



WESTMINSTER  
COLORADO

# City of Westminster Hazard Mitigation Plan

June 2018



wood.

# City of Westminster Hazard Mitigation Plan

June 2018

wood.

Cover Photo Credits:

Westminster, CO, EZ Messenger, <https://www.ezmessenger.com/westminster-co/>, May 17, 2018

City of Westminster, <https://www.cityofwestminster.us>, May 17, 2018

TripAdvisor, Westminster 2018:Best of Westminster, CO Tourism, [https://www.tripadvisor.com/Tourism-g33691-Westminster\\_Colorado-Vacations.html](https://www.tripadvisor.com/Tourism-g33691-Westminster_Colorado-Vacations.html), May 17, 2018

Westminster Castle - Westminster, Colorado - Photos Then and Now, Waymarking.com, [http://www.waymarking.com/waymarks/WM7W55\\_Westminster\\_Castle\\_Westminster\\_Colorado](http://www.waymarking.com/waymarks/WM7W55_Westminster_Castle_Westminster_Colorado), May 17, 2018

Westminster Vacations, Activities & Things To Do, Colorado.com, <https://www.colorado.com/cities-and-towns/westminster>, May 17, 2018

# TABLE OF CONTENTS

1 INTRODUCTION.....	1-1
1.1 Purpose.....	1-1
1.2 Background and Scope.....	1-1
1.3 Plan Organization.....	1-2
2 COMMUNITY PROFILE.....	2-1
2.1 Geography.....	2-1
2.2 Climate and Weather .....	2-2
2.2.1 Monthly Weather Summaries .....	2-3
2.3 History .....	2-4
2.4 Government.....	2-5
2.5 Economy .....	2-5
2.5.1 Commercial Summary .....	2-5
2.5.2 Fiscal Outlook.....	2-9
2.5.3 Future Development .....	2-10
2.6 Assessing Capabilities .....	2-12
2.6.1 Hazard Related Programs, Policies, Regulations and Codes .....	2-14
2.6.2 Hazard Management Capabilities of Other State and Regional Agencies.....	2-18
3 PLANNING PROCESS .....	3-1
3.1 Background on Mitigation Planning in the city of Westminster .....	3-1
3.2 Plan Selection Review and analysis – 2018 Update.....	3-1
3.3 Local Government Participation .....	3-2
3.4 The 10-Step Planning Process .....	3-3
3.4.1 Phase 1: Organize Resources.....	3-5
3.4.2 Phase 2: Assess Risks .....	3-17
3.4.3 Phase 3: Develop the Mitigation Plan.....	3-17
3.4.4 Phase 4: Implement the Plan and Monitor Progress.....	3-18
4 RISK ASSESSMENT .....	4-1
4.1 Community Description .....	4-1
4.1.1 Population and Demographics .....	4-1
4.1.2 High Vulnerability Populations.....	4-2
4.1.3 Open Space.....	4-3
4.1.4 Historic Sites.....	4-4
4.1.5 City Critical Infrastructure .....	4-5
4.2 Identifying Hazards .....	4-23
4.2.1 Natural Hazards Introduction.....	4-23
4.3 Natural Hazards Profile and Vulnerability .....	4-27
4.3.1 Climate Change.....	4-27
4.3.2 Drought and Water Security .....	4-33
4.3.3 Earthquake .....	4-39
4.3.4 Epidemic/Pandemic.....	4-45
4.3.5 Erosion, Deposition and Turbidity.....	4-49
4.3.6 Expansive Soil .....	4-49
4.3.7 Extreme Cold.....	4-50
4.3.8 Extreme Heat.....	4-52
4.3.9 Flooding.....	4-54
4.3.10 Dam Failure .....	4-65
4.3.11 Hail.....	4-77

4.3.12	Invasive and Noxious Species.....	4-79
4.3.13	Lightning .....	4-83
4.3.14	Severe Summer Storm .....	4-86
4.3.15	Severe Winter Storms/Blizzards.....	4-89
4.3.16	Solar/Geomagnetic Storm .....	4-89
4.3.17	Tornado .....	4-92
4.3.18	Open Space Fire (Wildfire) .....	4-96
4.3.19	Windstorm.....	4-97
4.4	Conclusion on Natural Hazards .....	4-100
5	MITIGATION STRATEGY.....	5-1
5.1	Mitigation Strategy: Overview .....	5-1
5.2	Goals and Objectives .....	5-1
5.3	Identification and Analysis of Mitigation Actions .....	5-2
5.3.1	Prioritization Process .....	5-3
5.4	Mitigation Action Plan.....	5-4
5.4.1	Progress on Previous Mitigation Actions .....	5-4
5.4.2	Completed Mitigation Actions Not Identified In 2010.....	5-5
5.4.3	Continued Compliance with NFIP .....	5-5
5.4.4	Updated Mitigation Action Plan .....	5-5
6	PLAN ADOPTION.....	6-1
7	PLAN IMPLEMENTATION AND MAINTENANCE.....	7-1
7.1	Implementation.....	7-1
7.1.1	Role of Hazard Mitigation Planning Committee in Implementation and Maintenance .....	7-2
7.2	Maintenance.....	7-2
7.2.1	Maintenance Method and Monitoring Schedule .....	7-2
7.2.2	Maintenance Evaluation Process .....	7-3
7.2.3	Incorporation into Existing Planning Mechanism.....	7-3
7.2.4	Continue Public Involvement.....	7-4

## Appendices

Appendix A: References

Appendix B: Planning Process Documentation

Appendix C: Adoption Resolution

Appendix D: Mitigation Categories, Alternatives, and Selection Criteria

# 1 INTRODUCTION

## 1.1 PURPOSE

The City of Westminster Colorado has prepared this multi hazard mitigation plan to guide hazard mitigation planning to better protect the people and property of the City of Westminster from the effects of hazard events. The plan was originally prepared in 2009-2010 and was updated in 2017-2018. It demonstrates the city's commitment to reducing risks from hazards and serves as a tool to help decision makers direct mitigation activities and resources. Other purposes include making the City of Westminster eligible for federal disaster assistance, specifically, the Federal Emergency Management Agency's (FEMA) Hazard Mitigation Assistance (HMA) grant programs including the Hazard Mitigation Grant Program (HMGP), Flood Mitigation Assistance (FMA), and the Pre-Disaster Mitigation (PDM) program, as well as earning points for the National Flood Insurance Program's (NFIP) Community Rating System (CRS) to lower flood insurance premium communitywide.

