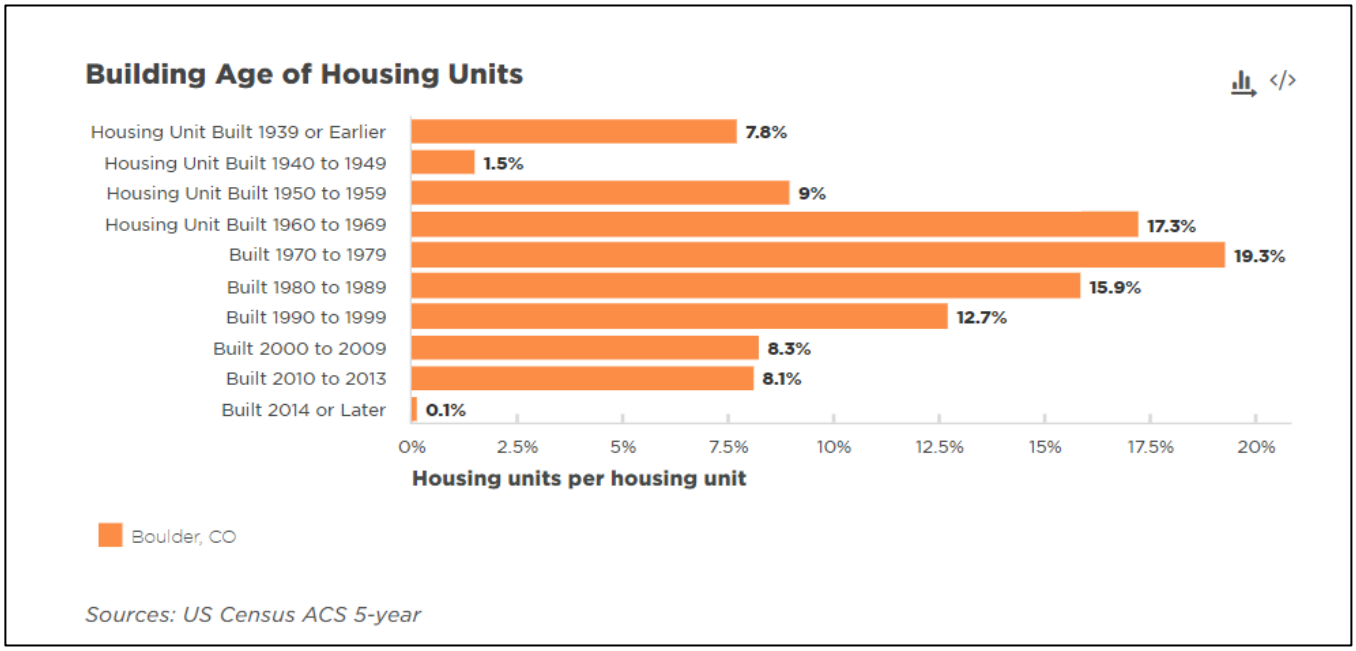
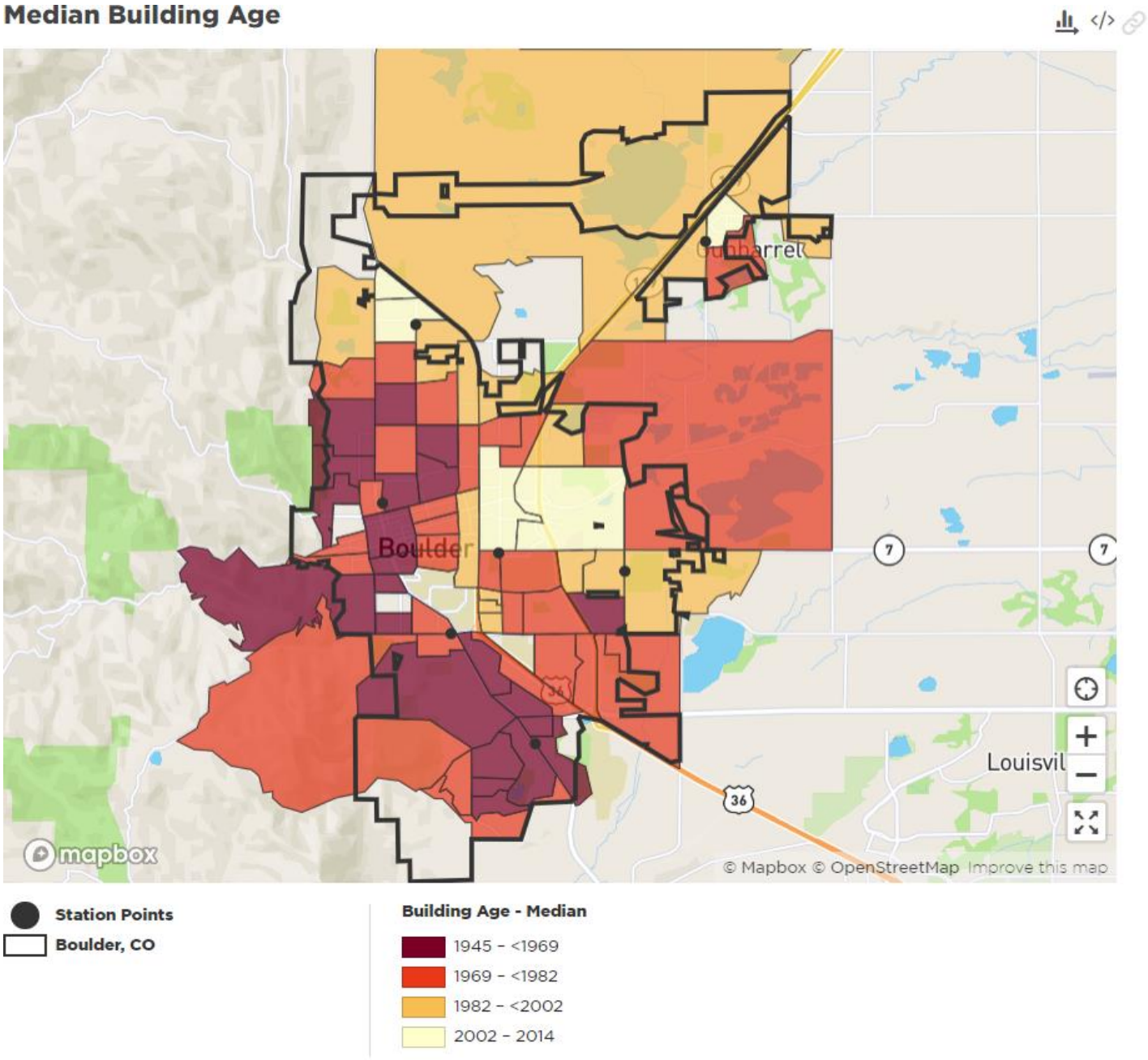


Figure 19: Age of Housing Units

Presence of Smoke Alarms

In 1976, NFPA 101 required smoke alarms in all new homes built. Smoke alarms were invented in 1965, and a smoke alarm standard was published in 1967 but not mandatory until 1976. While most homes have smoke alarms by code, BFR does not know how many are operational. The smoke alarm program is a public service offered to people who need to replace theirs, can’t afford to do so, or are elderly or disabled. The absence of working smoke alarms is a risk (nationally); however, the CRR division does not have a current program to identify working vs. nonworking smoke alarms.

Median Building Age[2]



[2] Due to limitations at MySidewalk, maps from the system have an overlay of population that doesn't lock to the map.

Historical Fire Incidents

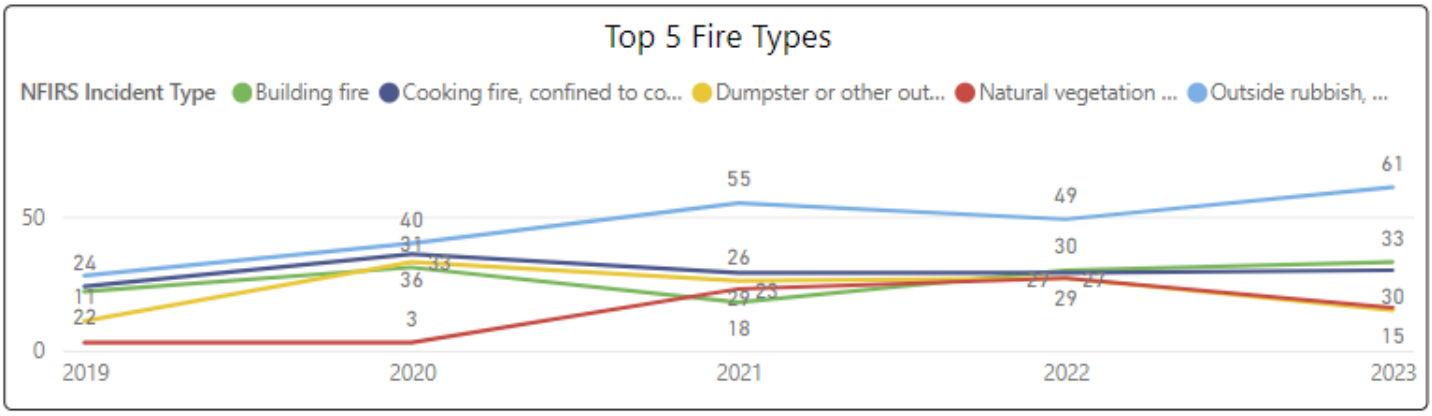


Figure 20: Top 5 Fire Types

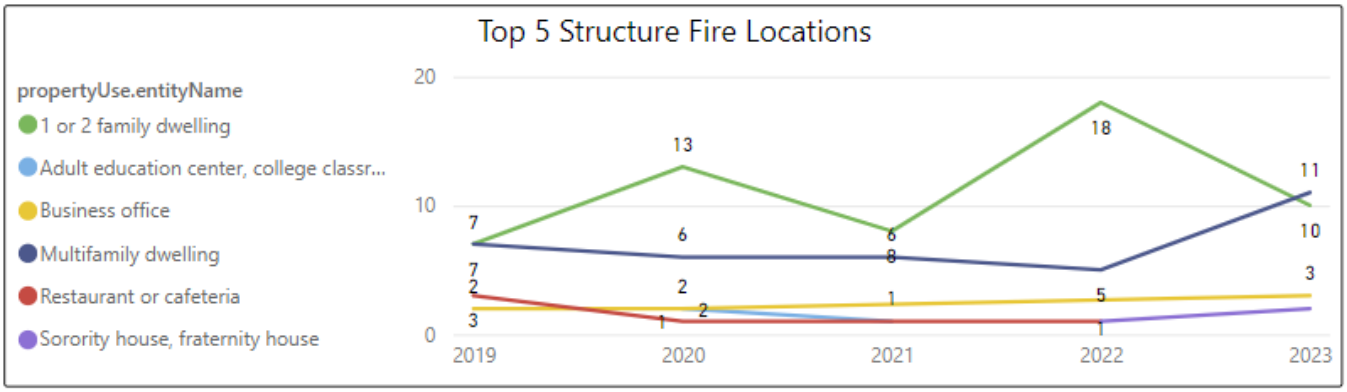


Figure 21: Top 5 fire locations

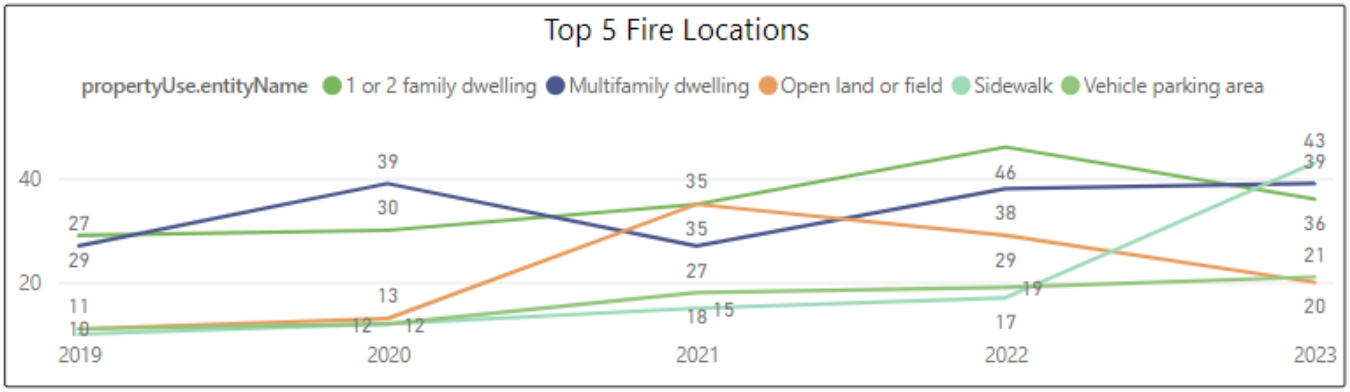


Figure 22: Top 5 structure fire locations

Incidents of Structure Fires

A regression analysis shows a correlation between older housing units and the increased fire risk. In the City of Boulder, there is a weak negative correlation between incidents of structure fires and the age of structures.

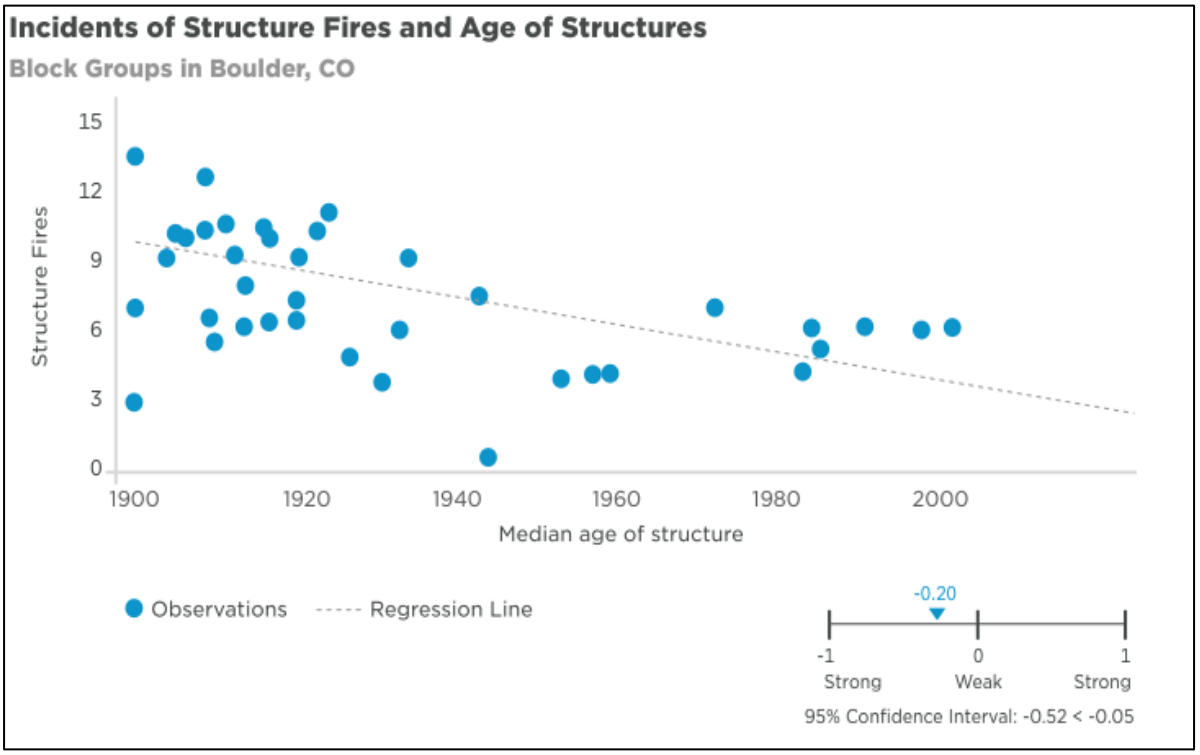
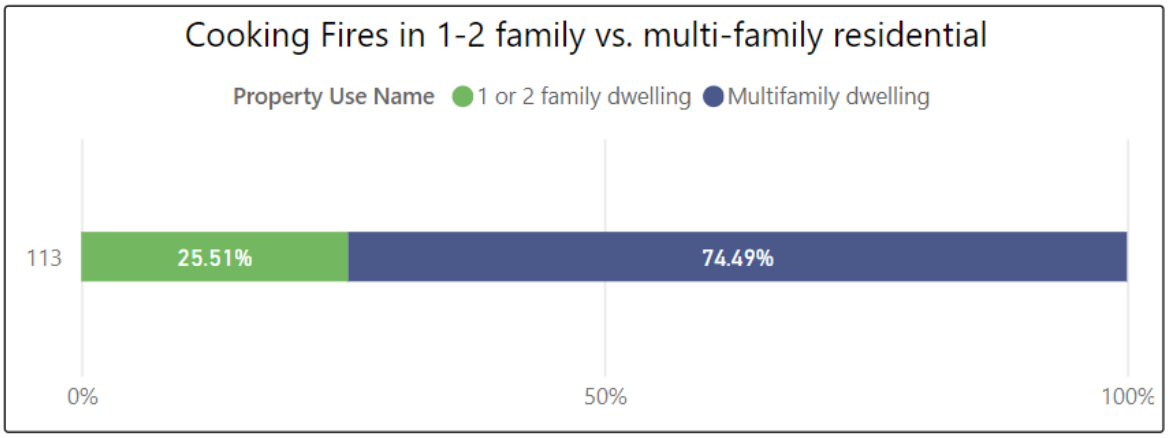


Figure 24 23: Incidents of Structure Fire vs. Age of Structure

Cooking Fires

Nationally, cooking fires are the number one cause of home fires. The leading cause of kitchen fires is unattended cooking. Seniors and young children are at the highest risk of being involved in a cooking fire incident. Cooking fires in multifamily dwellings are the city's top fire incident type and occur predominantly in multi-family residences.



Hazardous Materials Risk

If released or misused, hazardous materials are chemical substances that can contaminate the environment or affect people's health. These chemicals are found in industrial facilities, agriculture, medicine, research, and consumer goods. They include explosives, flammable and combustible substances, poisons, and radioactive materials. Typically, these substances are released due to transportation accidents or plant mishandling.

The City of Boulder has mostly experienced low-risk hazardous materials incidents, typically involving the initial engine or ladder company. These incidents include leaking fuels from automobile accidents, minor spills at research and manufacturing laboratories, fuel spills on construction sites, cutting natural gas lines during excavations, carbon monoxide calls in residential buildings and single-family residences, and small quantities of chemicals commonly used in households.

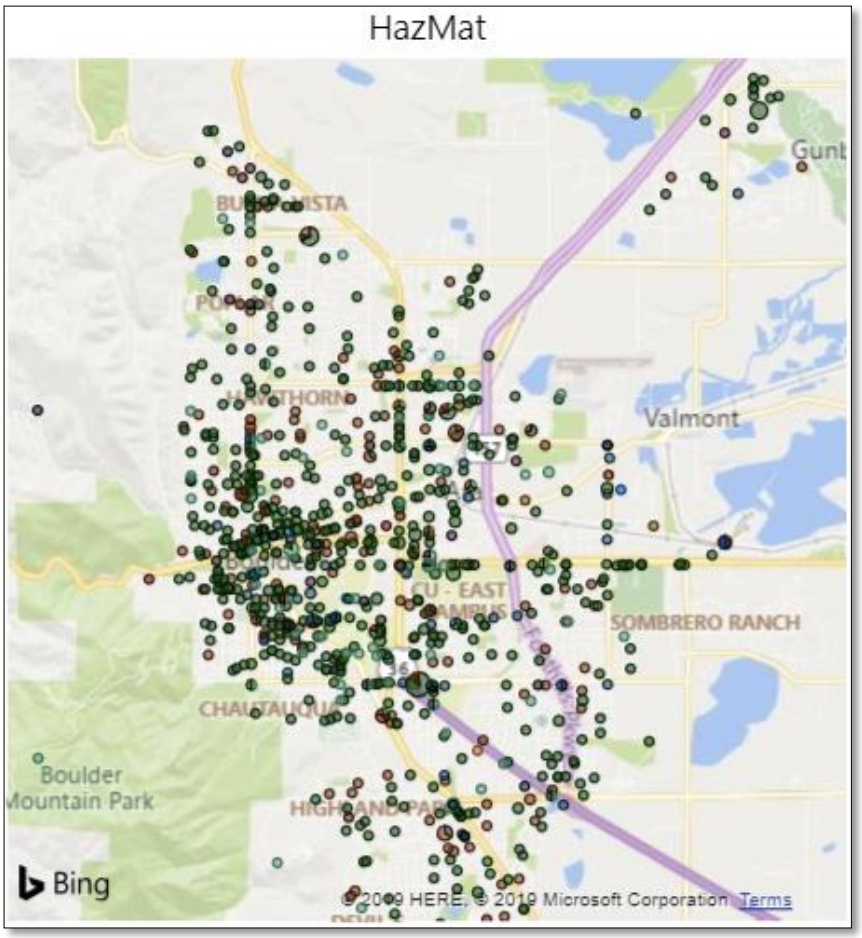


Figure 24: Hazmat Historical Incidents

Roadway incidents have a high frequency of occurrence. Vehicles carrying hazardous materials have greater access to a more significant portion of the city. Roadway transportation also involves more product handling than rail. As the railcars move through the city and county, they load and unload less frequently and in fewer designated locations. Roadway vehicles load and unload widely throughout the city and county, from gas stations to chemical facilities to hospitals and manufacturing locations. The routes taken are broader. Even with the hazardous cargo (HC) route running along the city's east side, these transport vehicles may be on any street at any time if the originating location or destination is away from the HC route.

The most significant risk of a moderate or high-risk hazardous materials incident in the City of Boulder and Boulder County lies with transportation. Rail incidents, although rare, pose the most significant risk due to the sheer volume of products involved. An incident involving a railcar, or multiple cars could severely threaten life and the environment in the city and rural areas. A release could impact drinking water supplies and cause an economic impact on businesses and agriculture in the affected area. Boulder's planning zone C has the city's highest population and building density. The map above depicts all hazmat incidents in the last five years and includes all risk levels

Technical Rescue Risk

The City of Boulder does not have large industrial facilities, like oil refineries or large industrial manufacturing campuses. However, the City of Boulder does have nationally/state-level critical technical and educational campuses. Examples are research centers at the University of Colorado, NIST (National Institute of Standards and Technology), and NOAA (National Oceanic Atmospheric Administration). These facilities present unique technical rescue risks that encompass the disciplines above.

Rescue Risk

The highest density of extrications is in planning zone C, as commuter traffic runs through this portion of the city. According to the National Safety Council (NSC) Injury Facts, motor vehicle collisions (MVC) are the second leading cause of unintentional death. Impaired driving, distracted driving, speeding, and inexperience can cause a life to be cut short. Approximately 6% of Boulder fire incidents are related to motor vehicles. The Vision Zero Boulder: 2022 Safe Streets Report (SSR) findings show that 67% of traffic crashes resulting in severe injury or fatality occur on arterials. The western part of the city has mountainous terrain. There is an active community of hikers, bikers, and rock climbers, leading to a high potential for high-angle rescue incidents handled by RMR.