## 1.2 BACKGROUND AND SCOPE

Each year in the United States, natural disasters take the lives of hundreds of people and injure thousands more. Nationwide, taxpayers pay billions of dollars annually to help communities, organizations, businesses, and individuals recover from disasters. These monies only partially reflect the true cost of disasters because additional expenses to insurance companies and nongovernmental organizations are not reimbursed by tax dollars. Many natural hazards are predictable, and much of the damage caused by these events can be alleviated or even eliminated.

Hazard mitigation is defined by FEMA as "any sustained action taken to reduce or eliminate long-term risk to human life and property from a hazard event." The results of a three-year, congressionally mandated independent study to assess future savings from mitigation activities provides evidence that mitigation activities are highly cost-effective. On average, each dollar spent on mitigation saves society an average of \$4 in avoided future losses in addition to saving lives and preventing injuries (National Institute of Building Science Multi-Hazard Mitigation Council 2005). An update to this report in 2017 (Natural Hazard Mitigation Saves: 2017 Interim Report) indicates that mitigation grants funded through select federal government agencies, on average, can save the nation \$6 in future disaster costs for every \$1 spent on hazard mitigation.

Hazard mitigation planning is the process through which natural hazards that threaten communities are identified, likely impacts of those hazards are determined, mitigation goals are set and appropriate strategies to lessen impacts are determined, prioritized and implemented. This plan documents the City of Westminster's natural hazards mitigation planning process, identifies relevant natural hazards and risks, and identifies the strategies the city will use to decrease its vulnerability and increase its resiliency and sustainability.

The City of Westminster's Natural Hazards Mitigation Plan is a single-jurisdiction plan that covers the incorporated community of the City of Westminster. It documents the city's natural hazards mitigation planning process, identifies natural hazards and associated risks to the city, and develops a hazard mitigation strategy to lessen vulnerability and improve resiliency to natural disasters, thereby enhancing the city's long-term sustainability.

The city prepared this hazard mitigation plan update pursuant to the requirements of the Disaster Mitigation Act of 2000 (Public Law 106-390) and the implementing regulations set forth by the Interim Final Rule published in the Federal Register on February 26, 2002 (44 CFR §201.6), finalized October 31, 2007 and updated in 2012. Hereafter, these requirements and regulations will be referred to collectively as the DMA. While the act emphasized the need for mitigation plans and more coordinated mitigation planning and implementation efforts, the regulations established the requirements that local hazard mitigation plans must meet for a local jurisdiction to be eligible for certain federal disaster assistance and hazard mitigation funding is under the Robert T. Stafford Disaster Relief and Emergency Act (Public Law 93-288). Due to the City of Westminster being subject to many kinds of natural hazards, access to these programs is vital.

This plan addresses natural hazards only. Although the Hazard Mitigation Planning Committee (HMPC) recognizes that FEMA encourages communities to address manmade and technological hazards as well as natural hazards, the scope of this effort was limited to natural hazards for two reasons: 1) many of the planning activities for manmade and technological hazards are either underway or complete and were developed by a different set of organizations and 2) the DMA requires extensive public information and input, which is in direct conflict with the confidentiality necessary in planning for the fight against chemical, biological and radiological terrorism. The HMPC determined it was not in the community's best interest to publicly share specific information about the area's vulnerability to manmade hazards. Information in this plan will be used to help guide and coordinate mitigation activities and decisions for local land use policy in the future. Proactive mitigation planning will help reduce the cost of disaster response and recovery to the city and its property owners by protecting critical community facilities, reducing liability exposure, and minimizing overall community impacts and disruption. Westminster has been affected by natural hazards in the past and is thus committed to reducing disaster impacts and maintaining eligibility for federal funding.

### 1.3 PLAN ORGANIZATION

The City of Westminster's Multi Hazard Mitigation Plan is organized as follows:

- Chapter 1: Introduction
- Chapter 2: Community Profile
- Chapter 3: Planning Process
- Chapter 4: Risk Assessment
- Chapter 5: Mitigation Strategy
- Chapter 6: Plan Adoption
- Chapter 7: Plan Implementation and Maintenance
- Appendix A: References
- Appendix B: Planning Process Documentation
- Appendix C: Adoption Resolution
- Appendix D: Mitigation Categories, Alternatives, and Selection Criteria