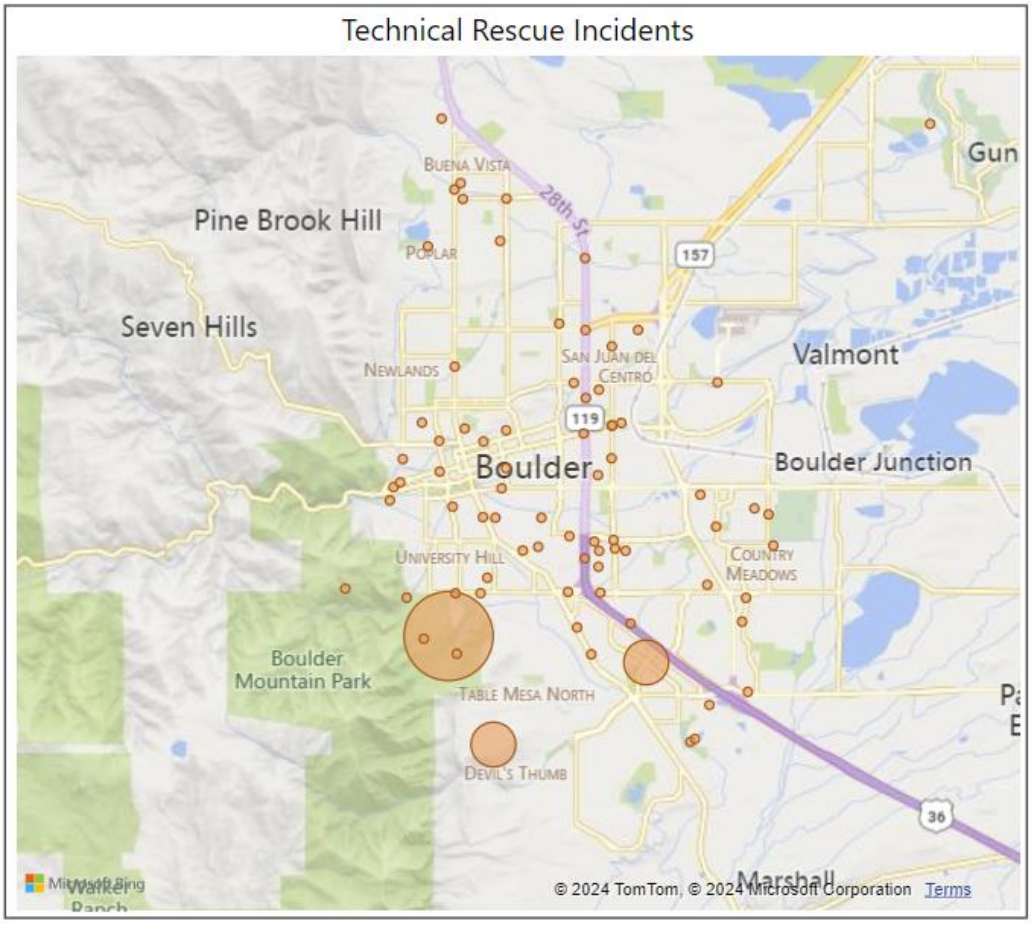


Figure 38: Technical Rescue Historical Incidents

Water Rescue Risk

The Boulder area is a popular attraction for visitors, and this increase in population drives service demand. The Boulder community has two distinct areas highly used for recreational water. Boulder Creek flows directly through the center of town and is virtually accessible throughout the creek as it flows through the city limits. This area sees a high use during spring runoff and is responsible for several incidents each year involving innertubes and kayaks. A mile marker and entry/exit sign system has been installed by the city parks department to aid in wayfinding for creek users and emergency responders. The Boulder Reservoir is the area's most significant open body of water for recreational use. Boulder Reservoir is a 700-acre recreation and water storage facility. Public use of the reservoir increases the potential for water rescue incidents. With freezing conditions in the winter, the water freezes and thaws, creating an unstable ice structure. Moving water is also a concern for BFR, as Boulder Creek traverses the city. Although water incidents are a risk, the frequency of these events is minimal, and the risk is seasonal. An average of 5 incidents a year are expected. The highest density of water rescues can be within, and just west of, planning zone C. Zone C is the downtown corridor, and it is also located in Boulder Creek. Recently The department worked with Parks and Recreation to design a mile marker system for Boulder Creek to aid in locating swiftwater victims.

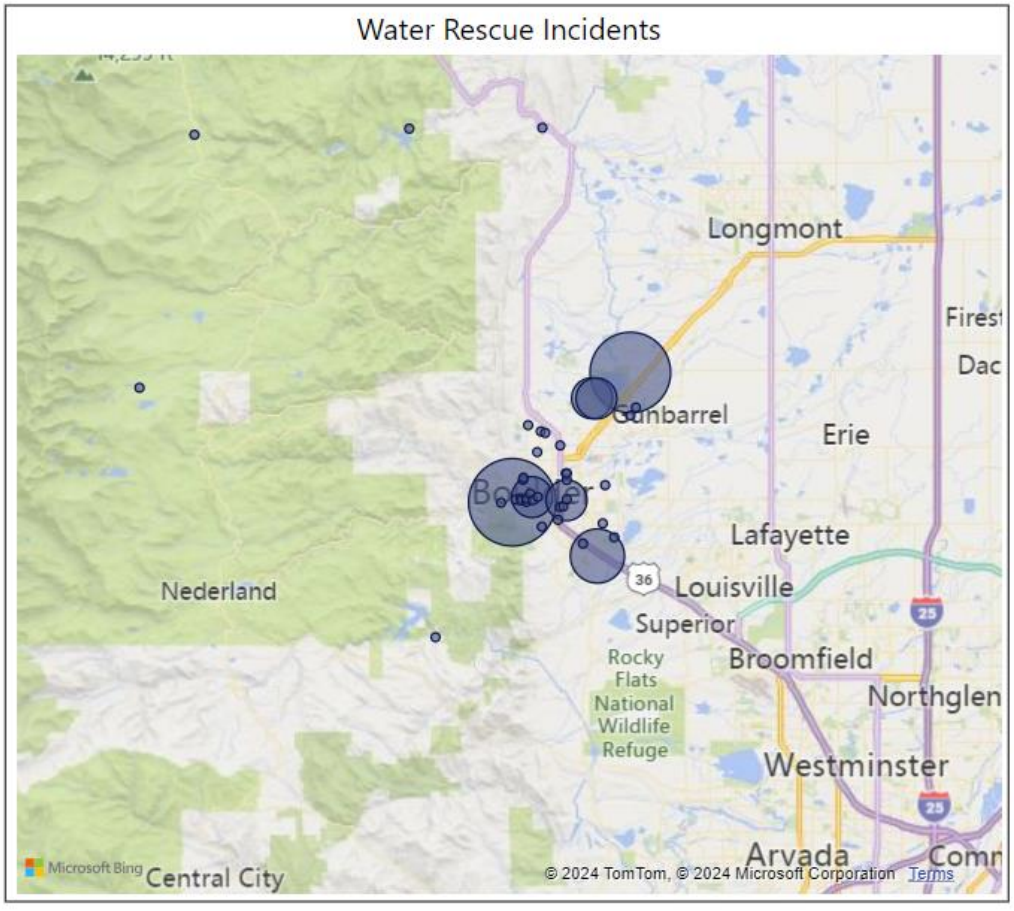


Figure 39: Technical Rescue Historical Incidents

Wildfire Risk

One of the significant risks in the City of Boulder is wildfire. The wildland-urban interface (WUI) traditionally existed along the city's western edge, but recent wildfires, both locally and nationally, have expanded the perception of where the interface is located. Due to its proximity to wildland fuels, extreme winds, and drought, the entire city could be considered within the WUI. Over the past century, fire suppression and other land management practices have led to much denser vegetation in the forests compared to their natural state. This leads to more frequent, high severity wildfires, impacting homes and the environment. Combined with steep terrain, drought, high temperatures, seasonal winds, and increased human activities such as development and recreational use, this has created an environment highly susceptible to extreme wildfire behavior. A map of the WUI is in Appendix C.

City of Boulder

Technical Assistance: Anchor Point Group, LLC
Date of Plan: September 2007

	Community	Rating	Score
33	Kohler Area	Very High	12
34	Upper University/Boulder Canyon Area	Very High	16
35	Shanahan West Area	Very High	19
36	Chautauqua	High	22
37	Upper Table Mesa Area	High	23
38	Dakota Ridge Area	High	24
39	Wonderland Lake Area	Moderate	27
40	Shanahan East Area	Moderate	28
41	East Side Area	Low	30
42	Lee Hill Area	Low	32

*Scores read from graph.

Table 1: Wildfire Risk

The threat of wildfires poses significant safety risks to residents, and the potential for large neighborhood fires is a critical concern in Boulder due to its layout and foothill location. The devastating Marshall fire in southern Boulder County in December 2021, which destroyed over 1,000 homes in Superior and Louisville, underscored this concern. Wildfires also damage ecosystems and watersheds, impacting the environment and the community's economic vitality in the long term. The table to the left outlines the communities in the City of Boulder with the highest wildfire risk. For more details about County wildfire risk, visit the Boulder County Wildfire Story Map.

Boulder has the highest wildfire risk during summer, particularly in July, but wildfires can occur throughout the year, as seen with the Calwood, Marshall, and NCAR fires. Historical wildfires in Colorado have occurred as late as December and January. Major destructive wildfires in Boulder County, such as the 1989 Black Tiger, 1990 Olde Stage, 2003 Overland, and 2010 Fourmile Canyon fires, collectively destroyed over 250 homes, burned more than 16,000 acres and posed threats to thousands of residents. Human activities, including arson, discarded smoking materials, poorly extinguished campfires, and residential fire pits, have been the primary cause of Boulder County's most destructive fires.

Fire-impacted areas can affect recreation due to unstable soils and rocks and fire-weakened stress, posing safety hazards for visitors. Wildfires can also compromise water quality during and after active burning, as ash can settle on drinking water supplies, and post-fire erosion can affect downstream sediment accumulation in water bodies.

Efforts to prevent wildfires, particularly those caused by humans, can reduce the number of ignitions and the subsequent catastrophic fires. Local plans in Boulder assign communities a hazard rating ranging from “low” to “extreme” and detail strategies for wildland dispatch configurations based on incident locations. The Colorado Wildfire Risk Public Viewer and FEMA National Risk Index are valuable resources for gaining additional risk information and wildfire awareness.

Building Risk Assessments

BFR has a methodology (2B.1) for identifying, assessing, categorizing, and classifying risk throughout the community. The Community Risk Reduction Division has developed a matrix to determine the overall fire risk of a specific commercial occupancy based on five categories:

1. Total building/occupancy area and building construction type.
2. Number of stories
3. Presence of an automatic sprinkler system
4. NFIRS occupancy classification
5. Special modifier

Based on this hazard classification system, the lowest possible score is a 4, and the highest score, excluding the modifier, is 26. The values are broken out as follows: 4-11= Low hazard, 12-18= Moderate Hazard, 19+= High hazard. Fire protection systems are identified and included in the risk assessment (2C.3), although they are not considered for resource deployment. The Risk by planning zone is detailed in Appendix E.

Residents and Housing Risk

Boulder, Colorado, is known for its highly educated population, fostering a culture of innovation and attracting a skilled workforce. The University of Colorado contributes to the city's youthful demographic, with an average age of 29. This combination of youth and education fosters a spirit of innovation and entrepreneurship, making Boulder a hub for startups and cutting-edge research. Boulder is a hub for research and technology companies. Additionally, the city offers over 45,000 acres of preserved open space, making it an outdoor paradise for nature enthusiasts, with hiking, biking, and climbing opportunities. The city's strong economy and idyllic setting result in a high quality of life. However, Boulder's popularity has led to significantly higher housing costs than the national average, posing many residents' homeownership challenges.

It's important to note that Boulder's demographics are becoming more diverse, with a growing Hispanic and Asian population alongside the predominantly white population (around 78%). Despite the influx of young professionals, Boulder remains a relatively expensive place to live, which may create barriers for lower-income families and retirees, potentially impacting the city's demographic balance. A community evaluation was done by the manager of data and analytics using the ESRI Accreditation tool. The Fire Accreditation Analysis tool is used to complete spatial analysis workflows and generate maps based on the CFAI Accreditation Model. The table below summarizes the at-risk variables in each planning zone on the Accreditation. Tool. The tool utilizes historical incident volume to create an incident-level risk assessment.

Planning Zone	At-Risk Population			High-Risk Occupancies		
	Population Age 65+	Households with 1+ Person with a disability	Households below the poverty level	Renter-Occupied Housing Units	Housing Stock that is mobile homes	Vacant Housing Units
A	17%	9%	11%	61%	0%	0
B	17%	15%	9%	28%	7%	424
C	10%	13%	29%	66%	1%	1,525
D	15%	11%	18%	50%	8%	665
E	16%	16%	11%	44%	0%	571

Below is a sample of the district profiles. Click here to view a dynamic, interactive view of each planning zone. The password for the folder is CRA/SOC2024.

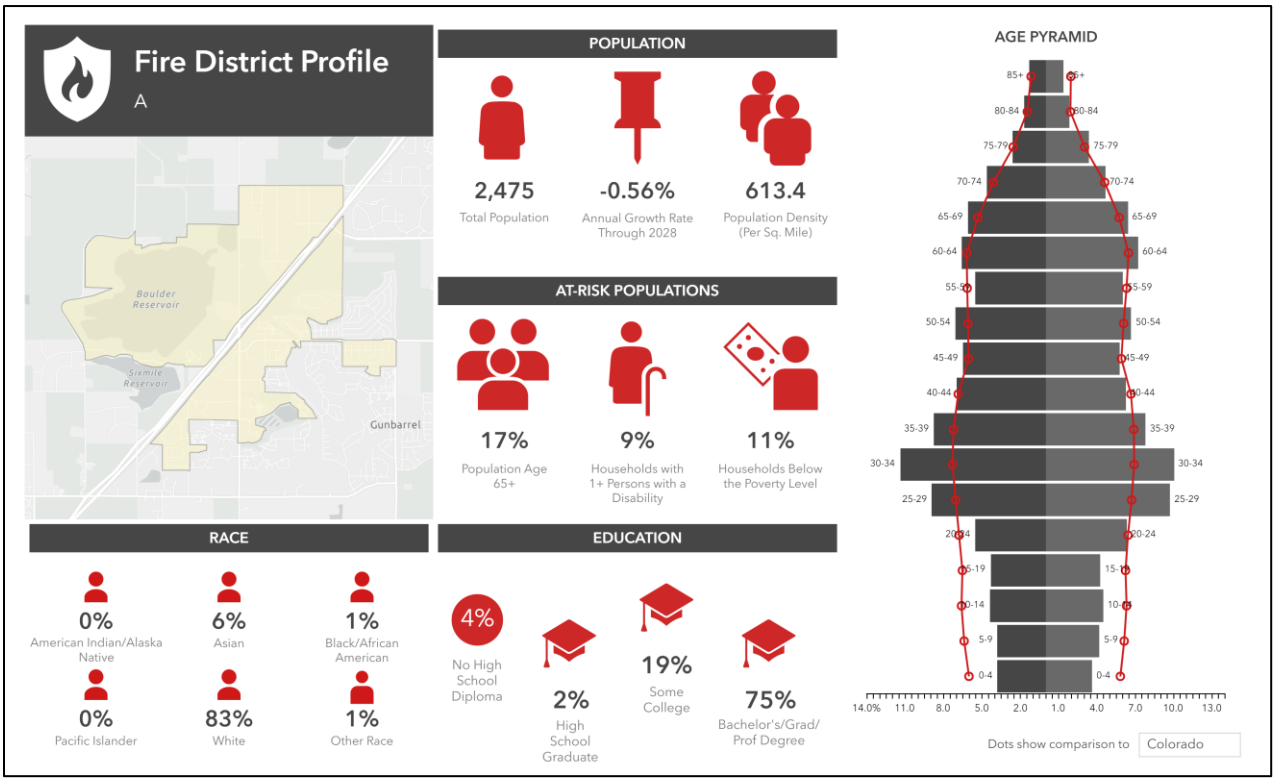


Table 2: At-risk population percentages

Unhoused Population

The increase in unsanctioned camping has led to health and safety risks for those staying within campsites and the broader community. Campsite residents may be at risk of severe health issues or loss of life due to uncertain weather, disease, and contamination, as well as being victims of crime, as campsites often attract more serious crimes such as drug distribution. Camping creates several community issues. It can increase fire risk and negatively impact and endanger wetlands or other sensitive and ecologically important natural areas. Community members, visitors, and city staff often feel threatened by behavior in misused public spaces. They can encounter biohazards in areas such as the Boulder Creek Path, parks, and open spaces.

The unhoused population also makes up a large percentage of the outside rubbish-type fires that BFR responds to. Although the exact number of outside rubbish fires attributed to the unsanctioned encampments is not known, it is worth noting that outside rubbish fires are the largest fire response we respond to at 35%. The highest percentage of the fires that involve unsanctioned camping tend to peak in the colder months, when they light the fires as a warming defense.

University of Colorado Boulder Students

The University of Colorado Boulder has an approximately 37,000-strong student body comprising a diverse mix of undergraduate, graduate, and professional students. The student community represents a blend of Colorado residents, out-of-state students, and an increasing number of international students, creating a rich and varied

campus atmosphere. After their first year, many students opt to live off-campus, with housing options including apartments, houses, and shared living spaces like fraternities and sororities. This young adult population faces heightened risks of medical emergencies and fires due to their independent lifestyles, often living away from home for the first time.

Special Event Risk

The City of Boulder hosts approximately 200 special events each year. These events vary in size and type, including small to medium music concert series, art shows, film festivals, and athletic events such as organized runs and triathlons. Several large events take place each year in the city, such as the Boulder Creek Festival, which draws approximately 100,000 visitors to the downtown area, the famous Boulder Bolder with approximately 50,000 runners on Memorial Day, and the Ironman competition that starts and finishes at the Boulder Reservoir.

The city's special events team, comprised of a cross-section of operational departments, reviews each event to minimize as much risk as possible. However, every special event, regardless of its organization, impacts emergency services due to the increased population during the event, traffic congestion within the city, and medical emergencies associated with the nature of the event.

To manage the risk, BFR is a special events team member that reviews each event and requires event organizers to comply with safety requirements such as on-site medical aid, emergency access requirements into the event, and prior notification of the event to all emergency responders.

Community Risk Reduction Initiatives

The City of Boulder and BFR administers several risk reduction programs.

College Student Programs

The fire department collaborates with CU Boulder to address risks associated with off-campus student housing. Community Risk Reduction staff meet with CU Boulder's Off-Campus and Neighborhood Relations team and participate in off-campus housing fairs organized by the university several times a year. While the department previously focused on on-campus student housing, efforts have shifted to managing off-campus risks. However, their ability to dedicate time to college-focused risk is limited, and filtering data specific to this demographic and housing type remains challenging.

Flood Mitigation

Flood and wildfire are the top two risks in Boulder. The city manages a floodplain mitigation program. The Community Risk Reduction team partners with Boulder Housing Partners and reviews all emergency plans for properties with older adults and people with disabilities. The team visits the residents at each location twice a year to present information about emergency preparedness. One of these sessions is timed before flood season and another later in the year. CRR Specialists also visit several independent living facilities in the city to discuss natural hazards and emergency preparedness with residents and staff.

Safe and Managed Public Spaces (SAMPS)

In April 2021, Boulder's City Council approved a pilot program to formalize the Safe and Managed Public Spaces (SAMPS) team. This team reflects a coordinated approach to managing camping and unsafe behavior in the city's public spaces. The City operates the SAMPS team. More information can be found on the SAMPS Dashboard.

Smoke Alarm Installation

Boulder Fire Rescue's smoke/CO alarm program is voluntary. The CRR team conducts home safety visits to check if alarms are adequately placed and in the correct locations. The department provides free installations and replacements if alarms are missing or need batteries. Homeowners who can't afford alarms receive them for free. Engine crews have smoke and CO alarms for immediate needs. Requests for alarms can be made through the Boulder Fire-Rescue website, and the program also engages families through school initiatives like Sound Off, which educates 1st-4th graders about the importance of working smoke alarms. The target groups for these services include older adults, low-income residents, manufactured home residents, and individuals with disabilities. While building codes require alarms in rentals, remodels, renovations, and new buildings, many other homes might lack these life-saving devices. This program assists Boulder residents in checking, installing, and maintaining smoke and CO alarms. The CRR division installed 68 smoke and CO alarms at the request of Boulder residents in 2023.

Road Safety

The Community Risk Reduction (CRR) division has implemented a comprehensive vehicle and road safety strategy to reduce traffic-related injuries and fatalities. This program includes initiatives such as child passenger safety, CarFit for older adults, free car seat distributions, bike helmet fittings and giveaways, and safety belt checks for pregnant women. The division plans to create a distracted driving program in 2026. All initiatives are systematically evaluated to ensure their effectiveness in mitigating risks and improving road safety.

Despite existing safety measures, the community continues to face preventable incidents due to improper car seat installation, lack of helmet use, awareness about vehicle adjustments for older drivers, and improper seat belt usage in pregnant women. These issues are especially prevalent in low-income communities and among older adults, significantly increasing injury risks.

The program collaborates with community partners and utilizes resources for inspections, educational sessions, and instructional materials. Quantifiable outcomes include increased proper car seat installation rates and higher helmet usage among cyclists, leading to measurable improvements in community safety. Ongoing evaluation and feedback refine the program, enhancing its effectiveness and contributing to reducing traffic-related injuries and fatalities in alignment with Vision Zero initiatives.

Vision Zero

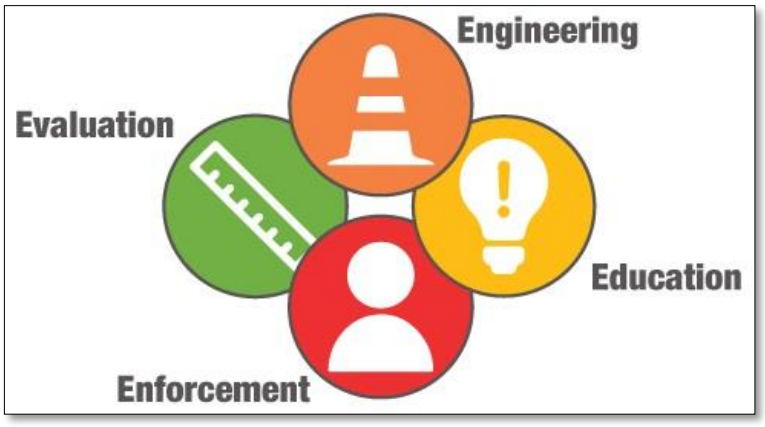


Figure 25: Vision Zero Methodology

Vizion Zero is a city-based risk reduction program. Boulder has joined leading-edge cities from around the U.S. in setting a goal of zero traffic-related fatalities and serious injuries. The Transportation Division formed the Vision Zero Community Partnership Committee to foster ongoing implementation of the city's safety strategies in collaboration with the broader Boulder community. This committee brings together community stakeholders to foster partnerships and broad-based leadership on mitigation strategies to achieve Boulder's Vision Zero safety goals. The committee includes representatives from the Transportation Advisory Board (TAB) and local, regional, and state-wide agency partners. It is charged with providing input and offering feedback regarding the Safe Streets Boulder action plan and co-developing and disseminating VZ safety education and awareness messaging for the greater Boulder Valley community.

Since 2009, an average of 3,275 collisions per year have been reported within the City of Boulder. The percentage of collisions that resulted in a severe injury or fatality has been relatively flat at 2 percent of all collisions over these six years. The City of Boulder has fewer fatal collisions per capita than similar Colorado cities. While only 8 percent of all traffic collisions in the city involve a bicyclist or pedestrian, they account for approximately 60 percent of severe injuries and fatalities sustained in traffic collisions. From 2017 – 2023, most (67%) of severe crashes happened on high-traffic arterial streets. There have been 18 fatalities in that period.

An interactive map of city crash data is available online. The map highlights the top collisions involving motor vehicles, bicyclists, and pedestrians from 2007 to YTD. The website features Vision Zero strategies of engineering, education, and enforcement to reduce severe injuries and fatalities. This interactive map also features a new map of close calls to pinpoint trends and identify possible mitigation measures.

Wildfire Risk Reduction

OSMP wildfire risk reduction efforts mimic fire's beneficial natural processes, which help to sustain healthy ecosystems and reduce the likelihood of extreme fires. OSMP work that mimics fire includes tree thinning, livestock grazing, prescribed burning, weed management, and a new pilot mowing program. Recent open space risk reduction work helped slow the NCAR Fire – which occurred under much less extreme conditions than the Marshall Fire – keeping it from becoming a more intense fire. Learn more about OSMP wildfire risk reduction efforts.