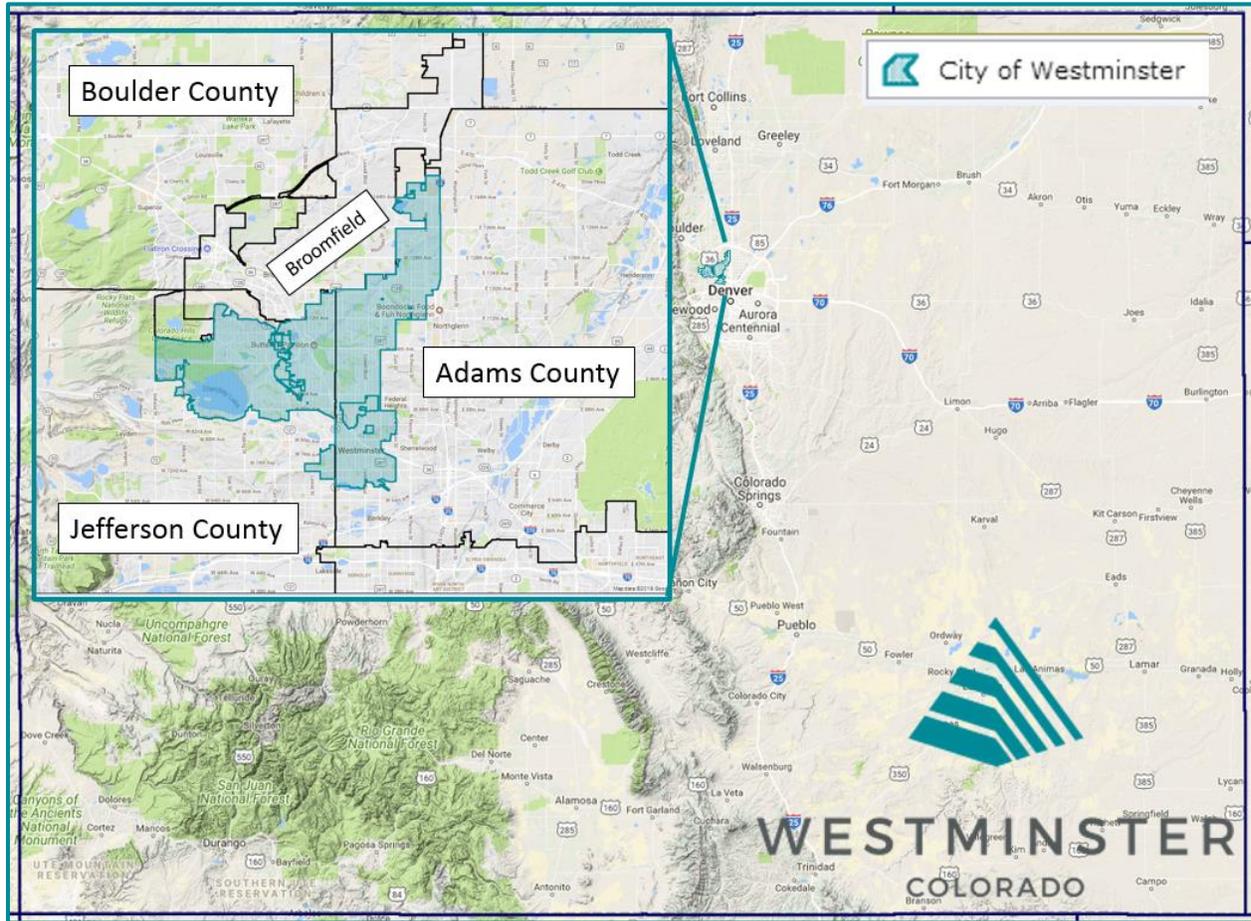
## 2 COMMUNITY PROFILE

The City of Westminster is located approximately midway between Denver and Boulder and overlaps portions of Jefferson and Adams counties. Westminster is an award-winning community with an international reputation for livability, excellent recreation facilities, leadership in technology and sound fiscal management, and has even been recognized for its promotion of solar energy and level of digital savvy (Explore Westminster-About the City n.d.). Westminster is a full-service city providing police, fire and emergency medical services, water and wastewater treatment, street construction and maintenance, parks, recreation, library services and various other services. Due to its location and the large variety of amenities it offers, Westminster has grown very quickly. The city has reached capacity with its annexation program and has entered a new era of sustainability and infill development to support new growth. It is a home-rule municipality with a council-manager form of government. The elected City Council, which consists of the Mayor, the Deputy Mayor, and five council members, sets policies for the operation of the city government and appoints the City Manager, who is tasked with the day-to-day administrative responsibilities of the city.

### 2.1 GEOGRAPHY:

The City of Westminster is located 5,384 feet above sea level and lies in the northwest quadrant of the Denver metropolitan area, between Boulder and Denver. It is bisected by the Denver/Boulder Turnpike (U.S. 36) and is adjacent to I-25. Westminster is 35.51 square miles and is on the edge of the high plains with gently rolling topography. Most development in the city consists of infill as approximately 95 percent of the city is built out. The primary land use is residential, followed by business and commercial land uses including 26 business parks, 68 retail centers and some light manufacturing. Westminster incorporates 3,090 acres of open space and 150 miles of trails. The city's largest body of water, approximately 1,200 acres, is Standley Lake. The city is also bisected by Big Dry Creek in the north and Little Dry Creek in the south.

**Figure 2.1 City of Westminster Boundaries and Planning Area**



Source: City of Westminster

## 2.2 CLIMATE AND WEATHER

Westminster is at the western edge of the Eastern Plains of Colorado. The climate of the plains is comparatively uniform from place to place, with characteristic features of low relative humidity, abundant sunshine, infrequent rains and snow, moderate to high wind movement and a large daily and seasonal range in temperature. Summer daily maximum temperatures are often 95°F or above. Due to the very low relative humidity accompanying these high temperatures, hot days cause less discomfort than in more humid areas. The usual winter extremes range from zero to -15°F, but have reached extraordinarily low readings of -30 to -40°F during some of the most extreme cold waves. The record temperatures for Westminster are -29 and 105°F.

A large proportion of precipitation (70 to 80 percent of the annual total) falls during the growing season from April through September. Midwinter precipitation is light and infrequent. More often, winter brings dry air and strong winds contributing to the aridity of the area. From early March through early June, periodic widespread storms bring soaking beneficial moisture. Summer precipitation comes largely from thunderstorm activity and is sometimes extremely heavy. Localized rains in excess of four-inches sometimes fall in just a few hours contributing to local flooding. Many years are drier than average and some years receive only half or less of the long-term average. Multi-year drought is common to the area such as the decade-long drought of the 1930s, the severe drought of the mid 1950s and 1970s and the recent intense widespread drought of the early 2000s.

Westminster's location near the foothills and mountains affects the average wind speeds. This affect is less than on the plains, but areas closer to the mountains are subject to periodic, severely turbulent winds from the effects of high westerly winds over the mountain barrier. These winds are sometimes referred to as "chinook winds" when they warm, and "bora winds" when they are associated with a strong cold frontal passage and downslope off of the mountains. Precipitation, which decreases gradually from the eastern border to a minimum near the mountains, increases rapidly with the increasing elevation of the foothills and proximity to higher ranges. The decrease in temperature from the eastern boundary westward to the foothills is less than might be expected with increasing altitude. This results from mountain and valley winds and greater frequency of the chinook. (Westminster, Colorado Average Snowfall 2016)

## 2.2.1 MONTHLY WEATHER SUMMARIES

Westminster enjoys generally moderate and pleasant weather. However, in the late spring and early fall, the weather can be highly variable and rapidly changing. Although prolonged heat events can occur during the summers, low humidity helps mitigate the effects. The altitude, low humidity and high UV index increase the risk of dehydration, sunburn and sun stroke. Severe weather events are being tracked and reported with greater warning and accuracy which helps provide ample opportunity to seek shelter if necessary.

The following monthly summaries are based on a general review of historic weather events for each month. They do not reflect non-event days that produced no remarkable weather.

### *January*

Rapid temperature shifts of 30 degrees in two hours are common as well as high winds (50-100mph) that have been known to overturn trucks, mobile homes, etc. The temperature may stay below zero for days to over a week. Heavy snows (8-16 inches) are common and the longest period of continuous snow for the metro area occurred in January 1948 (92 hours).

### *February*

The temperature may stay below zero for several days at a time to over a week. High winds (50-100mph) may occur and snows are between 4-12 inches are common. The longest period of snow cover with one inch or more of snow on the ground is 63 days in 1983-84.

### *March*

March weather varies greatly. High winds commonly (50-100mph) have been known to cut powerlines and cause grass fires. Snow events of 4-12 inches are common with periodic blizzards of 2-4 feet. The longest snow-free period of 232 days began in March of 1887.