The fire department is focused on reducing wildfire risk through specific activities. They conduct both curbside and detailed wildfire home assessments to help residents identify and fix potential hazards. They also engage in neighborhood and HOA outreach to educate communities on wildfire preparedness. The department works closely with local stakeholders to improve mitigation efforts and reduce the community's wildfire risk. Additionally, they are launching a new ambassador program to empower community members to promote wildfire safety and preparedness.

CWPP

One of the first assignments of the city wildfire resilience team was to inventory and update our wildfire plans and documents. The 2010 CWPP was way out of date and needed a revamp. Funding was secured in Q3 of 2023 to hire a consultant to assist with the process, as staff time would need to be more adequate to accomplish an update in a timely manner. An RFP process was completed, and SWCA environmental consultants were hired in November 2023. A core team was developed to establish the deliverables and provide the information and data to the consultants for document development. Monthly project meetings, community engagement events, and input from internal departments and external stakeholders produced a final draft in May 2014. The document identified several risk-risk areas and produced 36 broad recommendations within the tenets of the National Cohesive Wildfire Management Strategy: fire-adapted communities, resilient landscapes, and safe and effective response. The plan was presented to City Council at a study session and the final plan and deliverables were accepted by the core team in June of 2024. The team will now begin to prioritize the recommendations and build a workplan for implementation for late 2024 and beyond.

Wildfire Home Assessment Program

The first iteration of the wildfire home assessment program began in 2018, with the Wildland Division offering both Curbside and Detailed Home Assessments to the community. Curbside assessments are completed by uniformed Fire personnel during business hours from the viewpoint of the street, sidewalk, or public property, and they do not access private property. These initial curbside assessments are an operational tool to gather a general impression of how well each home is prepared for a wildfire event to assist in resource deployment. The information is available on a public-facing website to inform the community about the basic level of risk. The City of Boulder homeowners and renters who wish to improve their curbside assessment rating or learn how to prepare their homes better against a wildfire threat are encouraged to schedule a free detailed assessment.

Detailed Wildfire Home Assessments (DHA) have been highly sought, presenting an excellent opportunity for the department to interact with the community and provide resources for enhancing fire safety education and building resilience. Any home within the city can request an assessment; there are currently 3,287 parcels within the Wildland Urban Interface area of the city. By the end of 2022, 862 (61%) Curbside Assessments and 289 (20%) Detailed Home Assessments were started, and 131 were completed.

In 2023, the CRR Division took over the BFR DHA program. The program provides private reports to residents generated by the new Fire Aside software, which facilitates real-time data tracking and allows residents to interact with their reports, updating issues as they are resolved. This data tracking is crucial for program improvement and data collection for fire behavior models, as well as aids residents in applying for various grants. With a goal of 300 per year, the CRR division is on track. As of June 2024, the CRR division has accomplished 165 DHAs. Ninety-five percent of the time, residents have opened their reports. The Fire Aside software tracks how many days it takes to open the report and sends the resident reminders until they open it.

The program's cornerstone is individual DHA assessments, but it also emphasizes community engagement through a goal of monthly events. These events utilize engaged community members as "spark plugs" to foster neighborhood involvement. The program addresses home hardening and mitigation work, emergency planning, and insurance adequacy, ensuring residents are better prepared for wildfire/urban conflagration events. Special attention is given to vulnerable populations, such as older adults, individuals with disabilities, families with young children, and those with pets or transportation needs. The comprehensive approach of the Wildfire Home Assessment Program aims to reduce destruction from wildfires/urban conflagrations and enhance community safety and resilience.

Section V: Current Deployment and Performance

This section defines risk for each incident category (fire, EMS, hazmat, rescue), identifies the historical incident risk, and describes performance for the previous 5-year period. The diverse population in the city of Boulder adds a "human risk" factor that is not present in all communities. In Boulder, there is an increased risk caused by the temporary resident population. Temporary residents include college students and people experiencing homelessness. Incidents increase when students arrive and leave campus. The chart below shows an increase in call volume beginning in August and tapering off by November when students return to college and go home for winter break.

Current Deployment

BFR has a dispatch configuration for each incident type based on the type of risk. Through evaluation of incident types and critical task analysis, it has been determined that the dispatch codes and deployment array need further evaluation to better match the community's needs. The department attempts to provide consistent service levels based on the number of resources available within the city and the distance between these resources (2C.1).

Defining System Performance

The fire service department's performance adequacy is determined by assessing whether they have the necessary resources to promptly provide the right fire and emergency medical services (EMS) apparatus on-scene to minimize risks to civilians, property, and emergency responders. Different apparatus deployment configurations can affect service performance, so fire leadership must quantitatively evaluate the risk level associated with each option, given the wide range of hazard conditions in any specific community.

The 911 calls for service capture the various community hazards that the Boulder Fire Department (BFD) has addressed in recent years. This information is used to identify the known hazards in our community and the likelihood of needing to respond to certain types of hazards in specific areas. Once these hazards are mapped, each potential apparatus deployment configuration can be examined to determine how to dispatch sufficient resources to these hazardous conditions, minimizing civilian injury and death, property loss, and emergency responder injury and death.

The relationship between community hazards and the availability of apparatus is critical to system performance, which can be measured in terms of concentration/distribution, capability, and reliability. **Concentration** is the spacing of multiple resources arranged close enough so an initial ERF can be assembled on the scene of a hazard within the Department's established response time goals. Specific response time performance considers both first-due units and the ERF assembly. Adequate **distribution** of resources is necessary to respond to incidents/hazards throughout the jurisdiction, regardless of significance. The distribution of fire companies ensures a specific response time performance for a percentage of the calls for service. Fire station locations and staffing patterns must distribute and concentrate appropriate apparatus to respond to minor and major events within the desired response time goals.

Concentration

The methodology for station location predates most of the modern planning tools in use. Four out of the seven stations were built before 1970; therefore, ISO standards either needed to be implemented or prior versions. The department evaluates the locations for relocation or provides alternative response models to ensure equitable distribution using a GIS tool developed by City IT.

Distribution

BFR apparatus/stations have historically been placed based on distribution—which assumes that all areas have the same risk and probability of an event occurring—while much of the equipment carried had been based on concentration (e.g., high-rise pack in high-rise district). Ideally, 100% of the community would have a fire company on the scene within the allotted response time. The distribution of fire companies is considered adequate if they can respond to at least 90% of the incidents within the stated response time goal.

BFR Vehicles are dispatched using Automatic Vehicle Location (AVL), the closest unit is dispatched to most incidents. The map on the next page shows the 4-minute response time from each BFR station. According to national standards, four minutes would be the ideal travel time for each unit. The chart below depicts the area covered by each station and the percentage that can be accessed within four minutes.

Station Area	Full area	Area Not Covered	Amount of Area Covered	% Covered
1	95,945,893.77	8,893,101.76	87,052,792.01	90.73%
2	86,833,934.67	14,074,604.54	72,759,330.12	83.79%
3	83,670,468.25	19,992,914.17	63,677,554.08	76.11%
4	143,385,020.70	66,675,831.39	76,709,189.31	53.50%
5	122,621,451.67	59,694,305.55	62,927,146.13	51.32%
6	111,988,125.99	72,863,134.54	39,124,991.45	34.94%
7	116,620,965.20	34,558,193.07	82,062,772.13	70.37%

Figure 35: Area not covered by 4-minute drive time

Reliability

Response reliability refers to the probability that the resources designated to a certain area will be available to respond when an emergency occurs. Our current dispatching system employs the closest unit dispatching method, so unit reliability is not currently used as a measure. However, in 2020, the department evaluated the number of incidents in the designated response zones. In the future, the plan is to implement a new measure that considers closest unit dispatching when assessing reliability.

The charts below show the time spent by each unit inside and outside its territory and where the units are responding from 2018-2023. The green highlighted items indicate each unit's first-due response area (territory). Unit 2502 spends nearly as much time responding to incidents inside its territory as it does outside, with half of its time being spent responding to incidents at the University. Although not shown in the charts, Unit 2507 falls under the 'Out' category. Unit 2507 spends most of its time in the territories assigned to stations 2 and 3. When Station 3 becomes operational in 2024, we will need to conduct further evaluation, as moving the station may significantly impact the response volume of the units. Please note that these charts do not include responses by the closest unit.

UNIT	IN	OUT
2501	66%	34%
2502	44%	56%
2503	81%	19%
2504	35%	65%
2505	40%	60%
2506	7%	93%
2507	22%	78%
2516	42%	58%

Apparatus	2501	2502	2503	2504	2505	2506	2507	2516
CU	3%	16%	6%	1%	0%	0%	1%	2%
Out of Area	1%	0%	1%	0%	1%	1%	0%	1%
Station 1	66%	8%	6%	1%	2%	0%	0%	1%
Station 2	5%	44%	7%	10%	0%	0%	10%	4%
Station 3	13%	11%	81%	1%	8%	1%	12%	10%
Station 4	1%	7%	1%	35%	0%	0%	2%	1%
Station 5	10%	1%	3%	0%	40%	1%	40%	6%
Station 6	0%	0%	0%	0%	1%	7%	1%	0%
Station 7	1%	1%	5%	1%	1%	0%	1%	1%

Unit Hour Utilization

Unit hour utilization is the percent of the time during every 24 hours a unit is committed to an incident. A table on the next page reflects the first line apparatus and the BC's Unit Hour Utilization (UHU). UHU is calculated by dividing the total time a unit is committed to all incidents during a year divided by the total time in a year. UHU is expressed as a percentage and describes when a unit is unavailable for a response since it is already committed to an incident. The larger the percentage, the greater a unit's utilization and the less available it is for assignment to an incident. Where performance can be measured at the 90th percentile, unit hour utilization is more significant than 10 percent, which means that the response unit cannot provide an on-time response to its 90 percent target even if the response is its only activity.

UHU	Year				
Apparatus Name	**2019**	**2020**	**2021**	**2022**	**2023**
2501	8%	8%	13%	9%	8%
2502	10%	8%	16%	10%	9%
2503	11%	10%	18%	13%	12%
2504	6%	5%	10%	7%	6%
2505	6%	6%	10%	7%	6%
2506	2%	1%	3%	2%	1%
2507	6%	5%	9%	6%	5%
2516	6%	6%	11%	7%	6%

Figure 26: Unit Hour Utilization Year over Year

Critical Tasks

Evaluating the critical tasks necessary for on-scene operations is essential as part of a standard cover analysis. Understanding the critical tasks (2C.4) that must be completed to address an incident will help determine appropriate staffing levels, the number of units needed, deployment strategies, and duties required. A department must identify the tasks that will positively influence the situation's outcome and define the number of personnel and apparatus required to complete those tasks effectively. Since each emergency is different and the order of activities may vary depending on immediate needs, it is crucial to assess the scene variables upon arrival to determine how resources can be best utilized to meet primary objectives: Life Safety (occupants, emergency workers, bystanders, etc.), Incident Stabilization, and Property Conservation.

It is important to identify a minimum number of personnel to initiate all required tasks, and an incident commander must be present to assign specific tasks. Critical tasks are not pre-assigned based on unit designation (e.g., ladder trucks are not permanently assigned the ventilation task); however, the incident commander considers the unit type and available equipment before assigning a specific task to a crew. All personnel should have the necessary training to perform the assigned tasks. Assigning tasks to crews rather than individuals helps maintain crew integrity, increasing firefighter safety, efficiency, and accountability. Critical tasks are defined for low-risk fire incidents, residential/commercial structure fires, and EMS, TRT, and HazMat responses.

One of the challenges with fire response is that the same initial complement is dispatched for both residential and commercial structure fires. In the event of a commercial occupancy fire, the incident commander would call for a second alarm, with the policy allowing for an additional four alarms. BFR does not record timestamps for critical tasks. The only way to access this information is by querying the CAD comments to derive task timestamps. Storing data in free-text fields is an area for improvement within BFR.

Community Baselines

Response time is the most common performance measure used for fire services because it is understood by residents, easy to compute, and valuable in evaluating results. The 2020 mid-term update of the BVCP calls for BFR to: "have response times to location of emergency that is normally six minutes or less." This goal is supported by the National Fire Protection Association (NFPA) standards, which establish a six-minute response 90 percent of the time.

Response Time Intervals

In the City of Boulder, all calls are dispatched by the Boulder Police Department, which serves as the public safety answering point (PSAP) for BFR. BFR measures alarm handling (processing), turnout, travel, and total response time (2C.5). The target service-level objectives in the benchmark statements are based on industry standards and best practices and the department's needs. The objectives are included in the BVCP adopted by the City Council. As of August 2019, BFR does not have access to the phone pickup time and relies on aggregate data from dispatch to calculate the time.

Alarm Handling/Call Processing: The elapsed time from when a call is answered in the dispatch center to when emergency vehicles are dispatched to the incident.

Turnout Time: Elapsed time from when an emergency vehicle is dispatched to when it goes en route to the incident scene.

First Arriving Travel Time: Elapsed time from en-route and arrival on-scene for the first arriving emergency vehicle/unit.

ERF Travel Time: Elapsed time from when the first ERF unit goes en route to when the last ERF unit arrives on the scene.

First Arriving Total Response Time: The elapsed time from when an emergent call is answered in dispatch to when the first emergency vehicle/unit arrives. The first arriving total response time is the sum of each time component (alarm handling turnover + first unit travel).

ERF Total Response Time: The elapsed time from when a call is answered in dispatch to when the last ERF unit arrives. ERF total response time is the sum of each time component (alarm handling + turnout + ERF unit travel).

Data Analysis

The data processing method begins with CAD. Currently, the processing time depends on the handling time for alarms. This time is taken from the Tritech CAD 'PHONEPICK' field into the RMS system. Ideally, this should be captured using the phone system Intrado/Viper, but at present, the field is filled at the time a dispatcher starts data entry into the CAD. A depiction of the data flow is in Appendix D.

The criteria for alarm handling will be queried differently in CAD because the National Fire Incident Reporting System (NFIRS) codes are only available once the station officer enters them into Fire RMS. The criteria for the categories are outlined in the communications policy document.

The data analysis process includes the following:

- Retrieving the data using SQL
- Filtering by category, risk, and severity
- Counting personnel for minimum staffing to complete ERF
- Calculating the elapsed times for performance metrics using SQL
- Removing statistical outliers above 1.5 x interquartile range (IQR) and setting them aside in a separate report for analysis
- Running distribution analysis for 90 percentiles
- Completing response time charts

The exclusion criteria for incidents include exposures, zero en-route time, zero roll time, zero arrival time, no mutual aid, and emergency response. For NFIRS reports, the risk is assigned to structure fires using the NFIRS property type. The BFR 'Evaluation of Current Deployment' document provides a detailed explanation of the risk assignments. Call types and severity are also used to categorize the data.

The number of incidents used to calculate total response times for the first and second units are the same. The department excludes records if the apparatus needs timestamps to assess response times accurately. Including missing timestamps might capture the apparatus in a different dispatch order of arrival. Using two different N counts would also include response times that don't belong to a verifiable unit.

For example, canceled apparatus, non-emergent responses, and units that were not dispatched simultaneously were removed from the dataset. This exclusion applies to the entire record if the ERF cannot be met. This is part of other departments' known CPSE/CFAI methodology, ensuring the N counts match multiple response time categories. Each incident has a processing, turnout, first unit travel, ERF, first unit total, and ERF total. There are no orphaned response times in our performance charts. The data calculated for MySidewalk is derived similarly using different tools.

Benchmarking

Establishing a benchmark offers the agency a figurative “target.” All response time benchmarks are for urban population density.

Baseline Performance

All non-emergency responses, mutual aid assistance, exposures, and NULL arrival time values are removed NULL time values are removed before analysis. Times without all values represent an incomplete time segment. If a unit were canceled, the arrival time would equal NULL because it never happened. Upgrades and downgrades are also not considered because they would have been driving with the traffic flow for a portion of their response. Measuring mutual-aid units does not assess BFR capabilities in the City of Boulder; therefore, these responses are not included. For fire incidents, AMR was excluded because they are not used to create a fire ERF. Statistical outliers were removed when possible. The definition of a statistical outlier is 1.5 times the Interquartile Range (IQR). The categories and criteria for measuring baseline performance at the 90th percentile is detailed in the following table.

Risk Profile

Program	Hazard	CAD Incident Type	Min # Pers	Equipment	NFIRS Fields
HazMat	Low	ODORF-Odors invests/gas outside, HAZMINF-Minor hazmat response	3	1E	
TRT		INJACC2F-Injury Accident J/O, UNACCF-Unknown if injury acc	5	1E 1AM	
EMS		Severity A/B	2	1AM	
Fire		FINONF - Non-Struct Fire	3	1E	
HazMat	Moderate	GASF - Gas Smell inside	7	2E 1BC	
TRT		MAACCF-Rollover or pinned acc	9	2E,1BC,1AM	
EMS		Severity C/D	5	1E 1AM	
Fire		FISTRF-Struct Fire/Smoke insi	19	4E, 1L, 1BC,1AM,1SO	NFIRS prop_use = 419/429**
HazMat	High/Special	HAZMAJF-HAZMAT major response, HAZMFULLF-Countywide Hazmat	13	3E,1BC,1HM, 1AM + County	
TRT		RESCUE - Special Rescue, REWATF - All Water Rescues	11	2E,1DV,1BC,1AM	
EMS (ALS)		Severity E	8	1E + 1AM	
Fire		FISTRF-Struct Fire/Smoke insi	19	4E, 1L, 1BC,1AM, 1SO	NFIRS prop_use <> 419,429

Figure 27: Risk Determination

Response Strategies and Performance

Response performance is a critical aspect of fire and emergency services. The Commission on Fire Accreditation International (CFAI) views response time as a series of events that must be managed efficiently and effectively to ensure optimal outcomes. Turnout and travel time, directly controlled by the fire service, are critical in response performance. Factors such as station location and design, staffing levels, and local response procedures can significantly impact these times.

The fire service can also impact the call-processing interval, which is the time between the receipt of a call and the dispatch of firefighters, by setting standards and enforcing performance expectations for dispatch centers. The most critical period is between an incident's initial report and emergency responders' arrival. This is often referred to as “hello to hello.” The fire service can indirectly influence this interval through public education initiatives or promptly reporting an emergency.

In communities where the fire service also provides Emergency Medical Services (EMS), response performance is crucial to provide essential life support within 4 minutes and advanced life support within 8 minutes or less for cardiac arrest victims. Early notification and the concentration of emergency response services are essential to ensure successful resuscitation efforts. In the case of trauma events, response performance can mean the difference between life and death for critically injured patients. The "golden hour" benchmark states that patients

with significant critical injuries must be in the operating room within an hour of receiving their injuries to increase their chances of survival. Emergency services' prompt and efficient response is crucial in ensuring that critically injured patients receive the care they need within the golden hour.

The “time-temperature curve” standard is from the National Fire Protection Association (NFPA) and the Insurance Services Organization (ISO). These entities have established that a typical point source of ignition in a residential house will “flash over” at some time between five and 10 minutes after ignition, turning a typical “room and contents” fire into a structural fire of some magnitude.

Response performance is a crucial aspect of fire and emergency services. It requires effective management of response time elements, such as turnout and travel time, alarm interval, and call-processing interval, as well as the concentration of emergency response services in communities where the fire service provides EMS. Time is of the essence in emergencies, and optimal response performance is essential to positive outcomes. All response time charts were completed using the CAD call types and NFIRST property use. NFIRS baseline performance charts have been completed. However, the data set is smaller and therefore not reliable.

Emergency Medical Services

BFR responds to a wide variety of EMS calls, including falls, motor vehicle accidents, childbirth, difficulty breathing, and cardiac arrests. When indicated by dispatch, BFR sends an engine to all EMS incidents. Engine companies respond to all basic life support (BLS) calls; an engine and a private ambulance company respond to advanced life support (ALS) calls; the private ambulance transports patients to the hospital.

Seven Engines and one ladder are basic life support (BLS) first responders. Each piece of apparatus has three personnel. The department relies upon a third-party provider to provide Advanced Life Support (ALS) and patient transport. The department utilizes the ambulance service to complete the ERF component of its EMS program.

Two to ten ALS ambulances are in the system at any given time. The minimum staffing for the ALS ambulances is two personnel (one paramedic). The ambulance provider is required to meet response time criteria of 7 minutes 90% of the time and 11 minutes 98% of the time.

The company that arrives at the fire department's initial arrival will assess, treat, and stabilize the patient until an ambulance arrives. If the third-party provider unit arrives on the scene first, its personnel shall initiate care, and the staff from the initial fire department company shall provide support as needed.

American Medical Response (AMR), a private ambulance service, is responsible for transporting patients.

Low-Risk EMS

Benchmark: Low-Risk

The Department’s benchmarks are as follows:

> For 90% of all low-risk EMS response incidents, the total response time for the arrival of the 1st Unit/ ERF, staffed with a minimum of 2 personnel, shall be 6 minutes.

The first-due BLS unit shall be capable of providing incident command and producing related documentation, completing the patient assessment, providing appropriate treatment, performing automatic external defibrillation (AED), and initiating cardiopulmonary resuscitation (CPR).

Low-risk – EMS	
Critical Task	Minimum Personnel
Incident command	1

Patient Assessment/Treatment	1
Total	**2**

Table 3: Critical Tasks Low-Risk EMS

Baseline: Low-Risk

The department's 2019 -2023 baseline response times are as follows:

> For 90% of all low-risk EMS incidents, the total response time for the arrival of the 1st unit/ERF, staffed with a minimum of 2 personnel, is 6 minutes and 34 seconds.

EMS Response Times Table: Low-Risk

(Low Risk) EMS - 90th Percentile Times - Baseline Performance			**Benchmark (Target)**	**2019-2023**	**2023***	**2022**	**2021**	**2020**	**2019**
Alarm Handling	Pick-up to Dispatch	Urban		4:04	3:53	3:49	4:44	6:32	3:46
		Rural							
Turnout Time	Turnout Time 1st Unit	Urban		1:42	1:49	1:46	1:46	1:38	1:32
		Rural							
Travel Time	Travel Time 1st Unit **Distribution**	Urban		6:34	5:41	6:49	6:45	6:46	6:24
		Rural							
	Travel Time ERF **Concentration**	Urban		6:34	5:41	6:49	6:45	6:46	6:24
		Rural							
Total Response Time	Total Response Time 1st Unit on Scene **Distribution**	Urban	6:00	6:34	5:41	10:28	11:14	23:38	9:52
				N=12639	N=746	N=1,530	N=3,354	N=3364	N=3181
		Rural							
	Total Response Time ERF **Concentration**	Urban	6:00	6:34	5:41	10:28	11:14	23:38	9:52
				N=12639	N=746	N=1,530	N=3,354	N=3,364	N=3181
		Rural							

Table 4: EMS Response Times Table Low-Risk

Moderate-Risk EMS

Benchmark: Moderate-Risk

The Department's benchmarks are as follows:

> For 90% of all moderate-risk EMS incidents, the total response time for the arrival of the 1st Unit, staffed with a minimum of 2 personnel, shall be 6 minutes.
>
> For 90% of all moderate-risk EMS incidents, the total response time for the arrival of the ERF, staffed with five personnel, shall be 6 minutes.

Moderate-Risk EMS	
Critical Task	**Minimum Personnel**
Incident command	1
Airway Management/Patient Assessment/Treatment	
Possible AED/Chest Compressions/Medication	2
Patient Packaging/ Transport	2
Total	**5**

Table 16: Critical Tasks Moderate-risk EMS

The first due BLS unit shall be capable of providing incident command and producing related documentation, completing the patient assessment, providing appropriate treatment, performing automatic external defibrillator (AED), and initiating cardiopulmonary resuscitation (CPR). A third-party ambulance is used to accomplish the ERF for high and moderate acuity incidents. During these events, there is a high likelihood that the patient will need ALS intervention. The ALS unit shall be capable of providing appropriate treatment and IV access to medication administration.

Baseline: Moderate-Risk

The Department's baseline response time in 2019-2023 is as follows:

For 90% of all moderate-risk EMS incidents, the total response time for the arrival of the 1st Unit is 7 minutes and 23 seconds.

For 90% of all moderate-risk EMS incidents, the total response time for the arrival of the ERF is 11 minutes and 02 seconds.

(Moderate Risk) EMS - 90th Percentile Times - Baseline Performance			**Benchmark (Target)**	**2019-2023**	**2023**	**2022**	**2021**	**2020**	**2019**
Alarm Handling	Pick-up to Dispatch	Urban		3:39	3:30	3:24	3:46	3:18	3:05
		Rural							
Turnout Time	Turnout Time 1st Unit	Urban		1:42	1:51	1:46	1:40	1:40	1:39
		Rural							
Travel Time	Travel Time 1st Unit **Distribution**	Urban		5:22	5:33	5:41	5:36	5:11	5:01
		Rural							
	Travel Time ERF **Concentration**	Urban		8:57	9:36	7:54	7:35	7:07	7:05
		Rural							
Total Response Time	Total Response Time 1st Unit on Scene **Distribution**	Urban	6:00	7:23	7:07	9:10	9:22	8:23	8:10
				N=9328	N=2396	N=2971	N=2610	N=1828	N=2170
		Rural							
	Total Response Time ERF **Concentration**	Urban	8:00	11:02	10:44	11:37	11:22	10:16	10:19
				N=9328	N=2396	N=2971	N=2610	N=1828	N=2170
		Rural							

Table 5: EMS Response Times Moderate-Risk

The response model was changed in late 2019. The ERF went from 5 to 8 to include Pit Crew EMS.

High-Risk EMS

Benchmark: High-risk

The Department's benchmarks are as follows:

> For 90% of all high-risk EMS incidents, the total response time for the arrival of the 1st Unit, staffed with a minimum of 2 personnel, is 6 minutes.
>
> For 90% of all high-risk EMS incidents, the total response time for the arrival of the ERF, staffed with five personnel, shall be 8 minutes.

The first-due BLS unit shall be capable of providing incident command and producing related documentation, completing the patient assessment, providing appropriate treatment, performing automatic external defibrillator (AED), and initiating cardiopulmonary resuscitation (CPR). A third-party ambulance is used to accomplish the ERF for moderate-acuity incidents. During these events, there is a high likelihood that the patient will need ALS intervention. The ALS unit shall be capable of providing appropriate treatment and IV access to medication administration.

The first due BLS unit shall be capable of providing incident command and producing related documentation, completing the patient assessment, providing appropriate treatment, performing automatic external defibrillator (AED), and initiating cardiopulmonary resuscitation (CPR). A third-party ambulance is used to accomplish the ERF for high and moderate acuity incidents. During these events, there is a high likelihood that the patient will need ALS intervention. The ALS unit shall be capable of providing appropriate treatment and IV access to medication administration.

PIT Crew Model

In 2019, BFR took a more robust approach to high-risk emergency medical incidents. the department changed the response to all Echo EMS incidents from 1 Engine to 2. Below, this new critical tasking chart will be used from 2019 on. The PIT crew model will provide citizens with more effective EMS care. As part of this effort, the department collects cardiac survival rates to measure the quality of the PIT crew response performance (2C.2).

High – Cardiac/Respiratory Arrest (E)	
Critical Task	**Minimum Personnel**
Incident Command, size up, safety (LEAD)	1
Airway/BVM	1
CPR	1
Liaison	1
Monitor	1
Egress	1
Scribe	1
IV/IO Meds	1
Total	**8**

Table 6: PIT Crew Critical Tasking

Baseline: High-Risk

The Department's baseline response time in 2019-2023 is as follows:

For 90% of all high-risk EMS incidents, the total response time for the arrival of the 1st unit, staffed with a minimum of 2 personnel, is 7 minutes and 49 seconds.

For 90% of all high-risk EMS incidents, the total response time for the arrival of the ERF, staffed with five personnel, is 11 minutes and 12 seconds.

EMS Response Times Table: High-risk

(High Risk) EMS - 90th Percentile Times - Baseline Performance			Benchmark (Target)	2019-2023	2023	2022	2021	2020	2019
Alarm Handling	Pick-up to Dispatch	Urban		2:28	2:22	2:28	2:47	1:56	2:09
		Rural							
Turnout Time	Turnout Time 1st Unit	Urban		1:48	1:45	1:49	1:44	1:37	1:52
		Rural							
Travel Time	Travel Time 1st Unit **Distribution**	Urban		4:26	3:49	4:47	4:24	4:26	3:56
		Rural							
	Travel Time ERF **Concentration**	Urban		7:23	6:50	6:48	7:00	5:40	7:08
		Rural							
Total Response Time	Total Response Time 1st Unit on Scene **Distribution**	Urban	6:00	7:49	8:01	7:33	7:38	6:34	6:29
				N=114	N=57	N=56	N=49	N=32	N=27
		Rural							
	Total Response Time ERF **Concentration**	Urban	8:00	11:12	10:32	11:18	11:11	10:59	12:10
				N=114	N=57	N=56	N=49	N=32	N=27
		Rural							

Table 7: EMS Response Times High-Risk

The data set above was calculated utilizing BFR's current data procedures. Data from 2016 and 2015 does not reflect EMD use, as it was not fully integrated into the data set. The response times above were completed using

the CAD call types. NFIRS baseline performance charts have been completed. However, the data set is small. In 2019, the department implemented PIT crew EMS, which increased the number of personnel required for an ERF from 5 to 8.

Nurse Navigation

On September 7, 2022, the department implemented the Nurse Navigation program, which gets you to the right level of care, 911 calls with non-emergency injuries or illnesses may be transferred to a Nurse Navigator who can assess your symptoms and refer you to the most appropriate medical care. This care could include a referral to a local clinic or urgent care. The Program was designed by AMR and implemented through a collaborative effort between AMR, Boulder Fire-Rescue, and the city of Boulder dispatch. It routes dispatcher-triaged 911 callers with non-emergent injuries or illnesses to a Colorado State Licensed nurse for assessment. A nurse will then assess a caller's symptoms and refer them to the most appropriate medical care.

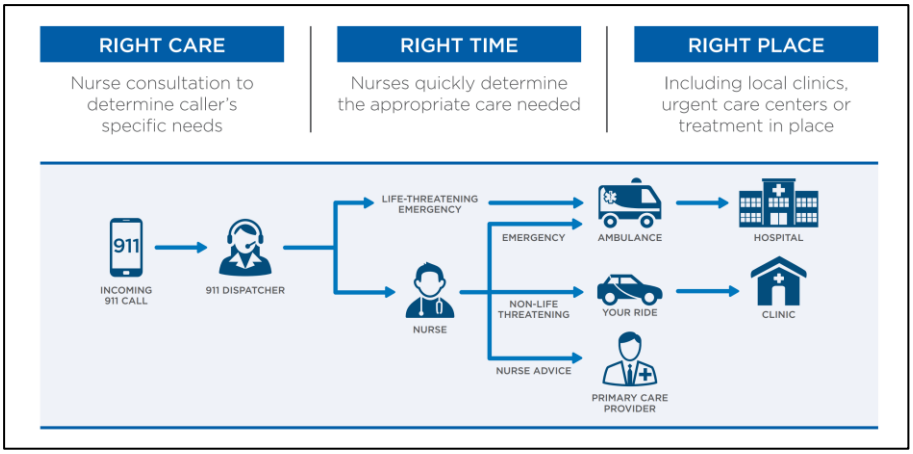


Figure 9: Nurse Navigation Flow Chart

CARE

The Community Assistance Response and Engagement (CARE) pilot program offers an alternative to police response for non-criminal calls that do not pose safety concerns and may be better addressed by health care and behavioral health professionals. CARE does not handle calls involving criminal activity, violent threats, physical disturbances, weapons, injuries, or significant medical needs. The CARE team works alongside the Crisis Intervention Response Team, which handles more serious calls than CARE. The CARE team includes a behavioral health clinician, a paramedic, and intensive case management. This program provides additional support for community members with complex needs.

Through this pilot, the city aims to:

- Help people feel supported and able to manage challenges while staying in the community.
- Increase positive health impacts for community members served by CARE and reduce future emergency service calls for those individuals through connection to ongoing community services.
- Better use police and fire resources by diverting calls that an alternative response could more appropriately serve.

Fire

Low-Risk Fire

Benchmark: Low-Risk Fire

The department's benchmark service level objectives are as follows: For 90% of all Low-Risk Fire incidents, the total response time for the arrival of the 1st unit, staffed with a minimum of 3 personnel, shall be 6 minutes.

The first arriving Engine shall be capable of providing a minimum of 3 personnel, providing a minimum of 1000 GPM and a minimum static water source (tank water) of 300 gallons; initiating command and providing for incident safety; requesting additional resources; deploying 200' of 1 ¾" hose-line while flowing a minimum of 150 GPM; establishing an uninterrupted water supply as needed; containing the fire; performing salvage and overhaul operations; conduct a fire cause determination, and produce related documentation.

Critical Tasks: Low-Risk Fire

For a low-risk fire (e.g., a dumpster fire), the total personnel needed for an effective response force is 3. A dumpster fire complement is one engine (3).

Low-Risk – Fire Suppression	
Critical Task	**Minimum Personnel**
Incident command, size up, IAP, safety	1
Pump Operator	1
Fire Attack	1
Total	**3**

Table 8: Critical Tasks Low-Risk Fire

Baseline: Low-Risk Fire

The department's 2019-2023 baseline response times are as follows:

> For 90% of all low-risk fire incidents, the total response time for the arrival of the 1st unit/ERF, staffed with a minimum of 3 personnel, is 10 minutes and 45 seconds.

Low-Risk Fire Suppression - 90th Percentile Times - Baseline Performance			**Benchmark (Target)**	**2019-2023**	**2023**	**2022**	**2021**	**2020**	**2019**
Alarm Handling	Pick-up to Dispatch	Urban		2:58	2:21	2:53	2:40	2:27	2:32
		Rural							
Turnout Time	Turnout Time 1st Unit	Urban		2:10	2:05	2:07	2:13	2:09	2:13
		Rural							
Travel Time	Travel Time 1st Unit **Distribution**	Urban		6:43	5:54	7:24	7:00	5:58	6:04
		Rural							
	Travel Time ERF **Concentration**	Urban		10:45	9:13	7:24	7:00	5:58	6:04
		Rural							
Total Response Time	Total Response Time 1st Unit on Scene **Distribution**	Urban	6:00	10:45	9:13	11:12	10:43	9:33	9:39
				N=6537	N=999	N=2053	N=1492	N=764	N=760
		Rural							
	Total Response Time ERF **Concentration**	Urban	6:00	10:45	9:13	11:12	10:43	9:33	9:39
				N=6537	N=999	N=2053	N=1492	N=764	N=760
		Rural							

Table 9: Low-Risk Fire Baseline Performance

Moderate Risk Fire

Benchmark: Moderate Risk Fire

For 90 % of all moderate/ high-risk structure fires, the total response time for the arrival of the first-due unit, staffed with a minimum of 3 fire personnel, shall be 6 minutes.

For 90 % of all moderate/high-risk structure fires, the total response time for the arrival of the ERF of 19 personnel shall be 8 minutes.

The first due unit shall be capable of, but not required to perform simultaneously, the following tasks: providing 1000 GPM from a static water source (tank water) of 300 gallons; initiating command; requesting additional resources; establishing and advancing an attack line flowing a minimum of 150 GPM; establishing an uninterrupted water supply; containing the fire; rescuing at-risk victims; and performing salvage operations. It is understood that the first due unit is responsible for conducting a proper size-up and may delegate the other task to other arriving equipment. These operations shall be done following departmental standard operating guidelines while providing for the safety of responders and the public.

The ERF shall be capable of establishing incident command outside of the hazard area for the overall coordination and direction of the initial complete alarm assignment, with a minimum of one member dedicated to this task. Establish a Safety Officer and EMS crew. Establishment of an uninterrupted water supply of a minimum of 1000 GPM with supply lines maintained by the driver/operator. Establishment of an adequate water flow application rate of 300 GPM from two hand lines, each of which has a minimum flow rate of 150 GPM, with each hand line operated by a minimum of two members; one team of two members to conduct search and rescue; at least one team, consisting of a minimum of two members to raise ground ladders and perform ventilation, the establishment of an on-deck crew consisting of a minimum of three members and if an aerial device is used in operations one member to function as an aerial operator to maintain primary control of the aerial device at all times.

Critical Tasks: Moderate Risk Fire

A structure fire complement currently consists of four engines (E) (12 personnel), one ladder (L) (3 personnel), a safety officer (SO) (1 person), a battalion chief (BC) (1 person), and one ambulance (2 personnel).

Moderate-Risk Fire Response	
Critical Task	**Minimum Personnel**
Initial Incident Command - Includes: Size up, IAP, Safety	1
Initial Attack Line	1
Pump Operator – Includes: Positioning Apparatus, Pump Operations	1
Water Supply	1
Primary Search	2
Control Utilities	1
Ventilation	2
2nd Attack Line	2
2nd Water Supply	1
On Deck Crew	3
Assume Command (IC2)	1
Assume Safety Operations – Includes: Second 360, Re-evaluate IAP	1
Rehabilitation/Patient Care	2
Total Personnel	**19**

Table 10: Critical Tasks High-Risk Fire

Baseline: Moderate Risk Fire

The department's 2019-2023 baseline response times are as follows:

For 90 % of all moderate-risk structure fires, the total response time for the arrival of the first-due unit, staffed with a minimum of 3 fire personnel, is 19 minutes and 49 seconds.

For 90 % of all moderate-risk structure fires, the total response time for the arrival of the ERF of 19 personnel is 27 minutes and 43 seconds.

(Moderate Risk) Fire Suppression - 90th Percentile Times - Baseline Performance			**Benchmark (Target)**	**2019-2023**	**2023***	**2022***	**2021***	**2020***	**2019***
Alarm Handling	Pick-up to Dispatch	Urban		1:59	1:55	1:33	1:43	0:56	1:15
		Rural							
Turnout Time	Turnout Time 1st Unit	Urban		2:16	2:21	1:54	2:35	2:20	0:38
		Rural							
Travel Time	Travel Time 1st Unit **Distribution**	Urban		4:57	3:41	5:49	5:00	3:48	5:34
		Rural							
	Travel Time ERF **Concentration**	Urban		7:45	07:03	29:27	13:37	10:37	18:14
		Rural							
Total Response Time	Total Response Time 1st Unit on Scene **Distribution**	Urban	6:00	19:49	19:47	7:50	8:14	6:17	6:28
				N=35	N=11	N=7	N=3	N=6	N=5
		Rural							
	Total Response Time ERF **Concentration**	Urban	8:00	27:43	23:10	38:36	17:48	26:01	21:43
				N=35	N=11	N=7	N=3	N=6	N=5
		Rural							

Table 11: Moderate/High-Risk Fire Baseline Performance

Moderate and high-risk fires have the same initial dispatch and the same ERF. For additional personnel, a second alarm would be called. A second alarm will be excluded from the ERF calculation because they are not dispatched

simultaneously. The number of units and personnel dispatched to all moderate and high fires and the critical tasking are the same for both.

The department has recognized that moderate fires are being over-dispatched and is aligning its response to that of the Boulder Valley Fire Consortium (BVFC). Further documentation is in the "deployment evaluation" and Boulder Valley Fire Consortium Standard of Cover. The ERF comprises units dispatched after the initial dispatch. These units will no longer be included in the new response time methodology.

High-Risk Fire

The current deployment is 4E,1L, and 1BC for all high-risk fires. Additional Alarms are needed where additional personnel are required to fight the fire. A second alarm would yield 12 people (3E) and a staff officer.

Benchmark: High-Risk Fire

> For 90 % of all moderate/ high-risk structure fires, the total response time for the arrival of the first-due unit, staffed with a minimum of 3 fire personnel, shall be 6 minutes.
>
> For 90 % of all moderate/high-risk structure fires, the total response time for the arrival of the ERF of 19 personnel shall be 8 minutes.

The first due unit shall be capable of, but not required to perform simultaneously, the following tasks: providing 1000 GPM from a static water source (tank water) of 300 gallons; initiating command; requesting additional resources; establishing and advancing an attack line flowing a minimum of 150 GPM; establishing an uninterrupted water supply; containing the fire; rescuing at-risk victims; and performing salvage operations. It is understood that the first due unit is responsible for conducting a proper size-up and may delegate the other task to other arriving equipment. These operations shall be done in accordance with departmental standard operating guidelines while providing for the safety of responders and the public.

The ERF shall be capable of establishing incident command outside of the hazard area for the overall coordination and direction of the initial full alarm assignment, with a minimum of one member dedicated to this task. Establish a Safety Officer and EMS crew. Establishment of an uninterrupted water supply of a minimum of 1000 GPM with supply lines maintained by the driver/operator. Establishment of an adequate water flow application rate of 300 GPM from two hand lines, each of which has a minimum flow rate of 150 GPM, with each hand line operated by a minimum of two members; one team of two members to conduct search and rescue; at least one team, consisting of a minimum of two members to raise ground ladders and perform ventilation, the establishment of an on-deck crew consisting of a minimum of three members and if an aerial device is used in operations one member to function as an aerial operator to maintain primary control of the aerial device at all times.

Critical Tasks: High-Risk Fire

A structure fire complement currently is comprised of 4 engines (E) (12 personnel), one ladder (L) (3 personnel), a safety officer (SO) (1 person), a battalion chief (BC) (1 person), and one ambulance (2 personnel).

High-Risk Fire Response	
Critical Task	**Minimum Personnel**
Initial Incident Command - Includes: Size up, IAP, Safety	1
Initial Attack Line	1
Pump Operator – Includes: Positioning Apparatus, Pump Operations	1
Water Supply	1
Primary Search	2
Control Utilities	1
Ventilation	2
2nd Attack Line	2
2nd Water Supply	1
On Deck Crew	3
Assume Command (IC2)	1
Assume Safety Operations – Includes: Second 360, Re-evaluate IAP	1
Rehabilitation/Patient Care	2
Total Personnel	**19**

Table 12: Critical Tasks High-Risk Fire

Baseline: High-Risk Fire

The department's 2019 -2023 baseline response times are as follows:

For 90 % of all moderate-risk structure fires, the total response time for the arrival of the first-due unit, staffed with a minimum of 3 fire personnel, is 20 minutes and 58 seconds.

For 90 % of all moderate-risk structure fires, the total response time for the arrival of the ERF of 19 personnel is 23 minutes and 47 seconds.

(High Risk) Fire Suppression - 90th Percentile Times - Baseline Performance			**Benchmark (Target)**	**2019-2023**	**2023***	**2022***	**2021***	**2020***	**2019***
Alarm Handling	Pick-up to Dispatch	Urban		2:49	2:37	3:38		2:41	1:04
		Rural							
Turnout Time	Turnout Time 1st Unit	Urban		2:32	1:36	1:53		1:21	1:44
		Rural							
Travel Time	Travel Time 1st Unit **Distribution**	Urban		3:39	3:40	8:19		3:48	1:41
		Rural							
	Travel Time ERF **Concentration**	Urban		6:58	6:36	8:31		8:15	10:52
		Rural							
Total Response Time	Total Response Time 1st Unit on Scene **Distribution**	Urban	6:00	20:58	26:59	13:20		8:57	4:17
				N=12	N=3	N=2	N=0	N=3	N=2
		Rural							
	Total Response Time ERF **Concentration**	Urban	8:00	23:47	29:31	32:17		26:02	13:30
				N=12	N=3	N=2	N=0	N=3	N=2
		Rural							

Table 13: Moderate/High-Risk Fire Baseline Performance

Wildland Fire

The CAD has a low call volume related to wildland fires. The dataset does not include mutual aid requests to the County. The service level agreement requires us to respond to all city-owned lands, even if they are not within the municipal boundary. Historically, there has been a similar level of wildland response based on risk; however, it was determined during this process that there should be. In 2023, the department will adopt the Boulder Valley Fire Consortium (BVFC) model of assessing low, moderate, and high-risk by indices and type of wildfire.

In the wildland fire environment, four primary safety hazards confront the firefighter: lightning, fire-weakened timber, rolling rocks, and entrapment by running fires. Each firefighter must know the interconnection of Lookouts, Communications, Escape Routes, and Safety Zones (LCES). LCES will be established before fighting the fire: select lookouts, set up communication, choose escape routes, and select safety zones. In a high/extreme fire, BFR will automatically need to request mutual aid for additional personnel.

BFR's deployment for wildland fires is tiered by indices based on fire danger and matched to a regional standard of cover (low, medium, high). The initial alarm for a low day to any wildland fire is one engine (type 1) and one wildland unit (either type 3 or type 6), a battalion Chief, and the on-call wildland duty officer (2590). The on-scene incident commander can double this alarm by calling for a second alarm. The critical task of the first due engine is to perform a size-up and an initial radio report to determine the complexity and growth potential of the incident. The on-call wildfire duty officer role is assigned to one of the members of the wildland division, who is required to respond if on duty or monitor the call if off-duty during low fire danger. This person is also responsible for coordinating mutual aid or external cooperator support functions if the incident exceeds the capabilities of the initial responding units.

The medium response for a wildland fire is one engine (T1), four brushes (T3 or T6), two BCs, two water tenders, and the wildland duty officer. The on-scene incident commander can double this by asking for a "second alarm."

A high-level response calls for two engines (T1), six brushes (T3 or T6), two tenders, 2 BCs, and the on-call wildland duty officer. Again, the alarm assignment can be doubled by calling for a second alarm.

The criteria for determining response levels are based on three main drivers of problem fire behavior. The "hot, dry windy" index (wind speed, temperature, and relative humidity), the ERC and BI percentile (energy release component and burn index), and a fuels and drought component. (1000-hour fuel moisture and regional drought level). Each criterion is given a point value based on breakpoints that will drive a change in fire behavior.

Conditions	**Winds/Temp/Rh HDW Index (percentile)**	**ERC/BI Percentile**	**Fuels/Drought Level (1000hr fuels/D1-5)**
LOW	0-75% percentile **1**	0-75% percentile **1**	>12% 1000hr/ D1-2 **1**
MODERATE	76-90% percentile **3**	76-90% percentile **2**	8-12 1000hr/ D3-4 **2**
HIGH	91-99% percentile **5**	90-% percentile **3**	<8 1000hr/D5 **3**

Response Levels:

Low Response = 3-5 points

Moderate Response = 6-8 points

High Response = 9+ points

The critical tasking process determined that BFR only utilized one category for dispatching wildland fire incidents. The department has adopted the BVFC indices table and the critical tasking tables below to better match the present risk.

Primary Factors	>50% Humidity <5MPH Wind <___%ERC Percentile <60° Temperature	20-50% Humidity 5-15MPH Wind <___%ERC Percentile 60° - 80° Temperature	<20% Humidity >15MPH Wind >___%ERC Percentile >80° Temperature
Secondary Factors	Burning Index (BI): ____ LFM_a:____ LFM_b:____% 3-Day ERC Trend: _____	Burning Index (BI): ____ LFM_a:____ LFM_b:____% 3-Day ERC Trend: _____	Burning Index (BI): ____ LFM_a:____ LFM_b:____% 3-Day ERC Trend: _____

Table 14: Indices Based Risk – Wildland

Landscaping Fires	Low	Moderate	High
Lawn/Mulch Roadside City Park Flowerbeds Golf Course Sports Field	1 Engine 1 Brush	1 Engine 2 Brush 1 Tender 1BC	2 Engine 3 Brush 1 Tender 1BC BCSO FDO Overhead

Table 15: BVCP Wildland Risk Deployment - Landscaping Fires

Wildland Fires	Low	Moderate	High
Lawn/Mulch Forest Roadside Ag. Field City Park Open Space Flowerbeds Hillside Golf Course Brush Mountain Sports Field Ditch	1 Engine 1 Brush 1BC	1 Engine 3 Brush 2 Tender 2BC 1BC BCSO FDO	2 Engine 3 Brush 2 Tender 1BC 2BC BCSO FDO Overhead *Check Aviation Availability

Table 16: BVCP Wildland Risk Deployment - Wildland Fires

Baseline: First Unit Wildland

The department's 2019-2023 baseline response times are as follows:

> For 90 % of responses to Wildland Fire incidents, the total response time for the first due unit staffed with a minimum of 3 personnel is 5 minutes and 2 seconds.