### *April*

Accumulations of up to 16 inches of snow and winds up to 40-50 mph make blizzards a common occurrence in April. Winds of 112 mph recorded 1999.

### *May*

High winds (70-85 mph), snow (up to 2.5 ft.), rain (up to 3.71 inches), hail (1.75 inches), lightning and tornados are common in May. Dry conditions can lead to wildfires.

### *June*

Light snow is possible in the 1<sup>st</sup> week of June. Heavy rain (1 inch per hour), high winds (63 mph), hail (golf ball size with up to a 6-inch accumulation) and lightning have occurred in June. Temperatures may drop

quickly due to fast moving storms. Temperatures can exceed 100 degrees. In 2012, Westminster experienced 5 consecutive days >100 F.

### *July*

Westminster experienced 27 days of >90 degrees in 2012. Severe thunderstorms, hail (1.5 inch), lightning, winds in >42 mph and flash flooding has occurred in July.

### *August*

August can be hot and dry with occasional severe thunderstorms (2.68 inches in an hour), wind (60-69 mph) and hail (1.75 inch). Dry thunderstorms which produce lightning and increase the fire hazard are also a possibility.

### *September*

September is characterized by variable weather with rapid drops in temperature, thunderstorms, winds (56 mph) and lightning. Cold fronts and snow (5-10 inches) can occur late in the month. In 2013, flash flooding caused a presidential state of emergency in Lyons, Boulder, Adams, Arapahoe, Broomfield, Clear Creek, Denver, Jefferson, Morgan, Logan, Washington, and Weld Counties.

### *October*

High winds ranging from 50-90 mph have been known to down powerlines. Thunderstorms producing lightning and hail may occur. Heavy rains range between 1-4 inches while snows can range 4-16 inches with rare blizzards of 2-4 feet of snow. Small tornados have occurred to the south and west of the metro area. In 1980, a rare tornado touched down in Boulder County causing minor damage.

### *November*

High wind ranging from 50-90 mph are not uncommon and winds of 100-120 mph winds have been recorded in November. Snows ranging from 4-12-inch are common while major snowstorms of 2-4 feet are possible. Fog can limit visibility to as low as 1/8 mile. Historically, the temperatures in Westminster during the month of November range in the 70's and below. However, starting in 2006, temperatures in the 80's have been recorded.

### *December*

Winds in the range of 50-100 mph have been noted in December. Snows generally result in 4-12 inches with heavy snow falls of several feet. Subzero temperatures can last several days to more than a week. (N. W. Service, NWS Boulder Denver Weather History 2016)

## **2.3 HISTORY:**

Prior to 1911, the area that was to become Westminster was inhabited by small herds of buffalo and antelope and was dotted with small marshy ponds. There is strong evidence that the Arapaho Indians maintained a semi-permanent encampment near Gregory Hill. The discovery of gold on Little Dry Creek in 1858 by Jim Baker, encouraged pioneers to settle in Colorado rather than continue to the promise of riches in California. The Homestead Act of 1862 also brought many people from the east to settle in the Colorado Territory.

The first permanent settler to build his home in Westminster was Pleasant DeSpain. In 1870, he built his home on 160 acres of farmland near what is now the intersection of 76th Avenue and Lowell Boulevard. He and his five sons cultivated and harvested grain and the fruit from their apple and cherry orchards.

The village of DeSpain Junction grew into a small farming community and continued to attract new settlers. The merchants that came to the small village reflected the needs of the farmers and ranchers of the area: blacksmith shop, lumber store, and general store. The railroad came to DeSpain Junction in 1881 and a train depot was built.

Many of the homesteaders found farming in Colorado's arid climate to be much more difficult than they had experienced in the Midwest and the East. For this reason, they sold their land to C.J. Harris, a real estate developer from Connecticut who arrived in DeSpain Junction in 1885. He subdivided the farms he bought into smaller tracts of land which he then sold to fruit farmers. By the 1920's, Westminster had become the center for some of the largest apple and cherry orchards in the country. In 1950, Shaffer Orchards, one of these orchards, was sold to make room for the Denver-Boulder Turnpike (US 36). Today, the highway is one of the busiest in the state, contributing to the growth of Westminster and other cities in the northwest quadrant of the Denver metropolitan area.

## 2.4 GOVERNMENT

The city charter, making Westminster a home rule jurisdiction in both Adams and Jefferson counties was adopted in January 1958. Home rule gave the Westminster City Council the authority to direct its destiny by allowing the issuance of bonds for the financing of utility improvements and by providing the financial control to provide needed capital infrastructure improvements. The city charter also called for a council/manager form of government, vesting the responsibility for managing the city's day-to-day operations in a professional City Manager. Another important provision of the charter called for the election of non-partisan City Council members at-large. This provision has provided Westminster with a City Council that is concerned with the overall welfare of the community, rather than with special interest segments. The city experienced significant growth and economic development from the 1970s through today.

The City Council is the legislative and governing body of the city. The council consists of the Mayor and six councilors. The council adopts laws, ordinances and resolutions that are within its authority. The Mayor is the executive head of the city with an equal vote on the City Council, but no veto power. The Mayor is the conservator of the peace and during emergencies, may exercise the powers to invoke martial law and command the assistance of all able-bodied citizens to aid in the enforcement of the city ordinances.

The City Manager is appointed by the City Council and is the chief administrator of city government. The City Manager is supported by two Deputy City Managers and is responsible for the operations of ten city departments (Community Development, Economic Development, Finance, Fire, General Services, Human Resources, Information Technology, Parks, Recreation and Libraries, Public Works and Utilities and Police). The city also has a Municipal Court with jurisdiction over cases arising from the provisions contained in the charter and ordinances of the city. The court is presided over by a judge who is appointed by the City Council. The city has about 1,500 employees (City of Westminster).

Public Safety is provided by a police force of 184 sworn and 79.6 non-sworn officers. The Westminster Fire Department is staffed with 117 line fire fighters, 12 administrative and 7 non-sworn staff located throughout the city at six fire stations.

## 2.5 ECONOMY:

### 2.5.1 COMMERCIAL SUMMARY

Westminster has experienced dramatic economic development and general growth since the 1970s. The original downtown with retail and some industrial activity is in the south part of the city (along 72nd avenue). As the city developed, four additional economic centers were created to ensure the city's continued economic vitality. The city is currently implementing its plan to create a new mixed-use city center on the 109-acre lot that was previously the location of a mall. This new city center will be located in the area of 88th-92nd Avenues just east of US 36. Transportation Oriented Development (TOD) is also

taking a greater role in the development plans of the city. The first mass transit rail station linking Westminster to the Denver metro system was opened in 2016 and future stations are planned along the U.S. 36 corridor. Of the estimated 4,000 businesses in the city, 1,730 businesses are registered with the City Clerk. Of the 1,730 registered businesses, 1,610 are small businesses (< 50 employees). Westminster Public Schools and Front Range Community College are our largest employers with each employing over 1,000 employees. (Westminster, Economic Activity Quarterly Reports produced by the City Clerk and GIS 2016) The Butterfly Pavilion and Insect Center is also a popular local attraction.

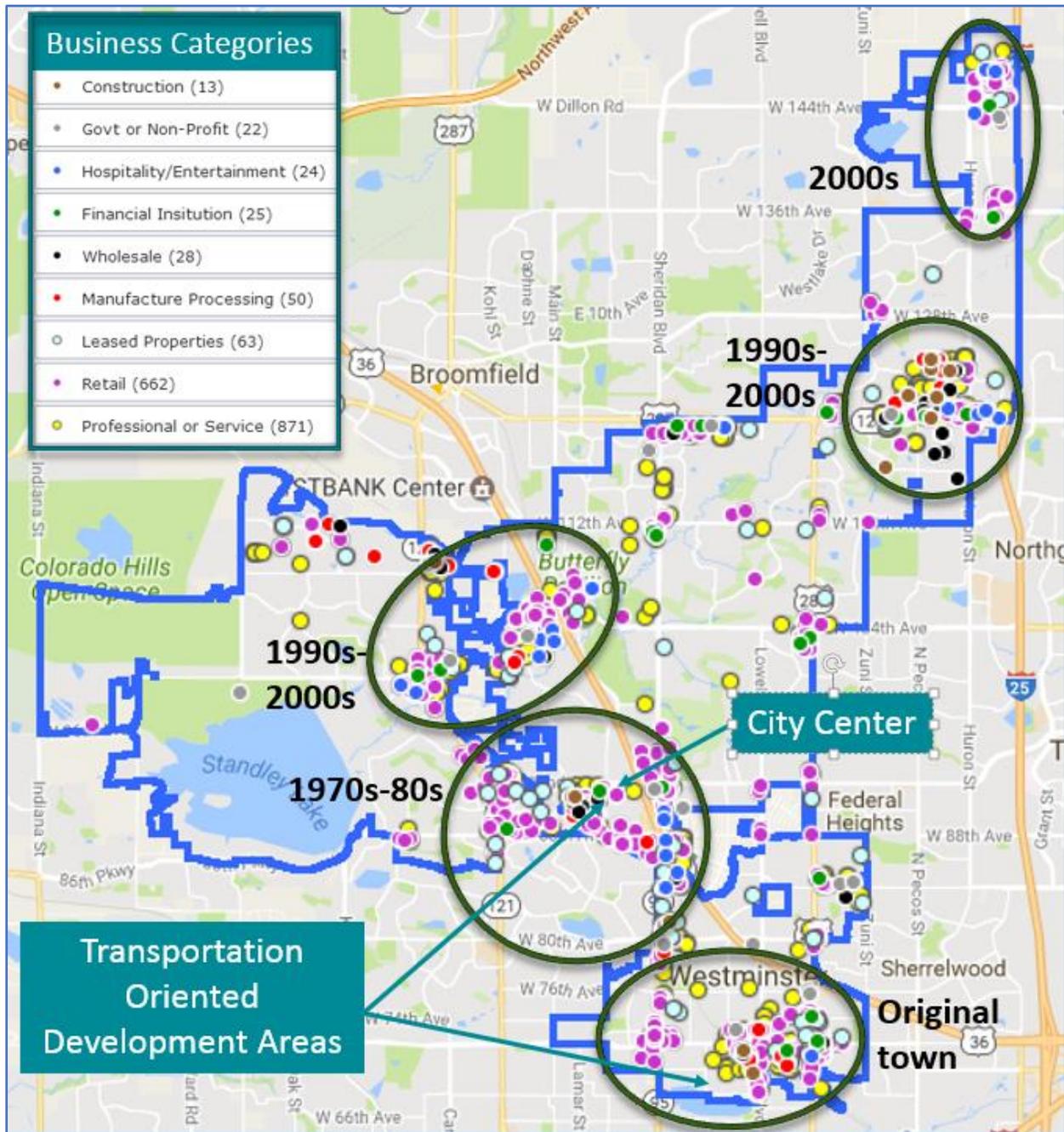
According to the City's Department of Economic Development, the top three employers in the City of Westminster based on the number of employees are Ball Corporation (1,182), Alliance Data Systems (1,045), and St. Anthony's North Hospital (915). **Table 2.1** below shows the top ten employers in the city based on the number of employees.

**Table 2.1 Top Ten Employers in the City of Westminster**

Employer	Business Types	Number of Employees
Ball Corporation	Aerospace and Packaging	1,182
Alliance Data Systems	Network Credit Authorization	1,045
St. Anthony's North Hospital	Healthcare Provider	915
DigitalGlobe	Geospatial	809
Trimble Navigation	Geopositioning Technologies	600
Tri-State Generation	Electric Energy Wholesales	550
ReedGroup	Human Resources Management	477
MTech Mechanical Technologies Group	HVAC Systems	460
Kaiser Permanente	Healthcare Provider	441
LGS Innovations	Research and Technology	373

Source: City of Westminster, Economic Development Department

**Figure 2.2 Business Types and Location in City of Westminster**



Source: City of Westminster

According to the Westminster Comprehensive Plan the city has seen the most economic growth in office uses in sectors such as aerospace, telecommunications, computer software and support and health care. Much of the economic growth in the city has occurred along the US 36 corridor and it is projected the corridor will capture 15 to 18 percent of new office growth in the metro area over the next 20 years (Citywide Economic Market Assessment, City of Westminster, BLIE, 2013). **Table 2.2** compares the industries located in Westminster to the Denver Metro area.