First Unit Wildland - 90th Percentile Times - Baseline Performance			**Benchmark (Target)**	**2019-2023**	**2023**	**2022**	**2021**	**2020**	**2019**
Alarm Handling	Pick-up to Dispatch	Urban		2:36	3:26	2:17			
		Rural							
Turnout Time	Turnout Time 1st Unit	Urban		1:55	2:14	1:15			
		Rural							
Travel Time	Travel Time 1st Unit **Distribution**	Urban		5:02	9:10	5:33			
		Rural							
	Travel Time ERF **Concentration**	Urban		8:54	12:28	5:33			
		Rural							
Total Response Time	Total Response Time 1st Unit on Scene **Distribution**	Urban	6:00	5:02	9:10	8:24			
				N=22	N=19	N=22	N=0	N=0	N=0
		Rural							
	Total Response Time ERF **Concentration**	Urban	6:00	5:02	9:10	8:24			
				N=22	N=19	N=22	N=0	N=0	N=0
		Rural							

Table 17: Low-Risk Wildland Baseline Performance

Low-Risk

Benchmark: Low-Risk Wildland

The Department's benchmark service-level objectives are as follows:

> For 90 % of responses to low-risk Wildland Fire incidents, the total response time for the first due unit staffed with a minimum of 3 personnel shall be 6 minutes.
>
> For 90 % of responses to low-risk Wildland Fire incidents, the total response time for the ERF unit staffed with a minimum of 3 personnel shall be 6 minutes.

The first due unit shall be capable of fire attack, structure protection, and water supply.

Critical Tasks: Low Risk Wildland

The current response complement for these incidents includes 1 Engine, 1 Brush Truck, and 1 Battalion Chief, 1Wildland Duty Officer.

Low-Risk Wildland	
Critical Task	**Minimum Personnel**
Incident Command, size up, safety	2
Fire Attack/Structure Protection	6
Total	**7**

Table 18: Critical Task: Low-Risk Wildland

Baseline: Low-Risk Wildland

There is no response time chart for high-risk wildland fires for 2019-2023.

Moderate-Risk Wildland

Benchmark: Moderate Risk Wildland

The Department's benchmark service-level objectives are as follows:

> For 90 % of responses for moderate-risk Wildland Fire incidents, the total response time for the first due unit staffed with a minimum of 3 personnel shall be 6 minutes.
>
> For 90% of all wildfire incidents on City-owned property, the total response time for the arrival of the wildland team, staffed with two Engine Bosses and two Task Force Leaders (or higher), shall be 20 minutes.

The first due unit shall be capable of fire attack, structure protection, and water supply. The ERF shall be capable of incident command, safety, IAP, and LCES.

Critical Tasks: Moderate Risk Wildland

The response compliment for these incidents includes 1 Engine, 4 Brush Trucks, 2 Water tenders, 2 Battalion Chiefs, 1 Wildland Duty Officer.

Moderate Risk Wildland	
Critical Task	**Minimum Personnel**
Incident Command, size up, safety, IAP, LCES	3
Fire Attack/Structure Protection	6
Anchor/Flank	8
Water Supply	4
Total	**21**

Table 19: Critical Tasks Moderate Wildland

Baseline: Moderate Risk Wildland

There is no response time chart for high-risk wildland fires for 2019-2023.

High-Risk Wildland Fire

Benchmark: High-Risk Wildland

The response compliment for these incidents includes 2 engines, 6 Brush Trucks, 2 Water Tenders, 2 Battalion Chiefs and 1 Wildland duty officer

High Risk Wildland	
Critical Task	**Minimum Personnel**
Incident Command, size up, safety, IAP, LCES	3
Fire Attack/Structure Protection	12
Anchor/Flank	12
Water Supply	4
Total	**31**

Table 20: Critical Tasks High-Risk Wildland

The Department's benchmark service-level objectives are as follows:

> For 90 % of responses for high-risk Wildland Fire incidents, the total response time for the first due unit staffed with a minimum of 3 personnel shall be 6 minutes.
>
> For 90% of all wildfire incidents on City-owned property, the total response time for the arrival of the wildland team, staffed with two Engine Bosses and two Task Force Leaders (or higher), shall be 20 minutes.

The first due unit shall be capable of fire attack, structure protection, and water supply. The ERF shall be capable of incident command, safety, IAP, and LCES.

Baseline: High-Risk Wildland

There is no response time chart for high-risk wildland fires for 2019-2023.

Technical Rescue

Depending on the incident, assets may be sent emergency, non-emergency, requested from other mutual aid partners, or not requested at all. The goal is to quickly and effectively recognize and identify the need for technical rescue services involving structural collapse, trench collapse, complicated or advanced vehicle extrication, confined space rescue, rope rescue, swift water rescue, sub-surface rescue/recover, etc. They perform rescue or incident stabilization to accomplish life safety and property conservation, and recovery as well as evidence collection. During large events such as a large life hazard structural collapse, perform initial steps toward incident mitigation to involve size-up, requesting additional technical rescue services, performing the rescue, shoring, and other steps toward incident stabilization until outside resources arrive to assist. While seasonal risks have been observed in the past, a changing climate and urban growth are presenting increasing year-round risks.

Low-Risk Technical Rescue

Benchmark: Low-Risk Technical Rescue

The Department's benchmark service-level objectives are as follows:

For 90 % of responses for Low-risk Technical Rescue incidents, the total response time for the first due unit/ERF, staffed with a minimum of 3 personnel, shall be 6 minutes.

Low-Risk – Technical Rescue	
Critical Task	**Minimum Personnel**
Incident command (size up, safety)	1
Access	2
Total	**3**

Table 21: Critical Tasks Low-Risk Technical Rescue

The first due unit shall be capable of incident command and access to the patient.

Baseline: Low-Risk Technical Rescue

The department's 2019 -2023 baseline response times are as follows:

> For 90 % of responses for low-risk technical rescue incidents, the total response time for the first due unit/ERF staffed with a minimum of 3 personnel is 7 minutes and 38 seconds.

Low-Risk Technical Rescue - 90th Percentile Times - Baseline Performance			**Benchmark (Target)**	**2019-2023**	**2023**	**2022**	**2021**	**2020**	**2019**
Alarm Handling	Pick-up to Dispatch	Urban		2:40	2:37	2:30	2:48	2:42	2:39
		Rural							
Turnout Time	Turnout Time 1st Unit	Urban		1:40	1:47	1:41	1:35	1:33	1:30
		Rural							
Travel Time	Travel Time 1st Unit **Distribution**	Urban		4:41	4:39	5:07	4:35	4:26	4:13
		Rural							
	Travel Time ERF **Concentration**	Urban		7:38	7:50	5:07	4:35	4:26	4:13
		Rural							
Total Response Time	Total Response Time 1st Unit on Scene **Distribution**	Urban	6:00	7:38	7:50	8:06	7:20	7:18	7:06
				N=2392	N=499	N=587	N=470	N=346	N=481
		Rural							
	Total Response Time ERF **Concentration**	Urban	6:00	7:38	7:50	8:06	7:20	7:18	7:06
				N=2392	N=499	N=587	N=470	N=346	N=481
		Rural							

Table 22: Response Times Low-Risk Technical Rescue

The response times above were completed using the CAD call types and some NFIRS data.

Moderate-Risk Technical Rescue

Benchmark: Moderate-risk Technical Rescue

The Department's benchmark service-level objectives are as follows:

> For 90 % of responses for moderate-risk technical rescue incidents, the total response time for the first due unit, staffed with a minimum of 3 personnel, shall be 6 minutes.
>
> For 90 % of responses to moderate-risk technical rescue incidents, the total response time for the arrival of the effective response force (ERF), staffed with a minimum of 9 personnel, shall be 8 minutes.

Moderate-Risk Technical Rescue	
Critical Task	**Minimum Personnel**
Incident Command, size up	1
Safety Officer	1
Pump Operator	1
Extrication	2
Stabilization	2
Pt Triage	2
Total	**9**

Table 23: Critical Tasks Moderate-Risk Technical Rescue

Baseline: Moderate-Risk Technical Rescue

The department's 2019 -2023 baseline response times are as follows:

For 90 % of responses for moderate-risk technical rescue incidents, the total response time for the first due unit, staffed with a minimum of 3 personnel, is 4 minutes and 26 seconds.

For 90 % of responses to moderate-risk technical rescue incidents, the total response time for the arrival of the effective response force (ERF), staffed with a minimum of 9 personnel, is 10 minutes and 45 seconds.

Moderate Risk Technical Rescue - 90th Percentile Times - Baseline Performance			**Benchmark (Target)**	**2019-2023**	**2023**	**2022**	**2021**	**2020**	**2019**
Alarm Handling	Pick-up to Dispatch	Urban		1:45	1:47	1:25	1:40	1:36	1:19
		Rural							
Turnout Time	Turnout Time 1st Unit	Urban		1:48	1:38	1:17	2:25	1:45	1:34
		Rural							
Travel Time	Travel Time 1st Unit **Distribution**	Urban		4:26	4:45	4:00	3:41	3:05	3:14
		Rural							
	Travel Time ERF **Concentration**	Urban		6:54	8:48	8:30	5:04	8:07	4:52
		Rural							
Total Response Time	Total Response Time 1st Unit on Scene **Distribution**	Urban	6:00	8:36	7:01	6:32	5:47	6:04	4:37
				N=57	N=14	N=13	N=17	N=4	N=19
		Rural							
	Total Response Time ERF **Concentration**	Urban	8:00	10:45	10:24	11:09	7:38	10:23	6:41
				N=57	N=14	N=13	N=17	N=4	N=19
		Rural							

Table 24: Response Times Moderate-risk Technical Rescue

High-Risk Technical Rescue

Benchmark: High-Risk Technical Rescue

The Department's benchmark service-level objectives are as follows:

> For 90 % of responses for Moderate-risk Technical Rescue incidents, the total response time for the first due unit, staffed with a minimum of 3 personnel, shall be 6 minutes.
>
> For 90 % of responses to Moderate-risk Technical Rescue incidents, the total response time for the arrival of the effective response force (ERF), staffed with a minimum of 12 personnel, shall be 8 minutes.

High–Risk Technical Rescue	
Critical Task	**Minimum Personnel**
Incident Command, size up, safety	1
Pump Operator	1
Safety Officer	1
Air Monitor	1
Extrication	2
RIT	2
Rehab	2
Rigging/Hauling	2
Total	**12**

Table 25: Critical Tasks High-Risk Technical Rescue

The first due unit shall be capable of incident command and patient access. The ERF shall be capable of providing incident safety, extrication, stabilization, PT. Triage, rigging/hauling, and rehab.

No outliers were removed from this data set.

Baseline: High-Risk Technical Rescue

The department's 2019 -2023 baseline response times are as follows:

For 90 % of responses for Moderate-risk Technical Rescue incidents, the total response time for the first due unit, staffed with a minimum of 3 personnel, is 4 minutes and 22 seconds.

For 90 % of responses to Moderate-risk Technical Rescue incidents, the total response time for the arrival of the effective response force (ERF), staffed with a minimum of 12 personnel, is 14 minutes and 52 seconds.

(High Risk) Technical Rescue - 90th Percentile Times - Baseline Performance			**Benchmark (Target)**	**2019-2023***	**2023***	**2022***	**2021***	**2020***	**2019***
Alarm Handling	Pick-up to Dispatch	Urban		4:01	3:21		3:38	2:39	
		Rural							
Turnout Time	Turnout Time 1st Unit	Urban		1:37	1:58		1:18	0:05	
		Rural							
Travel Time	Travel Time 1st Unit **Distribution**	Urban		5:22	5:24		4:56	3:17	
		Rural							
	Travel Time ERF **Concentration**	Urban		10:02	9:03		13:51	33:43	
		Rural							
Total Response Time	Total Response Time 1st Unit on Scene **Distribution**	Urban	6:00	14:52	13:57		9:42	4:38	
				N=10	N=6	N=0	N=3	N=2	N=0
		Rural							
	Total Response Time ERF **Concentration**	Urban	8:00	26:07	16:40		29:43	4:38	
				N=10	N=6	N=0	N=3	N=2	N=0
		Rural							

Hazmat

As mentioned earlier, Hazardous materials response is a locally provided service mandated by federal statute. Federal law requires Colorado to develop a hazardous materials response system. The responsibility for developing this system was delegated to local jurisdictions by statute. The statute requires local governing bodies to appoint a Designated Emergency Response Authority (DERA) to respond to hazardous materials emergencies. To provide the citizens with the best possible and most cost-effective response, Boulder County has one county Hazardous Materials Team. The team comprises the City of Boulder, the City of Longmont, the Boulder Rural Fire Protection District, and the City of Lafayette.

The response is the portion of incident management in which personnel control hazardous materials incidents defensively or offensively. The activities in the response portion of hazardous materials incident include (a) Analyzing the incident, (b) Planning the response, (c) Implementing the planned response, and (d) Evaluating the process.

Low-Risk Hazmat

Benchmark: Low-Risk Hazmat

The Department's benchmark service-level objectives are as follows:

> For 90 % of responses for low-risk hazmat incidents, the total response time for the first due unit, staffed with a minimum of 3 personnel, shall be 6 minutes.

The first due unit shall be capable of incident command, containing, controlling, and isolating any spilled product.

Critical Tasks: Low-Risk HazMat

Low-Risk – HazMat	
Critical Task	Minimum Personnel
Incident command	1
Contain, Control, Isolate	2
Total	**3**

Table 26: Critical Tasks Low-Risk Hazmat

Baseline: Low-Risk Hazmat

The department's 2019 -2023 baseline response times are as follows:

> For 90 % of responses for low-risk hazmat incidents, the total response time for the first due unit/ERF staffed with a minimum of 3 personnel is 8 minutes and 4 seconds.

(Low Risk) Hazmat - 90th Percentile Times - Baseline Performance			**Benchmark (Target)**	**2019-2023**	**2023**	**2022**	**2021**	**2020**	**2019**
Alarm Handling	Pick-up to Dispatch	Urban		3:09	2:45	3:23	3:06	2:45	4:00
		Rural							
Turnout Time	Turnout Time 1st Unit	Urban		2:02	2:10	2:00	2:06	2:03	2:00
		Rural							
Travel Time	Travel Time 1st Unit **Distribution**	Urban		7:42	5:44	8:15	7:17	7:57	7:30
		Rural							
	Travel Time ERF **Concentration**	Urban		7:42	5:44	8:15	7:17	7:57	7:30
		Rural							
Total Response Time	Total Response Time 1st Unit on Scene **Distribution**	Urban	6:00	11:38	9:17	11:51	12:17	10:56	11:47
				N=390	N=35	N=185	N=100	N=35	N=36
		Rural							
	Total Response Time ERF **Concentration**	Urban	6:00	11:38	9:17	11:51	12:17	10:56	11:47
				N=390	N=35	N=185	N=100	N=35	N=36
		Rural							

Table 27: Response Times Table Low-Risk Hazmat

Moderate-Risk Hazmat

Benchmark: Moderate-Risk Hazmat

The Department's benchmark service-level objectives are as follows:

> For 90 % of responses for Moderate-risk HazMat incidents, the total response time for the first due unit staffed with a minimum of 3 personnel shall be 6 minutes.

The Boulder County Hazmat Team benchmark service-level objectives are as follows:

> For 90 % of responses to Moderate-risk HazMat incidents, within the vicinity of East of Broadway/Hwy 93/U.S. 36, North of Hwy 128, South of Hwy 66, and West of East County Line Road, the total response time for the arrival of the effective response force (ERF) minimum of 7.
>
> For 90 % of responses to High-risk HazMat incidents outside of the area defined above, the total response time for the arrival of the effective response force (ERF) is a minimum of 7.

The first due unit shall be capable of incident command, containing, controlling, and isolating any spilled product. The ERF shall be capable of identifying incident safety, identifying the product, and decontaminating.

Critical Tasks: Moderate Risk HazMat

Moderate-Risk Hazmat	
Critical Task	**Minimum Personnel**
Incident Command, size up, safety	1
Identify	1
Decontamination	2
Contain, Control, Isolate	3
Total	**7**

Table 28: Moderate-Risk Hazmat

Baseline: Moderate-Risk Hazmat

The department's 2019 -2023 baseline response times are as follows:

For 90 % of responses for moderate-risk hazmat incidents, the total response time for the first due unit staffed with a minimum of 3 personnel is 8 minutes and 34 seconds.

For 90 % of responses for moderate-risk hazmat incidents, the total response time for the first due unit staffed with a minimum of 7 personnel is 12 minutes and 11 seconds.

(Moderate Risk) Hazmat - 90th Percentile Times - Baseline Performance			**Benchmark (Target)**	**2019-2023**	**2023**	**2022**	**2021**	**2020**	**2019**
Alarm Handling	Pick-up to Dispatch	Urban		2:42	2:33	2:28	2:57	2:34	2:18
		Rural							
Turnout Time	Turnout Time 1st Unit	Urban		2:10	2:02	2:12	2:08	2:12	2:25
		Rural							
Travel Time	Travel Time 1st Unit **Distribution**	Urban		5:13	5:10	5:15	5:15	4:49	4:54
		Rural							
	Travel Time ERF **Concentration**	Urban		9:00	8:48	7:41	8:53	8:13	8:52
		Rural							
Total Response Time	Total Response Time 1st Unit on Scene **Distribution**	Urban	6:00	8:34	8:52	8:29	8:53	8:31	8:48
				N=437	N=126	N=99	N=76	N=63	N=72
		Rural							
	Total Response Time ERF **Concentration**	Urban	8:00	12:11	11:53	11:28	12:28	11:41	12:44
				N=437	N=126	N=167	N=76	N=63	N=72
		Rural							

Table 29: Response Times Table Moderate-Risk Hazmat

High-Risk Hazmat

Benchmark: High-Risk Hazmat

The Department's benchmark service-level objectives are as follows:

> For 90 % of responses to high-risk hazmat incidents, the total response time for the first due unit staffed with a minimum of 3 personnel shall be 6 minutes.

The Boulder County Hazmat Team benchmark service-level objectives are as follows:

> For 90 % of responses to high-risk hazmat incidents within the vicinity of East of Broadway/Hwy 93/U.S. 36, North of Hwy 128, South of Hwy 66, and West of East County Line Road, the total response time for the arrival of the effective response force (ERF) minimum of 13 people personnel shall be 90 minutes.
>
> The total response time for the arrival of the effective response force (ERF), consisting of a minimum of 13 personnel, shall be 90 minutes.
>
> For 90 % of responses to high-risk hazmat incidents outside of the area defined above, the total response time for the arrival of the effective response force (ERF), which shall consist of a minimum of 13 personnel, shall be 120 minutes.

One hazmat unit can assess safety entry routes to the incident, identify a defensive perimeter, operational area, and staging area, direct defensive operations, and initiate a site-specific written action plan. They shall also be capable of preparing for and initiating offensive Hazmat operations, decontamination operations, and property conservation operations.

Critical Tasks: High-Risk HazMat

High-risk – Hazmat (3E,1BC,1HM, 1AM)	
Critical Task	**Minimum Personnel**
Hazmat Group Supervisor	1
Safety Officer	1
Entry Team Lead	1
Entry Team	2
Backup Entry Team	2
Research Lead	1
Research	1
Decontamination Leader	1
Decontamination Team	2
Site Access	1
Total	**13**

The charts below are the ERF that satisfies BFR's contribution to the county hazmat team. Currently, times from the authority are unavailable for integration into BRF's data.

Baseline: High-Risk Hazmat

The department's 2019 -2023 baseline response times are as follows:

For 90 % of responses for high-risk hazmat incidents, the total response time for the first due unit staffed with a minimum of 3 personnel is 10 minutes and 51 seconds.

(High Risk) Hazmat - 90th Percentile Times - Baseline Performance			Benchmark (Target)	2019-2023	2023	2022	2021	2020	2019
Alarm Handling	Pick-up to Dispatch	Urban		3:41			3:41		
		Rural							
Turnout Time	Turnout Time 1st Unit	Urban		0:29			0:29		
		Rural							
Travel Time	Travel Time 1st Unit **Distribution**	Urban		6:41			6:41		
		Rural							
	Travel Time ERF **Concentration**	Urban		7:35			7:35		
		Rural							
Total Response Time	Total Response Time 1st Unit on Scene **Distribution**	Urban	6:00	10:51			10:51		
				N=1	N=0	N=0	N=1	N=0	N=0
		Rural							
	Total Response Time ERF **Concentration**	Urban	8:00						
				N=1	N=0	N=0	N=1	N=0	N=0
		Rural							

Table 30: High-Risk Hazmat Baseline Performance

Section VI: Evaluation of Current Deployment and Performance

The following section will evaluate the current deployment and performance of BFR. Below is a map of response time distribution by planning zone and census block (2C.6).