**Table 2.2 Comparison of Denver Metro Area and Westminster Employment Composition**

<b>Industry</b>	<b>Denver Metro Area</b>	<b>Westminster</b>
Mining and Agriculture	0.9%	0.2%
Construction and Utilities	5.0%	2.5%
Manufacturing	5.8%	6.1%
Wholesale Trade and Transportation	8.1%	5.0%
Retail Trade	10.2%	17.8%
Professional, Technical and Information Services	13.2%	11.4%
Finance, Insurance and Real Estate	7.0%	7.3%
Managerial and Administrative Services	8.9%	9.9%
Health Care, Education and Human Services	12.4%	18.0%
Accommodations, Food Services and Entertainment	10.8%	15.3%
Other Services, except Public Administration	3.1%	2.5%
Public Administration	14.7%	4.0%
<b>Total Employment</b>	<b>100.0%</b>	<b>100.0%</b>

Source: Westminster Comprehensive Plan 2013; Colorado Department of Labor and Employment, Labor Market Information, Quarterly Census of Employment and Wages

**Figure 2.3 Key Employers by Industry**

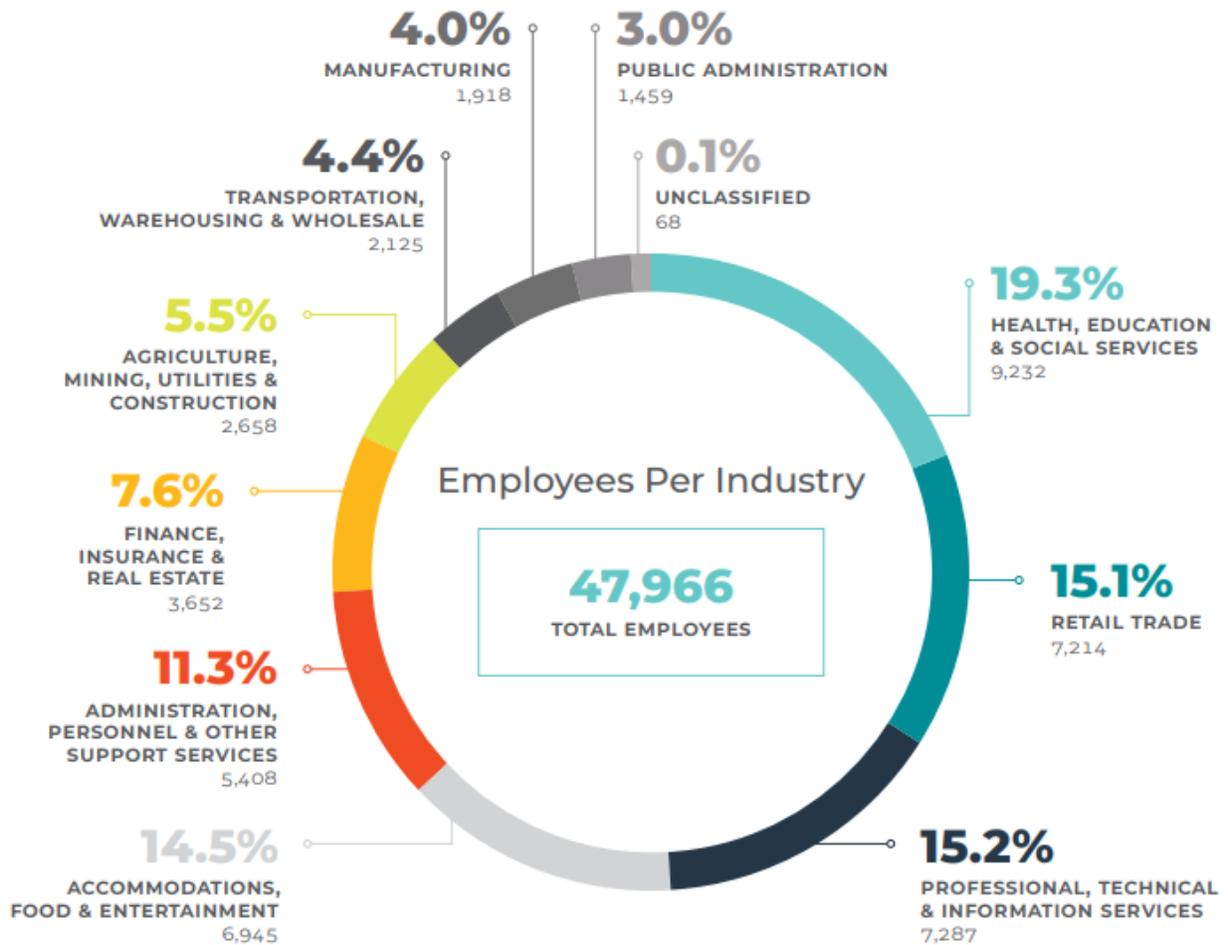
<p><b>AEROSPACE</b></p> <ul style="list-style-type: none"> <li>▶ Ball Aerospace</li> <li>▶ DigitalGlobe</li> <li>▶ Maxar Technologies</li> <li>▶ Trimble Inc.</li> </ul>	<p><b>TECHNOLOGY AND INFORMATION</b></p> <ul style="list-style-type: none"> <li>▶ Coalfire</li> <li>▶ Epsilon</li> <li>▶ LGS Innovations</li> <li>▶ Polycom</li> <li>▶ ReedGroup</li> <li>▶ Trueeffect</li> </ul>
<p><b>FINANCIAL SERVICES</b></p> <ul style="list-style-type: none"> <li>▶ ADS Alliance Data Systems</li> <li>▶ Alloya Credit Union (formerly SunCorp)</li> <li>▶ Citywide Home Loans</li> <li>▶ Phoenix Financial</li> <li>▶ ServiceLink</li> </ul>	<p><b>RESEARCH AND DEVELOPMENT</b></p> <ul style="list-style-type: none"> <li>▶ Cintron</li> <li>▶ Plato BioPharma</li> <li>▶ Protogenic</li> <li>▶ Synchroness</li> </ul>
<p><b>HEALTHCARE AND LIFE SCIENCES</b></p> <ul style="list-style-type: none"> <li>▶ ARCA Biopharma</li> <li>▶ AxisPoint Health</li> <li>▶ Cerapedics</li> <li>▶ Flagship Biosciences, Inc.</li> <li>▶ McKesson</li> <li>▶ ProtoMED</li> <li>▶ Surefire Medical, Inc.</li> <li>▶ Swisslog</li> <li>▶ Zimmer Biomet</li> </ul>	<p><b>ENERGY AND UTILITIES</b></p> <ul style="list-style-type: none"> <li>▶ Kahuna Ventures</li> <li>▶ Tri-State Generation</li> <li>▶ Stonehenge Energy</li> </ul> <p><b>MANUFACTURING</b></p> <ul style="list-style-type: none"> <li>▶ Air Comm Corp</li> <li>▶ Aspen Electronics</li> <li>▶ Ball Packaging</li> <li>▶ Springs Fabrication</li> <li>▶ Tenere</li> </ul>

Source: City of Westminster, Economic Development Department

## 2.5.2 FISCAL OUTLOOK

The City of Westminster is fiscally sound. From 1999 to 2012, the city's share of the Denver metro office market has climbed from 1.5% to 2.2%. Sales and use taxes, the primary funding sources for the city comprising 57.4% of the city's governmental activities revenues, were \$87.2 million in 2014. Total city revenues were \$212.4 while expenses in 2014 were \$174 million. The city's total assets are approximately \$1.07 billion of which \$794 million is invested in capital assets such as land, buildings, equipment, machinery, utility plants and parks. (City of Westminster 2014 Financial Report) Retail sales is the primary economic activity of the community with a total of \$3,508,511,177 in sales and \$44,411,044 in tax revenue for July 2013-July 2014 (Colorado Department of Revenue).