Incident Volume

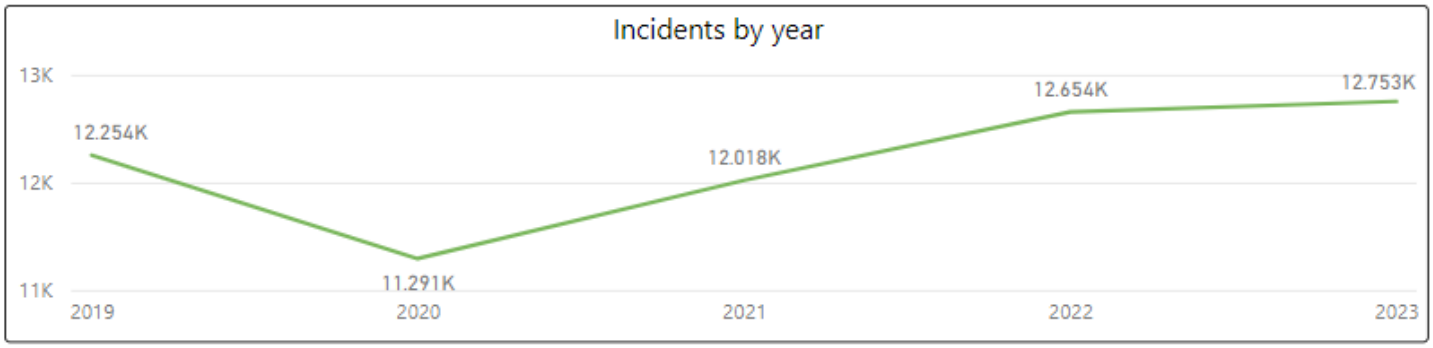


Figure 28: Incidents by type by year

Year	2019	2020	2021	2022	2023
Incidents	12,254	11,291	12,018	12,654	12,753
Difference	-963	727	636	99	-963
Percent Change	-8%	6%	5%	1%	-8%

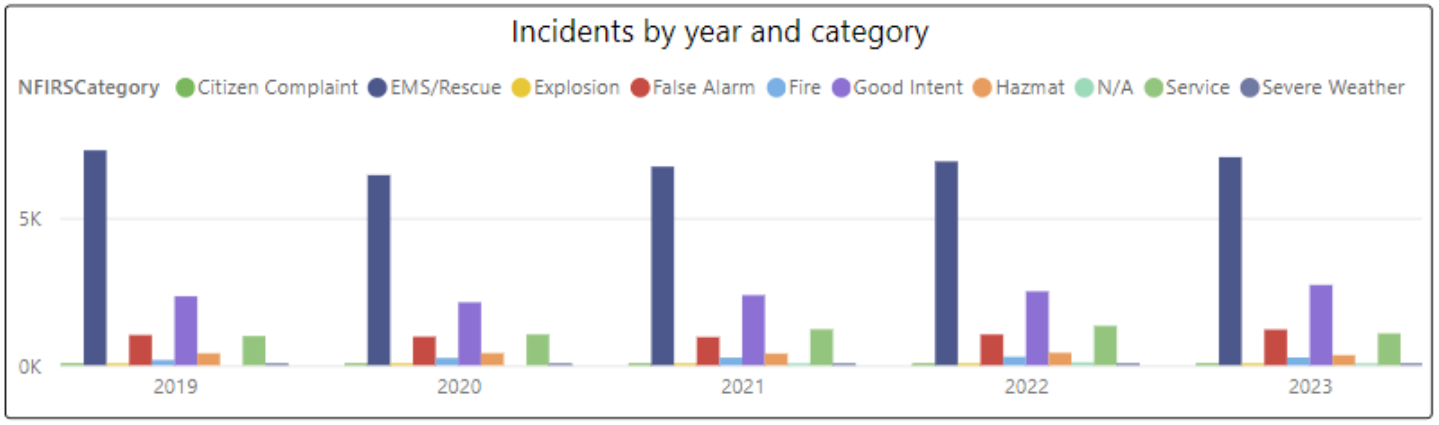


Figure 293: Incidents by year and category

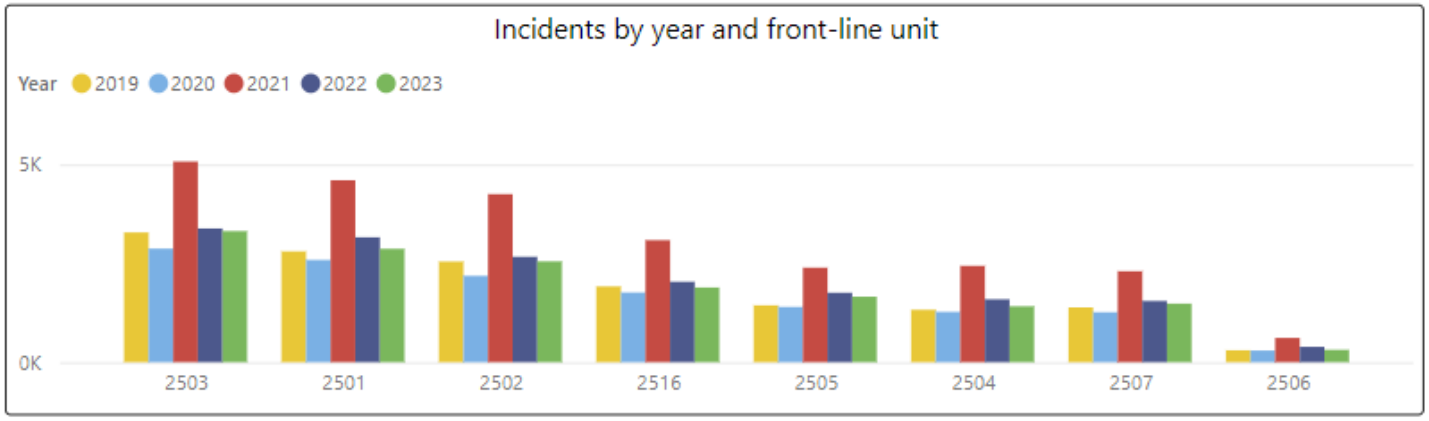


Figure 304: Incidents by year and front-line unit

Incidents by Time Period

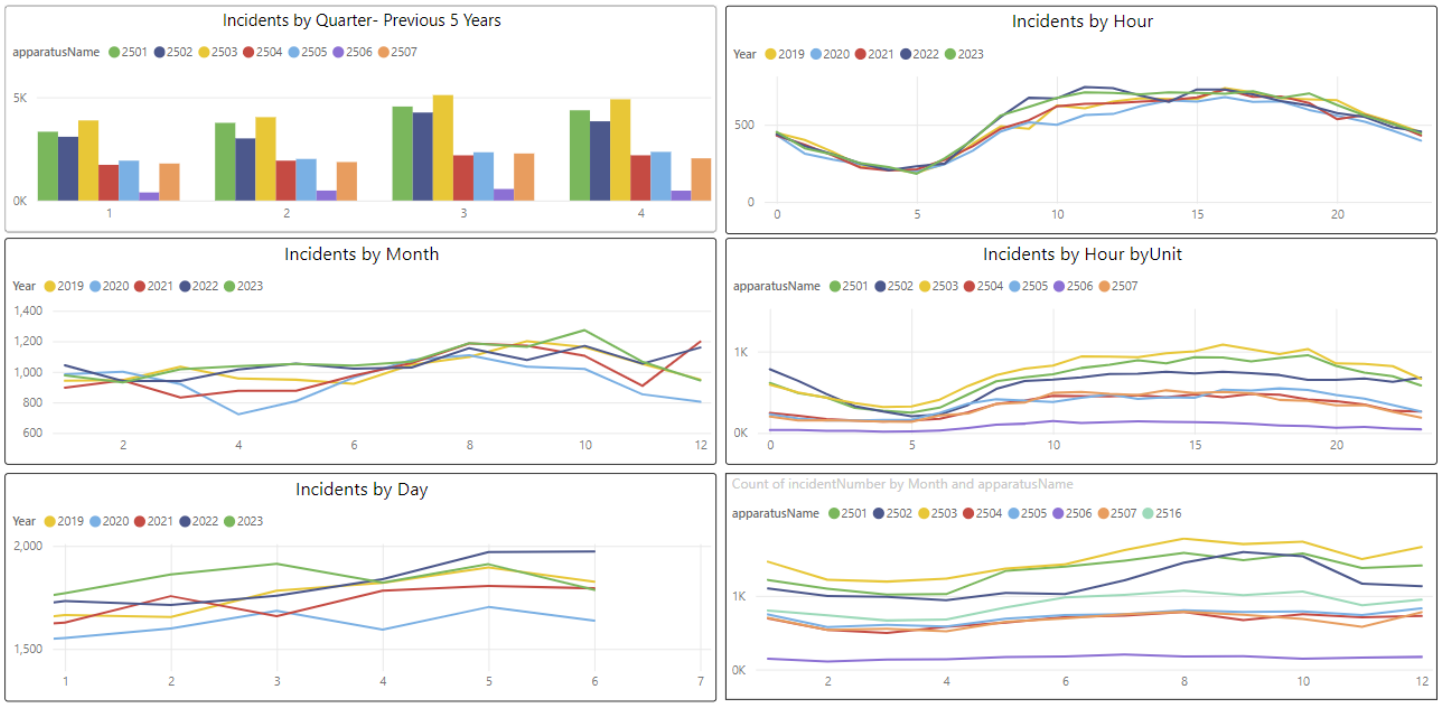
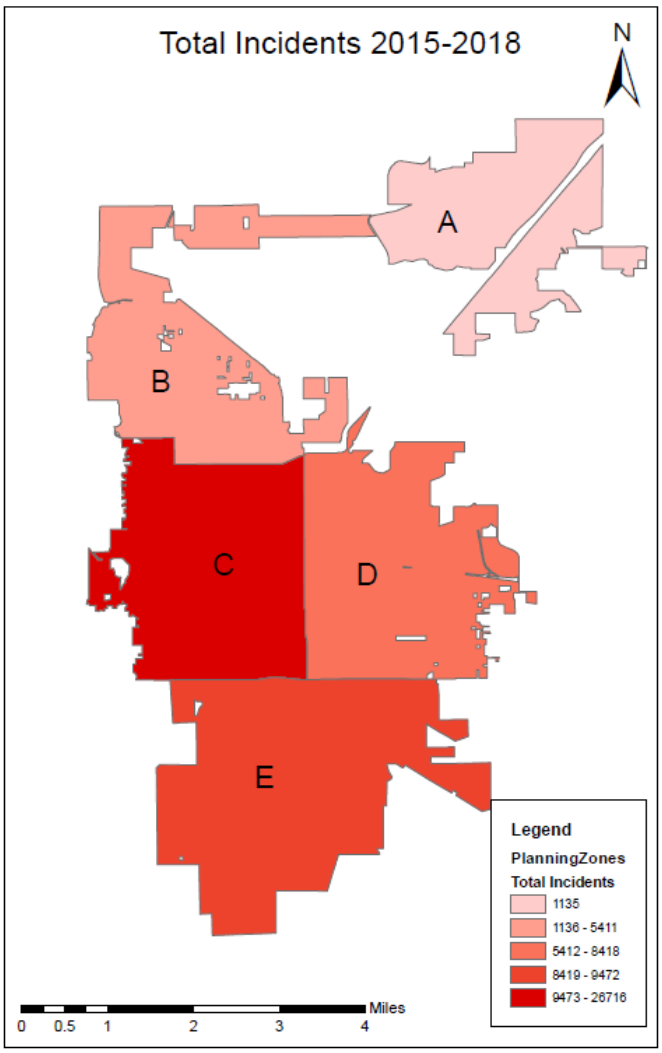


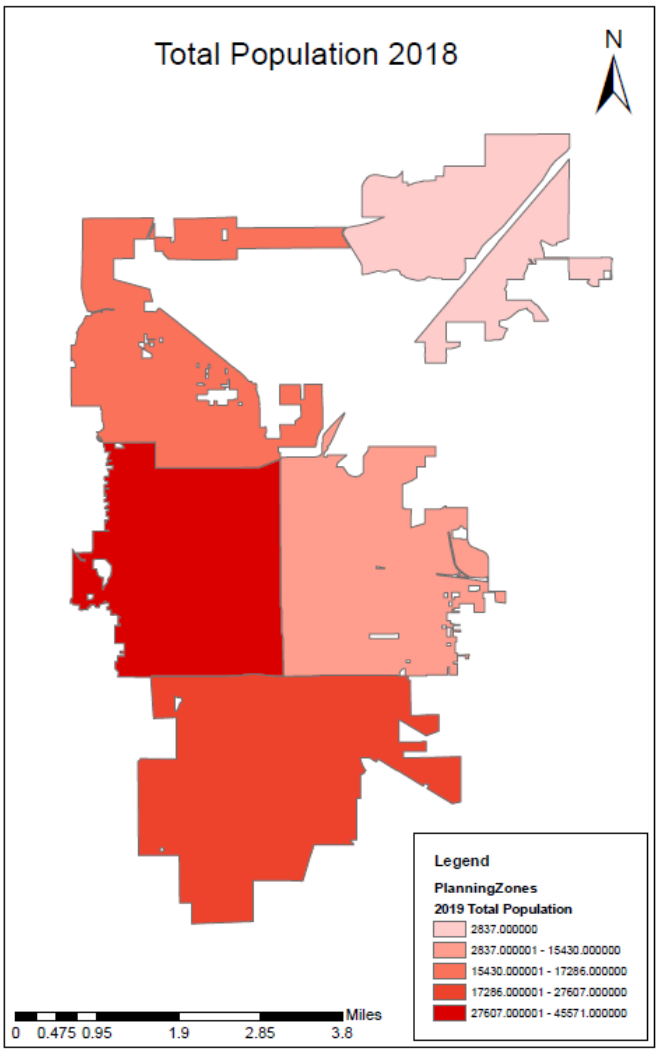
Figure 315: Incidents by year and front-line unit

Planning Zone Analysis

Population and Incidents by Planning Zone

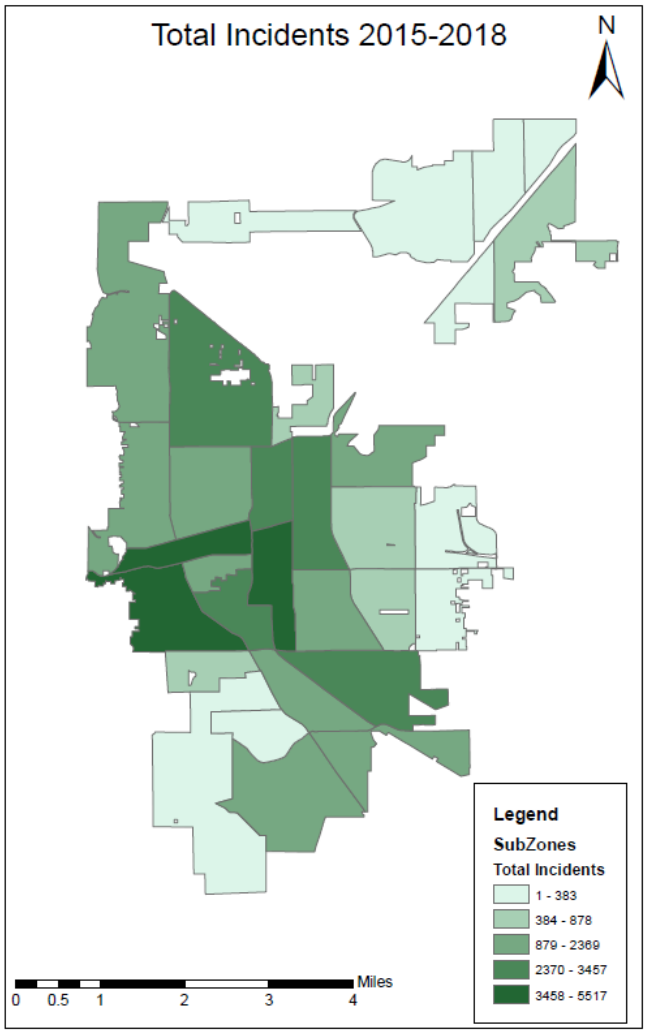
The map below compares historical risk to the city's population by BFR planning zones. In general, risk aligns with the city's current population. Zone B has a lower incident volume than expected based on population, while zone D has slightly more incidents. Since 2018, there have not been significant changes to the population that would require re-rendering these maps.





Population and Incidents by Subzone

The following map utilizes the same data but matches it to the sub-zones used by the fire department. Since 2018, there have not been significant population changes that would require re-rendering these maps.



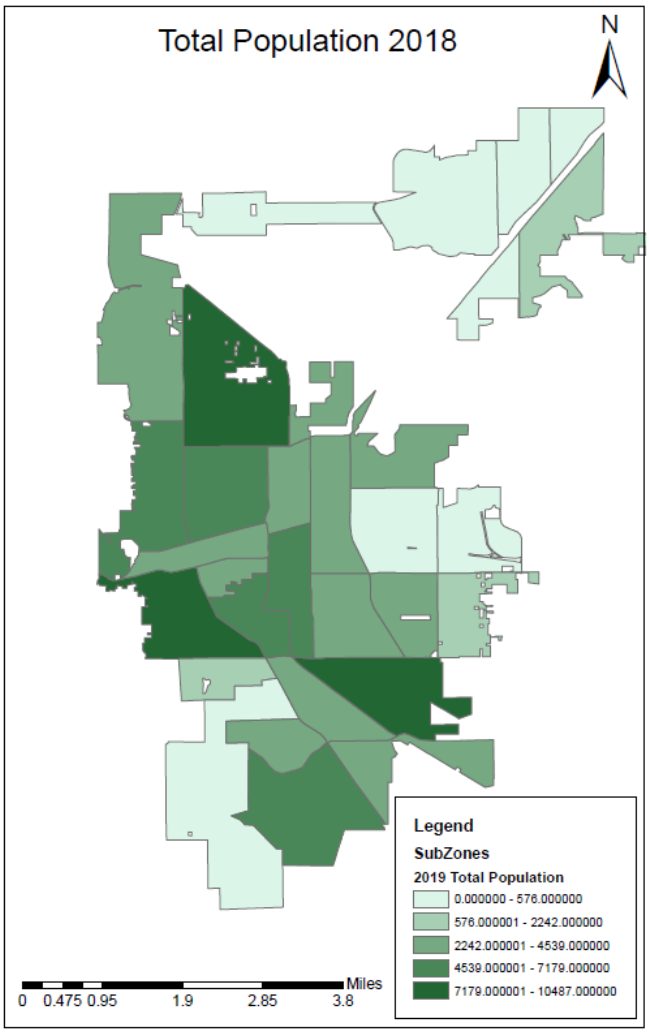


Figure 32: Total Incidents vs. Population in Sub-Zones

Program Evaluation

EMS

Emergency Medical Services account for the majority of BFR's incident volume. This statistic prompted the City Council to recommend exploring the enhancement of EMS under a fire-based model. In 2016, the council directed BFR to explore the enhancement of EMS under a fire-based model. The department wrote an EMS White Paper and presented it to the council in 2017. The City Manager and City Council requested a third party to validate and evaluate the white paper for financial feasibility and validity. Hiring a third party allowed for an objective study. In 2018, Fitch and Associates conducted a Financial Feasibility Study for ALS. Both studies were efforts to address performance gaps and identify areas for performance improvement (2C.7).

Fitch evaluated three years of data covering community response history, emergency medical services, fire service, and a review of response times. Their findings are summarized into 6 Options for Fire-Based ALS in Boulder, costing between $500k and $3.3 million annually.

BFR travel time =< 7.1 minutes for 90% of the incidents.

- 4-Minute Travel Time for 82% of calls with all eight stations
- 4-Minute Travel Time 90% of the time Not achievable with current station configuration

Progress is being made in improving ALS service delivery and reducing low-acuity EMS responses. In 2020, the communications center implemented Advanced SEND Protocol 38, and its effectiveness needs to be evaluated.

Quality Assurance/Quality Improvement

The department continues to work towards establishing a total quality management process for all incident types. The data analytics manager is exploring using Microsoft PowerApps to automate some of the QA processes for incidents other than EMS. An EMS quality assurance (QA) and continuous quality improvement (CQI) committee meets monthly. The committee comprises the Boulder Fire-Rescue Medical Director, Boulder Fire-Rescue EMS Administrator, two Paramedics, one EMT, and the American Medical Response Training Chief. QA occurs through the team's review of electronic health records throughout the month. Specific cases are brought by the team to the committee for review. The EMS QA and CQI committee is the driving force behind what the department's monthly EMS training is focused on.

Fire

BFR will change its deployment to match the BVFC Regional Standard of Cover SOG. The SOG will establish an agreed-upon guideline for standardizing coverage for selected risk factors across the BVFC. The regional standard of cover aims to standardize outcomes across agencies by adhering to CFAI principles. It defines community risk and regulates response times, turn-out times, call processing, and staffing levels. Objectives include reducing response times, deploying appropriate resources, standardizing systems, enhancing reliability and capacity, ensuring interoperable communication, and establishing standard operating guidelines. A copy of related documents is in the references for Category 2. It was discovered that 2516 was the only designated ladder in the CAD system. To include this capability, the department wants to add 2506 and 2507.

Hazmat

As mentioned in the program appraisal, BFR will work on timestamping tasks to capture efficacy on scene. Due to the low call volume of high-risk incidents, BFR will utilize training events to time tasks. Low and medium-risk incidents should provide enough data for analysis. BFR's current response times to Low, Medium, and High-Risk incidents are appropriate. Additionally, BFR will work with the data analytics manager and IT to capture more meaningful data. BFR will also work on training to properly code reports to capture Hazmat actions taken on calls better.

BFR will also change its deployment to match that of the Boulder Valley Fire Consortium (BVFC) Regional Standard of Cover SOG. The Hazmat Team will coordinate with the data analytics manager on analysis based on the new deployment models.

BFR has identified issues regarding recruitment and retention of Hazmat team members. Maintaining enough team members is critical to covering the SOC agreement with the Boulder County Hazmat Team for responses in Boulder County. BFR is obligated to send three Hazmat Techs to High-Risk incidents in the county and has not always had three Techs on duty. As stated in the program appraisal, BFR will explore options for maintaining team numbers and staffing. Additionally, BFR has identified a need to replace the firefighting foams in its inventory to comply with state laws and safety standards. BFR will research newer available options for front-line deployment.

Wildland

BFR will change its deployment to match that of the Boulder Valley Fire Consortium (BVFC) Regional Standard of Cover SOG. The data analytics manager will work with the Division Chief of Wildland and the dispatch manager to determine whether an analysis of response times based on indices is possible.

Technical Rescue

The BPFC does not use Priority Dispatch Protocol 29 to dispatch car accidents. The departments should analyze the current deployment against the proposed use of protocol 29 to understand the impact of implementing the protocol. As mentioned in the program appraisal, BFR will work on timestamping tasks to capture efficacy on scene.

Non-Emergent Incidents

BFR has analyzed non-emergency calls and their outcomes. The department identified high utilizers with non-emergent needs and developed a plan to decrease low-acuity call volume. The first initiative took place in August 2019 when public safety educators met with the staff at the Boulder Shelter to discuss the issues they are facing. To address the increased call volume, station area dashboards were created to identify high-volume call areas, risk levels, and call types. Progress towards this goal has been stalled as there is limited bandwidth.

Data Gaps

Analysis - cross-reference speed as a factor in incidents from the police department. Same with the age of occupants. Evaluate concurrent incidents

CAD Issues—The structure and completeness of the CAD are issues—fields are incomplete and inconsistent. CAD dispatch recommendations are sometimes not used during dispatch.

Call Processing - The time interval should be calculated using CAD and Intrado/Viper data for future accuracy. Boulder Fire Rescue has been given access to the Viper/Intrado CAD but has yet to join the times to the current fire data.

Outliers—Outliers must be evaluated annually, and the methodology needs to be reviewed. The process should also be automated. Consideration should be given to alternative outlier definitions, such as utilizing Z Score outliers (a Z Score >= 3 is considered an outlier and using the low outlier calculation below the IQR or the 90th percentile solely. This section should address the rules established by BFR regarding data qualification for processing. What happens with outlying data points, and what rules are established and codified to apply to them?

Data Access - Better access to data is needed. Due to the lack of good data, there is currently no way to perform predictive maintenance on facilities and fleet. Fleet focus can accomplish this task, but the current users do not use the software to the best of their ability.

Dispatch—There are gaps in Emergency Medical Dispatch (EMD), dispatchers using the appropriate determination. , Dispatcher training, data mapping, and police officer training (field request).

- Nurse Navigator is not being deployed correctly
- Need to do more with the video dispatch capabilities, Rapid SOS 911 eye
- Emergent responses, not using CAD recommendations, they aren't right, etc.
- ALS/BLS can be discerned in cad
- Fire assist – category is too broad

GIS Support - Boulder Fire lacks dedicated GIS staff and relies on the city for support. To address this gap, the department needs a GIS plan and a list of annual maps that must be created/updated.

Section VII: Plan for Maintaining and Improving Capabilities

Boulder's landscape is constantly changing due to current trends and future projections, requiring strategic planning and the ability to adapt. Boulder's population is aging, and residential density is increasing. Significant population and urban development growth also increases demand for emergency services. In addition, there are year-round wildfire risks and aging infrastructure in residential properties. All these factors highlight the urgent need for BFR to reevaluate and improve its operational readiness and capacity.

Factors Driving the Need for Change

Aging population—The proportion of older adults in Boulder County is dramatically increasing relative to all other age groups and will stabilize by 2040. The number of adults 80+ years old is projected to increase 244% by 2050.[3]

Increase in population – According to Aterio, Boulder, Colorado's population is expected to grow by 2.8% from 2025 to 2030. In 2022, Boulder's population was 107,000 people, with a median age of 28.5 and a median household income of $80,243. Between 2010 and 2022, Boulder County's population increased 11 out of 12 years. Chad Marturano, CU System Chief Financial Officer, is predicting overall enrollment growth at CU Boulder in the next five years, “We forecast these five-year budgets, and at Boulder, we're anticipating growth over this five-year time horizon of around 3.7% to 3%, just depending on the year".[4]

Increase in EMS calls – With Boulder’s population and employment projections, EMS incidents are expected to increase, particularly in redeveloped areas. BFR experienced an increase of 11 percent in EMS calls between 2015 and 2017.

Year-round wildfire risk – Climate change has extended Boulder’s wildfire season, necessitating heightened preparedness and response capabilities beyond the traditional fire season.

Movement towards a more urban form – Shifts towards higher-density residential and commercial developments pose logistical challenges for fire and EMS service delivery, requiring adaptive strategies for access and response.