**Figure 2.4 City of Westminster Fiscal Outlook**



Source: Westminster Daytime Employment by Industry (City Economic Profile 2018/2019)

### 2.5.2 FUTURE DEVELOPMENT

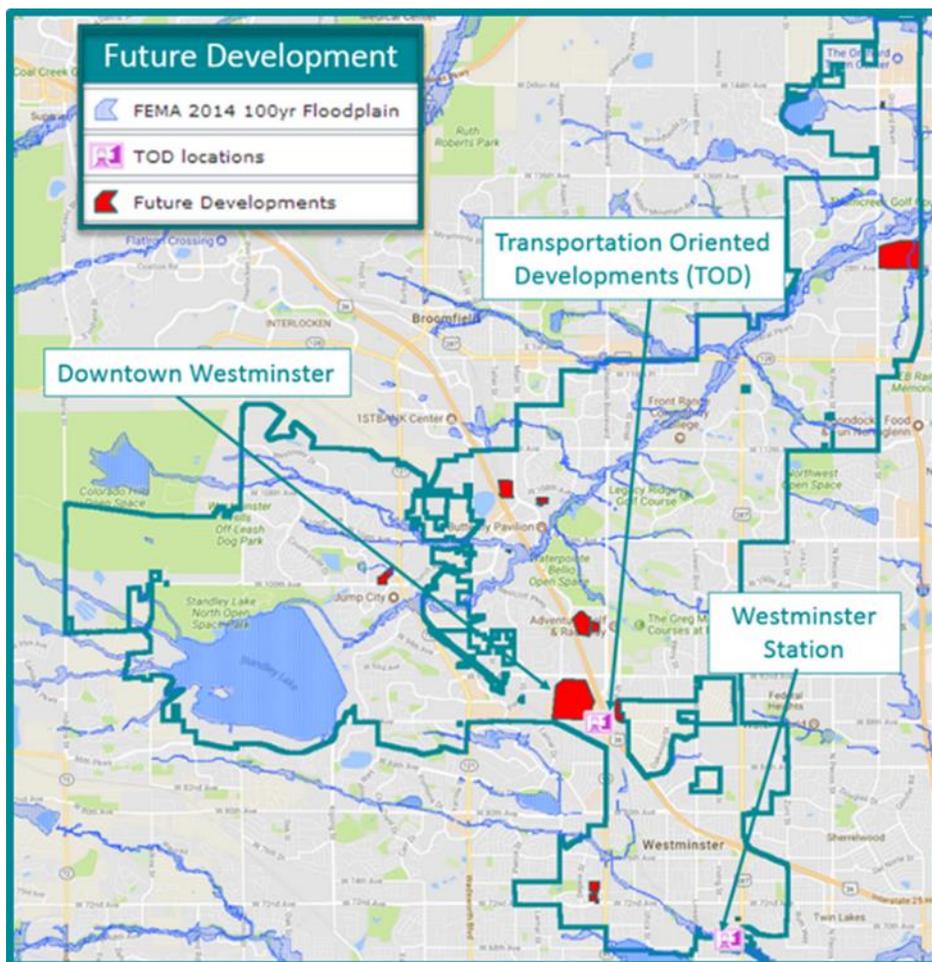
Westminster is the next Urban Center of the Colorado Front Range. It is a vibrant inclusive, creative and well-connected city. People choose Westminster because it is a dynamic community with distinct neighborhoods, quality educational opportunities and a resilient local economy that includes: a spectrum of jobs; diverse, integrated housing; and shopping, cultural, entertainment and restaurant options. It embraces the outdoors and is one of the most sustainable cities in America. (City of Westminster Strategic Plan)

The city is approximately 95% built out, but there are major redevelopment efforts underway. The city's Specific Area Plan identifies two areas as Transit Oriented Development (TOD). Generally, TOD includes dense mixed-use development supported by multimodal infrastructure which provides people with options to walk, bicycle, ride transit or drive.

Westminster Station in south Westminster is served by the B Line Commuter Rail operated by the Regional Transportation District (RTD). Downtown Westminster is anticipated to be served by the B Line in the future. Today it benefits from RTD's high frequency Bus Rapid Transit service from the Park and Ride located at US 36 and Sheridan Boulevard.

The city is also committed to providing its residents with a variety of housing options through the development of additional single-family neighborhoods as well as affordable and multi-family communities. Planning for the construction of a new water treatment plant and City Court House is ongoing. The city has a well-established record of considering the potential relationship between our natural hazards and development/re-development.

**Figure 2.5 Areas of Future Development in City of Westminster**



Source: City of Westminster

The map above (**Figure 2.5**) shows the areas of Westminster that are expected to see development in the future in relation to mapped flood hazards. The City's 2015 Comprehensive Plan describes the development potential in the City and provides a table that outlines the projected development based on the assumption of the average development intensity for different land use classifications. The table (**Table 2.3**) is divided into 6 development categories: Existing Development - reflects existing development as of August 2013; Current Development - projects currently under construction, approved or proposed as of August 2013; Gross New Development by 2035 - average assumed intensities to vacant lands and underutilized sites that are likely to develop by 2035; Existing Development Lost - existing development that is likely to be lost due to redevelopment of underutilized sites; Net New Development by 2035 - reflects the total of the Existing, Current and Gross New Development in the city; City at 2035 - totaling Net New Development and Existing Development results in the Comprehensive Plan development potential at 2035. Further discussion of the City's future development, including discussion on the City's redevelopment strategy can be found in **2.6.1. Hazard Related Programs, Policies, Regulations and Codes.**