Urban Development - Shifts towards higher-density residential and commercial developments pose logistical challenges for fire and EMS service delivery, requiring adaptive strategies for access and response (2A.4).

Age of Homes— The median age of Boulder homes (49 years) highlights potential fire hazards due to outdated fire alarms, emphasizing the need for proactive fire prevention and public outreach.

Innovation

Fire Department Dashboards

ESRI Operations Dashboard - The Operations Dashboard for ArcGIS is a configurable web app that provides location-aware data visualization and analytics for a real-time operational view of people, services, assets, and events. From a dynamic dashboard, view the activities and key performance indicators most vital to meeting the organization's objectives.

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[3] "Aging in Boulder County" September 2019. Retrieved from: https://assets.bouldercounty.gov/wp-content/uploads/2019/09/aaa-ppf-report-2109.pdf

[4] Doak, O (2024) “ Projected Record-Breaking Fall Enrollment at CU Boulder”. Retrieved from: https://www.yahoo.com/news/local-news-projections-predict-record-035900524.html

Power BI is a business analytics service that delivers insights to enable fast, informed decisions. The data can be transformed into visuals and shared with colleagues on any device. BFR is in the process of deploying these dashboards to SharePoint. By Q1 2025, all dashboards should be available to personnel.

Open Data Catalog

The City of Boulder has a public-facing open data catalog where departments voluntarily post data for public engagement. BFR has been a contributor to the open data catalog since 2016. Fire response areas, station locations, response times, and unit response times are all in the data catalog. Data sets are available through an ESRI GIS portal, allowing almost live updates to the data set.

Boulder Measures

The City of Boulder's Community Dashboard provides the public with data on city programs and community indicators, organized according to the city's SER Framework. Developed by the community, the framework provides a vision for an inspired future and aligns efforts across the city by establishing a common language for goals and priorities. We are working to enhance this dashboard using public feedback, so check back for ongoing updates. Many community indicators in Boulder Measures also have the complete underlying data published online in the Open Data Catalog.

Planning for Change

Several initiatives are underway to ensure the future success of BFR. Below is a list of ongoing and future projects.

- Rebuilding Station 2 – this aging station is past its operational life span and no longer sufficiently accommodates the Fire Department's service needs or goals. Rebuilding will provide modernized emergency services to the community. Facilities & Fleet CIP Summary Page (opengov.com).
- Rebuilding Station 4 – this aging station is past its operational life span and no longer sufficiently accommodates the Fire Department's service needs or goals. Rebuilding will provide modernized emergency services to the community. Facilities & Fleet CIP Summary Page (opengov.com).
- Continued buildout of ALS – the department continues to incrementally build out ALS-capable units via recruitment efforts and supporting current personnel who wish to attend paramedic school.
- Asset management (capital assets) and replacement management—The department is developing plans for personnel and asset management tools to capture and centralize the management of capital and critical assets.
- Revamping of Fleet Replacement model—both a critical and structural-based (prioritized) model of fleet replacement have been developed and presented to city management and the city budget office. The new model follows best-practice algorithms from both heavy fleet and fire apparatus perspectives and takes into consideration the sustained post-COVID impact on apparatus build and delivery times (38+ months at the time of writing).
- Extensive review of Training needs – a more thorough review of the many components of Training, including a more detailed analysis to support an understanding of overtime expense is needed. This will greatly support city management's understanding of future funding requests.
- Incident Command Vehicle requests for large-scale events - The vehicle will be used for critical incidents within the City of Boulder and regionally and will be used as the command center for Police and Fire-Rescue

Departments to strategize their response during critical incidents such as fires, floods, riots, or other emergencies. Fire Rescue CIP Summary Page (opengov.com)

- Expanded recruitment efforts (paramedic school offered as an incentive, ability to reduce financial and diversity equity barriers, and efforts to expand the diversity of the interview pool. These changes to the department's hiring process should lead to greater diversity within the department, provide a more equitable approach to a career in the fire service, and foster better connections within the community. Fire - Administration (Safe) (opengov.com)
- Expansion of NFPA 1582 / WFI – physical, behavioral, spiritual, and eventually financial wellness.
- Closest Unit Dispatch project - This is a correction to the setup of the CAD system that has needed to be addressed for 20+ years. The current configuration only allows BFR to see their own dispatched resources – even if other agencies have been dispatched to the call. Also, the current configuration only allows the City of Boulder Dispatch (housed under Police, even though it also supports Fire) to see resources within the City of Boulder (CoB) – even at CoB borders. This means that if a call comes in somewhere out in the county but gets routed to CoB Dispatch (cell tower decision tree, potential issue at border areas), CoB Dispatch must now route the call to Boulder County Dispatch, which can add up to 90 seconds to the response time for the 911 caller. This added step will not be necessary with the configuration correction. Likewise, suppose a significant event occurs at the city border. In that case, it will be easy to send immediate resources from other agencies (mutual aid agreements are already in place) – and, importantly, all agencies will have visibility to this resource allocation.
- Radio infrastructure upgrade: Upgrade the current city infrastructure to a Motorola system to allow City and County interoperability.
- Preparing for community expansion in East Boulder (Station 7), and possible expansion in North Boulder (Station 5)
- Creation of Division Chief organizational structure (making positions non-rotational)—This is a recent 2024 adjustment that allows for stability in the division and subject matter experts and reduces the loss of knowledge and experience by rotating this position.
- Possible expansion of alternate response model (CARE): Analysis of this project's success and potential for expansion is ongoing.
- Moving and condensing departmental information into an internally accessed Sharepoint site—this effort to centralize departmental information is almost complete.
- Placement of a dedicated AMR ambulance at new Station 3 (with crews stationed at the location) – this initiative will begin by the end of 2024 when crews can respond from new Station 3.
- The movement of a single internet “store” for station supplies will reduce the number of cards necessary for the department and simplify the expenses for both stations and the department. Overall expenses are also expected to be reduced.
- Compliance data analysis for contracted ambulance service—this analysis does tie to compliance fees and the department's revenue opportunity. Still, the main objective is to encourage better service delivery from a for-profit entity.
- Electrification of the fleet in alignment with city goals – two electric fire apparatus to be delivered in 2024.
- Further utilization of the city’s grants office to support equipment growth opportunities for the department.

- Approval of Overhires – up to 4 per academy (2x/year) until aging workforce fully retires – this has already had a huge impact on staffing availability and reduction of overtime expenses and the organization looks forward to the insights that future analysis will bring.
- Continued staffing analysis looking at the "relief factor" or "roster impact" needed to realistically meet minimum staffing requirements and support operational initiatives such as sending staff to paramedic school or increasing the wildland deployment of line personnel.
- Detailed home assessment project – this ongoing Community Risk Reduction work will be an informative tool for the city, the department, and homeowners within and along the Wildland Urban Interface (WUI).
- MobileEyes data gathering for future fee/enforcement opportunities, expanded beyond the current building types. Revenue generated is secondary to the ability to quantify evidence of compliance and, thus, community risk reduction.
- DataMart project—This is an Information & Technology department-supported project that aims to make all Fire platform-based data available for in-depth program analysis, cross-programmatic understanding, and planning for continuous improvement.

Master Plan 2020

The BFR Master Plan was initially developed in 1996, revised in 2012, and again in 2020. The BFR Master Plan was most recently updated to reflect current and emerging trends, such as increased community expectations and technological and communications advances. The master plan is intended to guide BFR for the next 5 to 10 years in providing safety, education, and incident mitigation to the citizens of the City of Boulder.

The CRA/SOC guides the 2020 Master plan, the BVCP discussed in the Community Expectation Section, and information gathered from many internal and external initiatives. These initiatives included a technology needs assessment by ERP Consultants, an ALS feasibility study conducted by Fitch and Associates, a financial feasibility study, community engagement, and multiple strength, weakness, opportunity, and threat assessments with members of the community, internal business partners and members of the fire department. The final stage of the process was a BFR retreat to identify the master plan priorities. The retreat consisted of three full working days dedicated to the Master Plan.

Financial Feasibility

As part of the Master Plan update, Boulder Fire-Rescue (BFR) worked in conjunction with a third-party consultant, GK Baum & Co., to conduct a financial feasibility study on the cost (and additional budget support or revenue) needed to alter and enhance departmental programming to meet the strategic goals as stated in the updated Master Plan. The financial analysis focused on developing 10-year financial plans for the three possible levels of investment that can be pursued relative to the city's future financial condition. The three levels of investment are described below and consist of Fiscally Constrained – little to no additional investment in BFR programs; Action – moderate level of additional investment in BFR programs; and Vision – all BFR's recommended program initiatives receive full budget support.

The financial analysis considered multiple factors, including department budget structure and levels, funding sources, local sales and use tax and property tax projections, debt funding thresholds, variable cash flow Schedules, etc. The feasibility study's result indicated that relative to current budget forecasts, BFR would need additional funding of between $3.6 million and $6.2 million per year to fund operational enhancements and capital infrastructure improvements. This additional funding could be sourced through reallocations within the city's General Fund or supported by increased and potentially dedicated sales and use or property taxes.

Community Engagement

Part of the continuous improvement process involves feedback from the community to assess the community's support for our initiatives. To accomplish this, the department used a public engagement plan based on the updated community engagement framework adopted by the City Council. The department distributed the survey using "Be Heard Boulder." Information cards were also handed out, and informal Q&A sessions happened around the community.

Data Summary:

- Master Plan Site Visits – 978
- Contributors – 218
- Survey Submissions – 224
- Questions – 7

The survey results indicated that the communities' priorities align with ours overall. The community also valued community risk reduction activities.

The top three residents' risks and concerns:

1) Emergency Medical Services
2) Structure Fire Suppression,
3) Wildfire Mitigation.

The Top three factors in support of Fire-Based ALS:

1) Lower Average Response Times
2) Greater availability of ALS units in the City
3) Continuity of Care from the Scene to the Hospital.

An additional outreach opportunity was presented when BFR Citizen Academy alums expressed interest in offering feedback. As identified during a focus group of BFR Citizen's Academy alumni, the community values an emphasis on community risk reduction, particularly increased public awareness and education. Also, utilizing proactive mitigation related to wildfire has been communicated to staff.

External and Internal SWOT Analysis

In the spring of 2019, the department conducted a Strengths, Weaknesses, Opportunities, and Threats (SWOT) Analysis with internal and external stakeholders. The department also held a round-table discussion with participants from public safety agencies. Here are the results: there were seven sessions, 26 contributors, and two surveys were sent out. Internal departments involved were Human Resources, Finance, CMO, Police Department, AMR, OEM, Housing, Climate, IT, and FA. External departments included several faith-based organizations, the community, CU, and Boulder County Chiefs Participants. The results are in the appendix.

Power Engage

In June 2024, the department began using Power Engage, software that sends text message-based surveys to community members interacting with the fire department. These messages ask community members to answer

four questions about their experience with Boulder Fire and dispatch. As of July 9th, 2024, 363 surveys were sent, with a 20.4% response rate.

Wildfire Management Review

Catastrophic wildfire is one of the biggest risks facing the City of Boulder. Therefore, it makes sense to periodically review the city's approach to its Wildland Fire Program. With the recent completion of a draft update to the Service Level Agreement between Fire and OSMP, it became apparent that it was time to review and affirm our current program components and processes. A management review of the Wildland Fire Program across the City of Boulder and all the departments involved in this effort was conducted to pinpoint a unified vision and purpose and to identify opportunities for continuous improvement.

During the review, themes began to emerge, and it became evident that there were seven focus areas for improvement. These were administration, coordination, fire response, fuel mitigation, outreach, policy, and technology. Discussion focused on staff bandwidth to complete projects and implement programs, the need to introduce current and new technologies, the challenge of fire mitigation with a year-round fire season, and coordination with internal and external partners. Additional challenges were discussed and explored. This review aimed to result in a more efficient and effective Wildland Fire Program for the citizens and visitors of Boulder. The recommendations made for each focus area are high-level and are intended to guide us in what we need to do next.

One key development from the review was forming the city wildfire resiliency team. This team is comprised of multiple city departments that share the work involving wildland fire response, mitigation, and risk reduction. It is made up of two tiers: an executive leadership group representing department directors and the City Manager's Office to provide strategic guidance. The second group is the "core team," comprised of the mid-managers and subject matter experts tasked with implementation.

The first recommendation from this group was to review and update all relevant plans and documents involving wildland fires. The major stand out was the Community Wildfire Protection Plan. This is a comprehensive document outlining recommendations to reduce the wildfire threat through the three tenets of the National Cohesive Wildfire Strategy: Safe and effective response, Resilient landscapes, and fire-adapted communities. Our plan was out of date and no longer relevant. This was identified as an immediate need to rectify. The team took on the development of a new CWPP. The new CWPP was created in partnership with the core team and a consultant and was accepted in May of 2024. Many of the recommendations of the management review were incorporated into this new CWPP, and this group's current work is to prioritize and implement the outlined recommendations.

Section VIII: Appendix

Division Org Charts

Operations

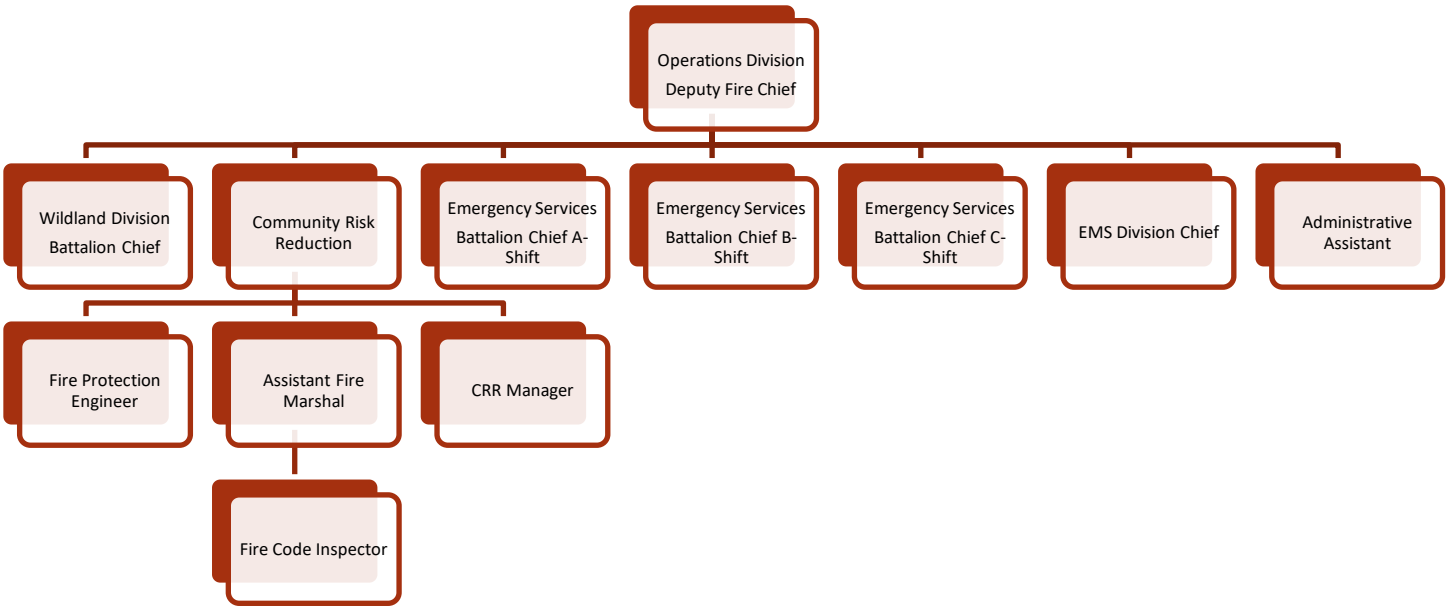


Figure 31: Operations Org Chart

Community Risk Reduction

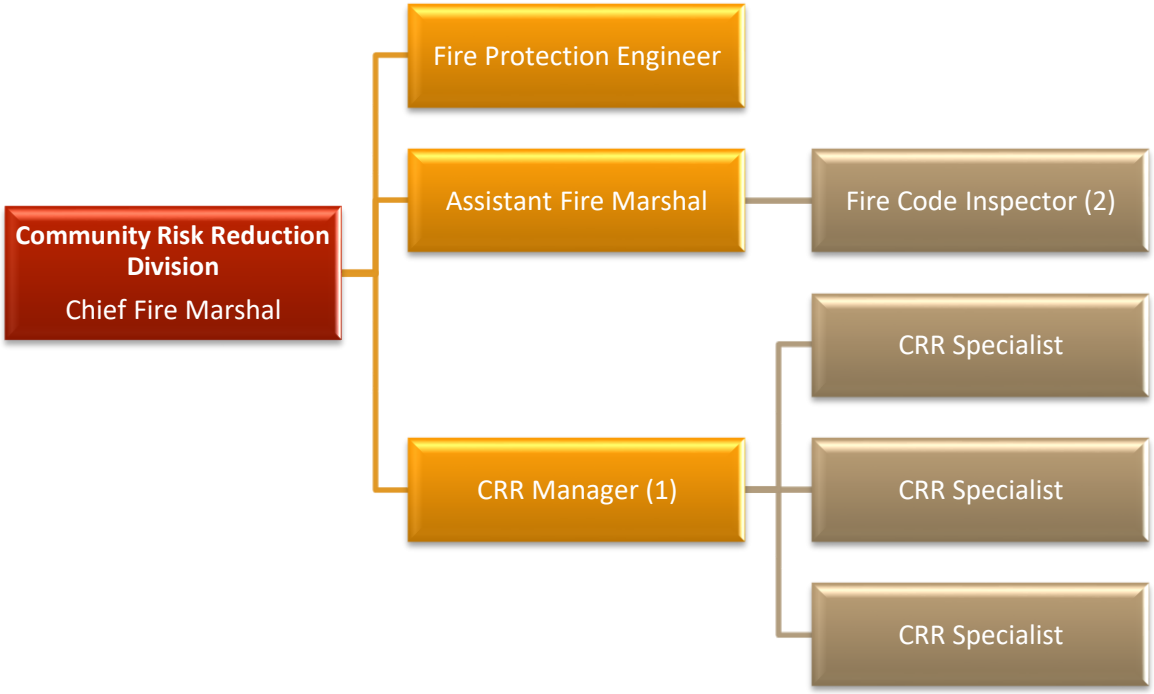


Figure 56: Emergency Services Org Chart

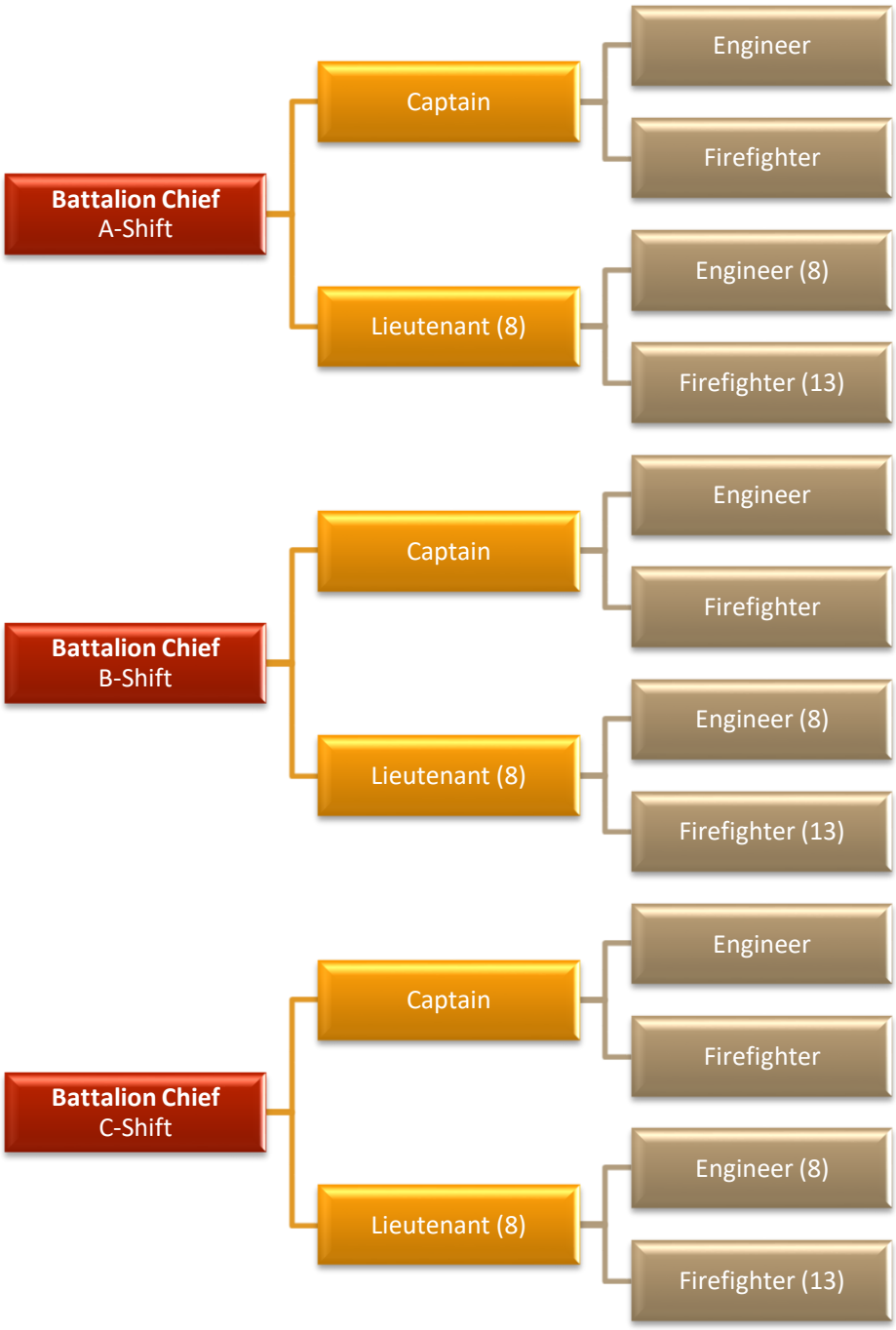


Figure 56: Emergency Services Org Chart

Figure 337: Wildland Org Chart

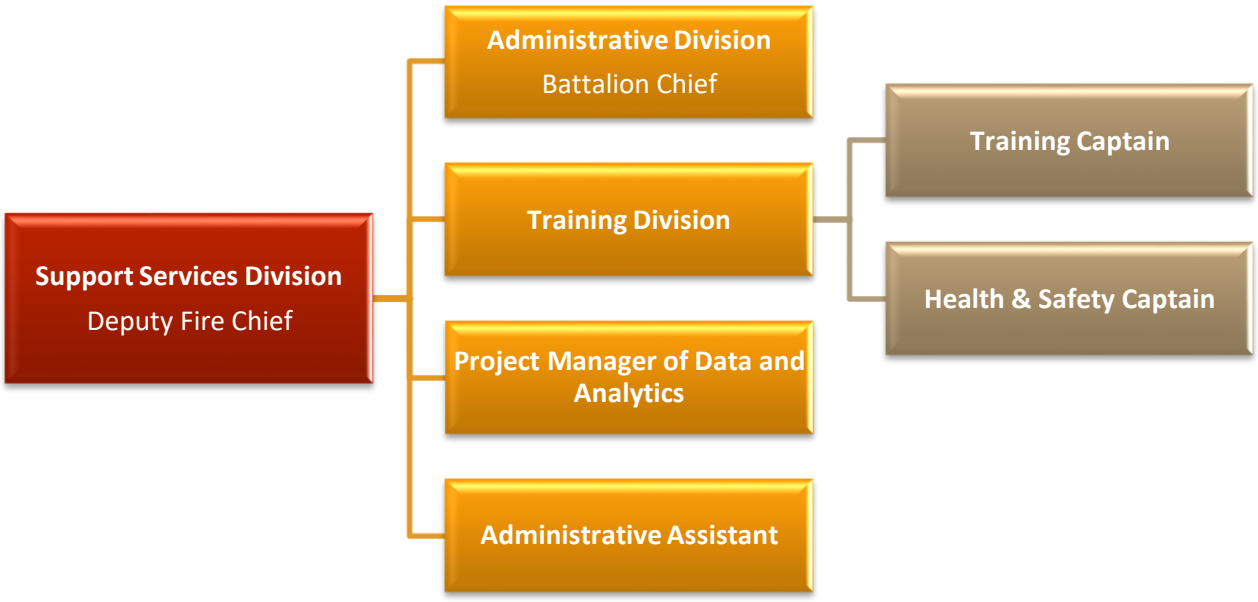


Figure 32: Support Services Org Chart

Appendix B

Apparatus Details[5]

Front Line

Unit Number	Pump	Tank	Ladder/Platform
2516-5045	1500 single-stage PTO pump	300 gallons	100’ Platform
2501-5048	1000 gpm 2-stage pump	300 gallons	
2502-5043	1500 gpm 2-stage pump	500 gallons	
2503-5044	1500 gpm 1-stage pump	500 gallons	
2504-5049	1000 gpm 2-stage pump	300 gallons	
2505-5052	1500 gpm 1-stage pump	500 gallons	
2506-5050	1500 single-stage pump	300 gallons	75’ Stick
2607-5051	1500 single-stage pump	300 gallons	75’ Stick

Table 33: Front Line Apparatus Detail

Wildland

Unit Number	Pump	Tank	Ladder/Platform
2538-5042	500 single-stage pump	500 gallons (470 water/30 foam)	
2539-5047	500 single-stage pump	500 gallons (470 water/30 foam)	

Table 34: Wildland Apparatus Detail

Reserve

Unit Number	Pump	Tank	Ladder/Platform
2515-5038	1500 single-stage pump	500	75’ Stick
2514-5039	1500 single-stage pump	650 gallons + husky 12gpm foam system	
2513-5040	1500 single-stage PTO pump	620 gallons	

Table 35: Reserve Apparatus Detail

[5] If pump does not say PTO driven, then it is a traditional split shaft driven pump.

Appendix C

Wildland Urban Interface

The WUI is located within or next to an "at-risk community," as defined in the recommendations to the Secretary of Agriculture in a Community Wildfire Protection Plan. An "at-risk community" is within the wildland-urban interface listed in the Federal Register notice titled "Wildland Urban Interface Communities within the Vicinity of Federal Lands that are at High Risk from Wildfire." These communities are areas where conditions are conducive to a large-scale wildfire event, posing a significant threat to human life or property. Below is a map illustrating the Wildland Urban Interface (WUI).

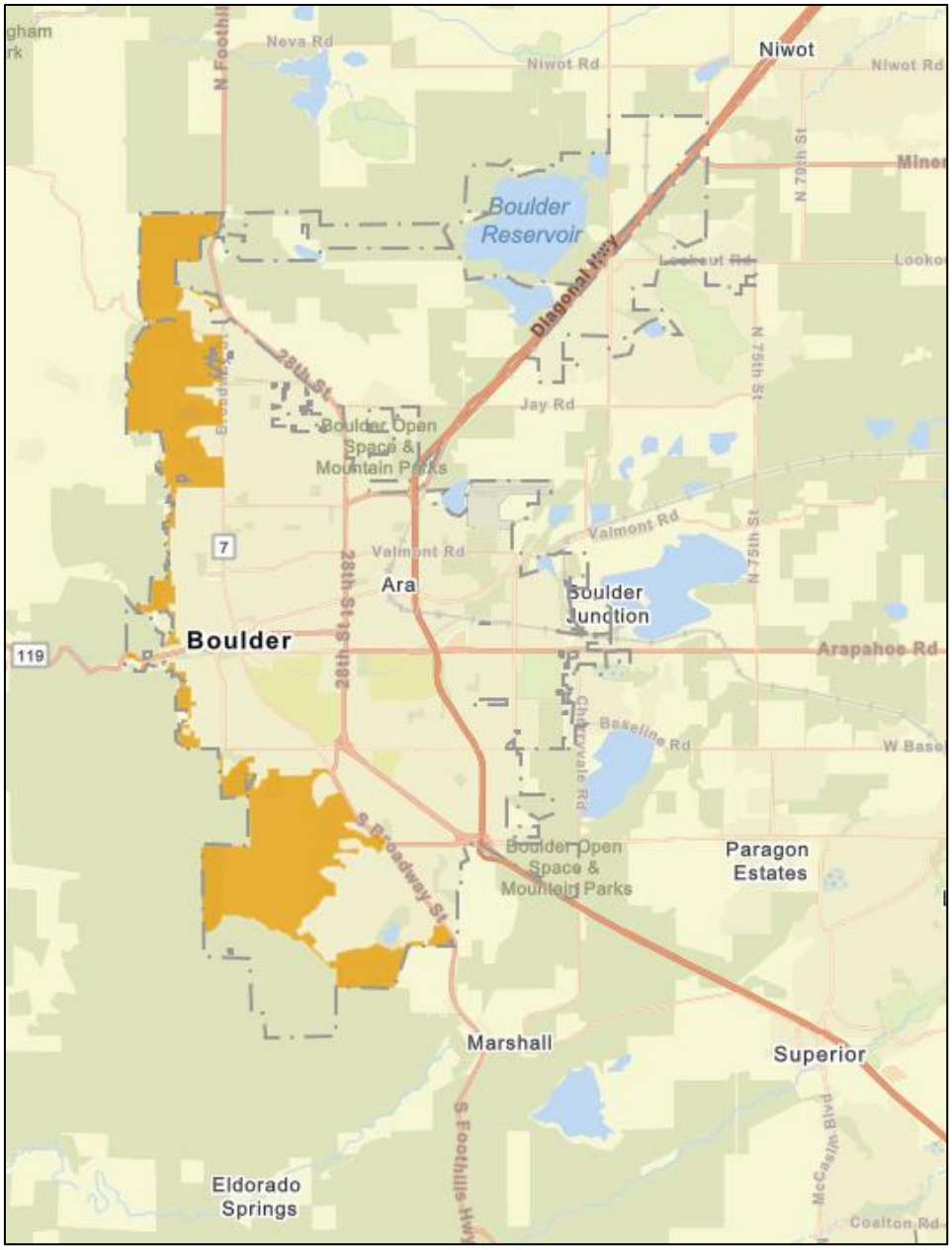


Figure 34: Wildland Urban Interface Map

Appendix D

CAD/Firehouse Database Schema

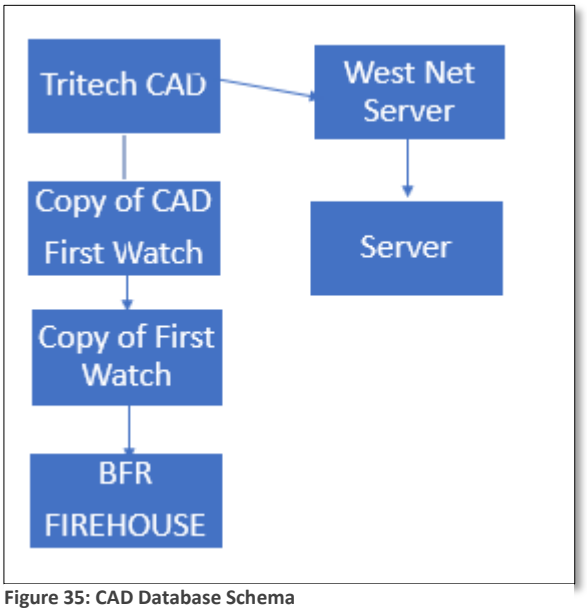


Figure 35: CAD Database Schema

Appendix E

Risk by Planning Zone

Zone A

The area is closest to Station 6. The rest of the zone is Open Space (1,2) and residential/Light Commercial (5).

Zone	Address	Special	High	Moderate
A1	6055 Reservoir RD - BCRFTC			X
A2	5605 63rd - Boulder Reservoir Water Treatment Plant			X
A3	6555 Monarch Rd – Lexmark International	X		
A3	6300 Diagonal Hwy - IBM		X	
A4	5145 N 63rd - BFR Sta. 6			X
	5920 Longbow Dr. – Medtronic			X
	4910 Nautilus Ct. – Avery Brewing Co.		X	
	4820 Nautilus Ct. - Boulder Country Day School		X	
	4600 Sleepytime Dr. – Celestial Seasonings	X		
	6265 Gunbarrel Ave. – BI Incorporated		X	
A5	7070 Winchester Cir – Micro Motion			X
	6400 Spine Rd. – Lockheed Martin			X
	5075 Chaparral Ct. – Boulder Preparatory High School			X
	6400 Lookout Rd – Electra		X	
	5405 Spine Rd – Watershed School			X
	6230 Lookout Rd – Boulder Rural Fire Protection			X
	Residential – one- and two-family dwellings		X	
	Multifamily residential		X	

Table 36: Zone A Risk

Zone B

The area is closest to Station 5.

Zone	Address	Special	High	Moderate
B1	One-and-two-family dwellings, Multifamily Residential		X	
	Open Space WUI	X		
	Commercial industry – Light/Medium		X	
	Shinning Mountain Waldorf School			X
B2	Open Space			X
B3	4365 19th – BFR Sta. 5			X
	4500 19th – Boulder Meadows Mobile Home Park		X	
	Uptown Broadway – commercial/Residential mix		X	
	Topaz Dr/Emerald Rd/Agate Rd – county pocket – lack of adequate water source		X	
	1897 Sumac – Crestview Elementary (not sprinkled)		X	
	Lucky's Market			X
	2100 Norwood – Centennial Middle School (not sprinkled)		X	
	3955 28th – Sunrise Assistant living		X	
	3845 Northbrook – high-density housing		X	
	2700 Winding Trail - residential high-density & access		X	
	Robin Hood Area – residential. High-density & access issues.		X	
	Willow Springs Shopping Center			X
	19th & Joslyn- residential – Density & access issues.		X	
	3690 Broadway – residential Melody Hts / access		X	
	Rest of Planning Zone - residential		X	
B4	2800 Palo Parkway – Manor Care Senior Care		X	
	2800 Kalmia – The Boulders – Residential high-density & access issue		X	
	Four Mile Creek – residential access, narrow streets, and blockage		X	
	Rest of Planning Zone – Residential		X	
	Pleasant View Fields - access			X

Table 37: Zone B Risk

Zone C

The area closest to Station 1 and part of Station 3, the rest of the zone, contains Residential—1, 2, 4, and 5.

Zone	Address	Special	High	Moderate
C1	1100 Alpine/1100 Balsam – Old Boulder Community Hospital (under development)			X
	Open Space WUI	X		
	Balsam/Maxwell/Broadway/9th Residential access & density		X	
	The Academy at Mapleton Hill		X	
	Knollwood Residential Neighborhood		X	
C2	2121 Mesa – Mesa Vista long-term care facility		X	
	2441 13th – BFR Sta. 1			X
	3130 Repplier – Columbine Elementary			X
	19th & Alpine – residential access		X	
	1225 Alpine - commercial			X
	2600 Broadway - commercial			X
	2401 13th – Casey Middle School			X
	Mt. Zion Lutheran Church and Preschool		X	
	2750 Boulder Medical Center			X
	Rest of the Planning Zone – Residential		X	
C3	Commercial – Retail/general business		X	
	Mapleton Mobile Home Park		X	
	Residential-Single Family and Multifamily		X	
C4	Pearl Street Retail area	X		
	St. Julian Hotel			X
	Grace Commons Church		X	
	Commercial – Retail/general business		X	
	Residential-Single Family and Multifamily		X	
	Open Space WUI	X		
C5	1777 6th – Boulder County Justice Center		X	
	1777 Broadway – City Government		X	
	Arapahoe 9th -6th – residential - access		X	
	The “Hill” Retail/Commercial/Residential area		X	
	1150 7th – Flatirons Elementary School			X
	New Vista High School			X
	1050 Arapahoe – Presbyterian Manor - Senior High Rise	X		
	970 Aurora – Academy Senior Living			X
	Open Space WUI	X		
	2225 Baseline – BFR Sta. 2			X
C6	1604 Arapahoe – Boulder High School		X	
	Residential - Light Commercial		X	
C7	University of Colorado Boulder Campus		X	
C8	1585 30th – BFR Sta. 3			X
	29th Street Retail area			X
	1055 Adams Cir. – Golden West Senior Residence/ High Rise	X		
	Commercial / Mixed Residential		X	

Table 38: Zone C Risk

Zone D

Closest to Station 7 and part of Station 3. The remaining zone is Residential/industrial 1, Commercial High-Density Residential 2. Medium Industrial Commercial 3, Light Industrial 4, and Single-Family Multi-Family Housing 5-7.

Zone	Address	Special	High	Moderate
D1	County Communications & Jail		X	
	Noble Park Mobile Home Park		X	
	Open Space WUI	X		
D2	3350 30th - Brookdale - Senior Living		X	
	3375 34th - Brookdale - Senior Care		X	
	Center Green Dr. Business Park		X	
	Residence Inn by Marriott		X	
	Hyatt Place Hotel			X
	Orchard Grove Mobile Home Park		X	
	Multifamily Residential (non-sprinklered): Talisman Pl., Oneil Cr, Corona Trail, 34th St.		X	
	San Juan Del Centro		X	
	Multifamily Residential (Sprinklered) – Steel Yards, Junction Place			
	Retail/commercial business			X
	Pfizer Pharmaceutical – Walnut and 33rd St.		X	
	1805 33rd St – Police HQ/dispatch		X	
	3300 Fisher Dr – RTD Maintenance			X
D3	4747 Arapahoe – Boulder Community Hospital		X	
	Open Space WUI	X		
	Ball Aerospace	X		
	Pfizer Pharmaceutical – Sterling Dr.	X		
	2075 55th – Corden Pharma Chemical	X		
	Boulder Humane Society			X
	Western Ave – Light Industrial		X	
	Vapor Distillery		X	
	2510 and 2500 47th St. – Light Industrial		X	
	City of Boulder Fleet Services		X	
	2995 55th St. - USPS		X	
D4	5815 Arapahoe - Mixed-use commercial industrial		X	
	County Sheriffs HQ			X
	1901 63rd – Boulder County Recycling Center			X
	1901 63rd – Household Hazardous Waste Drop off		X	
	Western Disposal Facilities		X	
D5	30th/Foothills/Arap/Colorado – CU east campus: student housing, Light Industrial,BioPharma		X	
	3995 Aurora - Boulder Community School of Integrated Studies - Elementary School			X
	4685 Baseline – Boulder Manor Senior			X
D6	Arapahoe Corridor - Commercial		X	
	1220 Eisenhower – Eisenhower Elementary School			X
	Friends School – Pre- Elementary and Middle			X
	Multifamily and SFD residential		X	
D7	1380 55th – BFR Sta. 7			X
	Boulder Jewish Community Center			X
	Congregation Bonai Shalom		X	
	Multifamily and SFD Residential		X	

Table 39: Zone D Risk

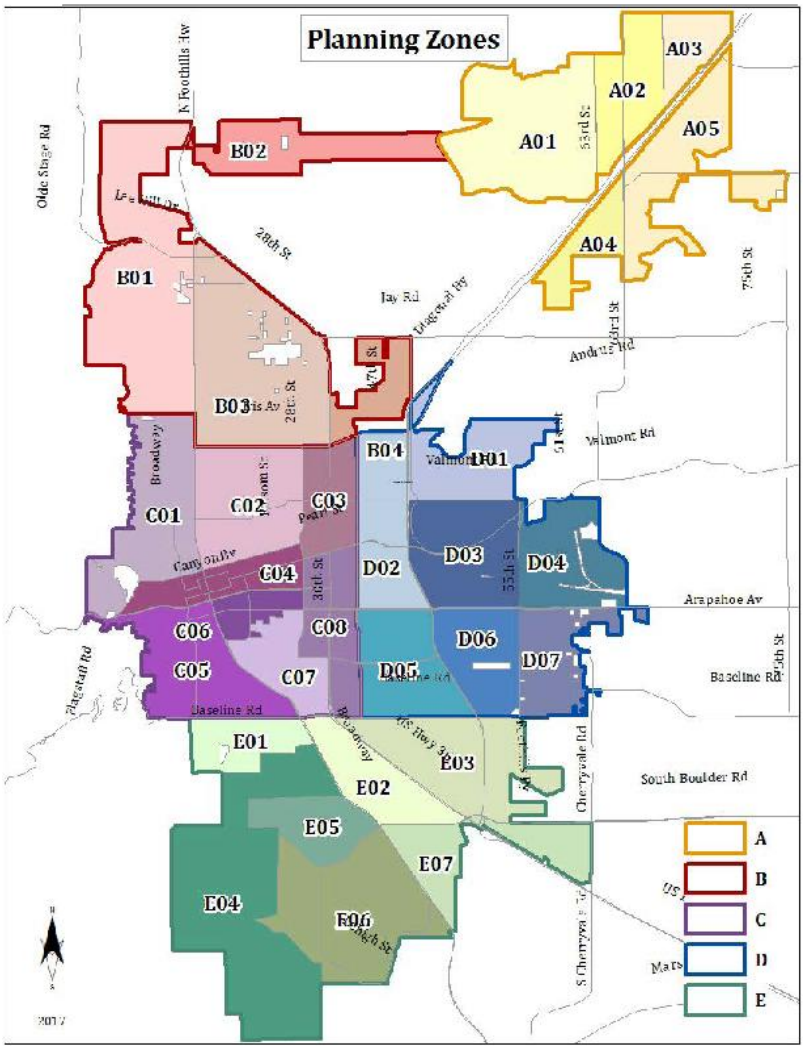
Zone E

Closest to Sta 2 and Sta 4. The remainder of the planning zone contains Single-family residential 1,2, 3, 5, 6, 7.

Zone	Address	Special	High	Moderate
E1	Chautauqua	X		
	SFD residential		X	
E2	505 27th Way - Multi-Family (non-sprinklered)		X	
	2700 Moorhead - Residential with access issues		X	
	SFD and Multifamily Residential		X	
	Commercial Retail/business		X	
	3100 Bucknell – Halcyon School (Special Education)			X
	3740 Martin Dr – Creekside Elementary School			X
E3	3300 Baseline - Williams Village high Rise Student Housing		X	
	3275 Apache – Bear Creek Apartments - High-density student housing			X
	4475 Laguna Apartments - access		X	
	4800 Baseline – Meadows Shopping Center			X
	350 Ponca/4950 Thunderbird Frasier Meadows Senior Living		X	
	4545 Sioux – Horizons K-8 School			X
	Manhattan to Tenino High-density Residential poor access		X	
	290 Manhattan – Manhattan School of Arts			X
	Congregation Har Hashem		X	
	St. Andrews Presbyterian Church		X	
	South Boulder Circle High-density Residential poor access		X	
	SFD and Multifamily Residential		X	
E4	NCAR		X	
	NIST	X		
	NOAA		X	
	Open Space WUI	X		
E5	Open Space WUI	X		
	SFD and Multifamily Residential		X	
E6	801 Gillaspie – Brookdale Meridian – Senior Living		X	
	2500 Table Mesa – Bear Creek Elementary School			X
	1575 Lehigh – Mesa Elementary School			X
	1500 Knox – Southern Hills Middle School			X
	1515 Greenbriar – Fairview High School		X	
	Mt. Hope Lutheran Church		X	
	805 Gillespie - Community Montessori School (not sprinklered)		X	
	St. Martin de Porres Catholic Church		X	
	SFD and Multifamily Residential		X	
	Open Space WUI – with limited access/narrow streets	X		
E7	1200 Broadway – Century Link switch gear building		X	
	Cornerstone Church		X	
	Morning Star Senior Living and Memory Care		X	
	Bixby School		X	
	4655 Hanover – Summit Middle School			X
	Tantra Park – multi-family housing with limited access		X	
	Walden Cir – multi-family with limited access		X	
	SFD and Multifamily Residential		X	
	Table Mesa Commercial area			X
	Open Space WUI	X		

Table 40: Zone E Risk

Appendix F


Planning Zones
A01
A02
A03
A04
A05
B01
B02
B03
B04
C01
C02
C03
C04
C05
C06
C07
C08
D01
D02
D03
D04
D05
D06
D07
E01
E02
E03
E04
E05
E06
E07
A
B
C
D
E
Broadway
Baseline Rd
Arapahoe Av
South Boulder Rd
Valmont Rd
28th St
30th St
55th St
75th St
Foothills Hwy
Olde Stage Rd
Cherryvale Rd

Appendix G

SWOT Results

Internal Stakeholder Results

Opportunities	Threat
• CRR/Public Education /Community Risk Understanding - Employees and Community • Partnerships: Community, City Depts, Volunteers, etc. • Finance: Alternative funding (grants, health service org, etc.) • Fire Hazard Mitigation/Assessment • Increase Fire presence at EOC • More Community Exposure to Fire Dept/Firefighters (events, athletics, coaches) • Reduce emissions (GHG)	• Increase in Risk (events, aging pop, climate change) • General Fund (economic downturn, not able to create income) • Cyber Threats (hacking, fake threats, biotech) • Communications: Local/Regional issues • Emergency Shelter Information (people don't know where to go, power issues) • Increased Population (traffic, emergencies) • Staffing (too much overtime/lack of staffing at community events)

Table 41: Internal SWOT Results

External Stakeholder Results

Strengths	Opportunities
• Strong leadership/relationships with external partners • Crews are friendly, professional, and experienced. • Great prevention division • Coordination with BFR is easy	• Public Education (community, kids, fall prevention, non-English speaking) • Pre-Planning (CU, Faith-Based) • Employee Benefits: Retention (Daycare etc.) • Decentralize Decision Making (unified command)
Weakness	**Threats**
• Battalion Chiefs (communication, external relationships) • Pre-Planning (CU, Faith-Based) • Public Education: Fire Drills • Culture	• Lack of Public Education • Chemicals on campus (inadequate inventory, lead paint, asbestos, research facilities) • Safety at Faith-Based Facilities

Table 42: External SWOT Results

Public Safety Round Table - Start/Stop/Continue

- Consider the Public Safety Model (evaluate opportunity and consequence)
- Consider Consolidation
- Make a concerted effort to increase moral communication and coordination.
- Leadership Development
- Continued Development of the EMS process (define it)
- BFR is not in the news a lot; this does not define success (positive press)

Department SWOT Analysis

Boulder Fire-Rescue Employees Survey, November 2018 || 4 Questions / 39 Responses (124 Personnel)

Q1: PLEASE LIST UP TO 3 STRENGTHS OF BOULDER FIRE RESCUE. (109/117)

Apparatus/Equipment/PPE	18
Dedicated Personnel (teamwork)	10
Depth of professional knowledge	6
Adaptability	5
24/7 coverage	4

Table 43: BFR SWOT Question 1 Responses

Q2: PLEASE LIST UP TO 3 WEAKNESSES OF BOULDER FIRE-RESCUE. (116/117)

Insufficient Funding	19
Outdated/Insufficient facilities (stations/storage)	11
Communication Gap between Line & Mgt	7
No guidance (clear direction)	6
Training (money, division, needs)	6

Table 44: BFR SWOT Question 2 Responses

Q3: WHAT 3 WORDS WOULD YOU USE TO DESCRIBE THE CULTURE AT BOULDER FIRE RESCUE? (112/117)

Old school	9
Improving (evolving)	8
Frustrated/Irritated/Low Moral	8
Desire to Grow/Ready for Change	7
Entitled (Elitist)	7

Table 45: BFR SWOT Question 3 Responses

Q4: WHAT ONE THING SHOULD BFR START/STOP/CONTINUE? (39/39)

BFR should start a 24/7 safety officer coverage	2
Hold people accountable/to a higher standard	3
Start ALS	4
Start communicating the specific direction and goals of the department	3
Start improving fire stations/Infrastructure	2

Table 46: BFR SWOT Question 4 Responses