**Table 2.3 Projected 2035 Development in City of Westminster**

	<i>A. Existing Development 2013</i>	<i>B. Current Development</i>	<i>C. Gross New Development by 2035</i>	<i>D. Existing Development Lost</i>	<i>E. Net New Development by 2035</i>	<i>F. City at 2035</i>
<b>Residential Uses</b>						
Very Low Density (R-1 and R-2.5)	838	147	13		160	998
Low Density (R-3.5 and R-5)	25,665	272	254		526	26,191
Medium Density (R-8)	5,117	99	187		286	5,403
<i>Subtotal Single Family (Detached &amp; Attached)</i>	<i>31,620</i>	<i>518</i>	<i>454</i>		<i>972</i>	<i>32,592</i>
High Density (R-18)	11,710	1,030	176		1,206	12,916
Very High Density (R-36)		465	460		925	925
Residential Units from Mixed Use	1,649	256	4,466		4,722	6,371
<i>Subtotal Multifamily</i>	<i>13,359</i>	<i>1,751</i>	<i>5,102</i>		<i>6,853</i>	<i>20,212</i>
<b>Total Residential Units</b>	<b>44,979</b>	<b>2,269</b>	<b>5,556</b>		<b>7,825</b>	<b>52,804</b>
Population*	109,169					129,423
<b>Non-Residential Uses</b>						
Retail Commercial**	10,443,089	235,029	2,539,300	-963,897	1,810,432	12,253,521
<i>Hotel (square feet)</i>	<i>1,361,660</i>	<i>159,500</i>	<i>403,677</i>		<i>563,177</i>	<i>1,924,837</i>
<i>Hotel (rooms)</i>	<i>1,905</i>	<i>212</i>	<i>577</i>		<i>789</i>	<i>2,694</i>
Service Commercial	177,285	3,500	57,122	-27,961	32,662	209,947
Office/R&D	4,950,686	426,103	4,468,191	-56,038	4,838,256	9,788,942
Flex/Light Industrial	3,283,510	0	1,339,478	-125,296	1,214,182	4,497,692
<b>Total Building Square Feet</b>	<b>18,854,570</b>	<b>664,632</b>	<b>8,404,091</b>	<b>-1,173,192</b>	<b>7,895,532</b>	<b>26,750,102</b>
Employment	39,300					57,300
<i>*Based on a 2035 household size of 2.58, as projected by DRCOG 2035 Metro Vision Plan. Also assumes a 5% residential vacancy rate.</i>						
<i>**Includes office uses within retail commercial centers.</i>						

Source: City of Westminster, 2015 Comprehensive Plan

## 2.6 ASSESSING CAPABILITIES

Identification of loss prevention mechanisms already in place provides an assessment of Westminster’s “net vulnerability” to natural disasters and the city’s capability to mitigate them. This more accurately focuses the goals, objectives, and proposed actions of this plan. This part of the planning process is referred to as the mitigation capability assessment.

The HMPC took two approaches to conducting this assessment for the city. First, an inventory matrix of common mitigation activities was made. The purpose of this effort was to identify activities and actions that were either in place, needed improvement, or could be undertaken, if deemed appropriate. Second, the HMPC conducted an inventory of existing policies, regulations, and plans. These documents were collected and reviewed to determine if they contributed to reducing hazard-related losses or if they inadvertently contributed to increasing such losses. This section summarizes the city’s mitigation capabilities currently in place.

This mitigation capability assessment describes the city’s existing mitigation policies, procedures, and plans. **Table 2.4** summarizes the results of the mitigation capability assessment. Excerpts from applicable plans, rules, and regulations follow, which provide more detail on the existing policies related to hazard mitigation and highlight where the city has made efforts above and beyond the standard policies.

**Table 2.4 City of Westminster Mitigation Capabilities Overview**

Capability	Yes/No	Comments
<b>Planning and Regulatory Capabilities</b>		
Building Codes Year	Y	2015 IBC
BCEGS Rating	Y	4.4
Capital Improvements Program (CIP) or Plan	Y	
Community Rating System (CRS)	Y	Rating of 6
Community Wildfire Protection Plan (CWPP)	N	
Comprehensive, Master, or General Plan	Y	Westminster Comprehensive Land Use Plan
Economic Development Plan	Y	
Special Plans	Y	Northeast Comprehensive Development Plan; Urban Renewal Plan; North I-25 Corridor Plan; Westminster Emergency Plan and Management Systems, City of Westminster Drought Mitigation Plan, Source Water Protection Plan, Westminster Station Area Specific Plan, Downton Specific Plan, Comprehensive Water Supply Plan (CWSP)
Elevation Certificates	Y	
Erosion/Sediment Control Program	Y	XI-7-7
Floodplain Management Plan or Ordinance	Y	WMC 11-8
Flood Insurance Study	Y	
Growth Management Ordinance	Y	
Hazard-Specific Ordinance or Plan (Floodplain, Steep Slope, Wildfire)	Y	
NFIP	Y	
Site Plan Review Requirements	Y	
Stormwater Program, Plan or Ordinance	Y	2007 Storm Drainage Study WMC 8-13
Zoning Ordinance	Y	Title XI, Chapter 4, of the Westminster Municipal Code
Subdivision Ordinance	Y	Title XI of the Westminster Municipal Code
Fire Department ISO Rating	Y	Class 1
<b>Administrative and Technical Capabilities</b>		
Emergency Manager	Y	
Floodplain Administrator	Y	
Planner/Engineer (Land Development)	Y	
Planner/Engineer/Scientist (Natural Hazards)	Y	
Engineer/Professional (Construction)	Y	
Resiliency Planner	Y	
Transportation Planner	Y	
Full-Time Building Official	Y	

Capability	Yes/No	Comments
Conduct "as-built" Inspections	Y	
GIS Specialist and Capability	Y	
Grant Manager, Writer, or Specialist	Y	
Warning Systems/Service: - General	Y	Public education, Reverse 911, text alerts, Cable Television Interrupt, NOAA Weather Radio All Hazards, Metropolitan Emergency Telephone System, National Warning System
- Flood	Y	Water contamination/Flood Warning Detection System
- Wildfire	N	
- Tornado	Y	
- Geological Hazards	N	
Cultural Resources Inventory	Y	
<b>Financial Capabilities</b>		
Levy for Specific Purposes with Voter Approval	N	
Utilities Fees (Stormwater)	Y	
System Development Fee (Stormwater)	Y	
General Obligation Bonds to Incur Debt	N	
Special Tax Bonds to Incur Debt	N	
Withheld Spending in Hazard-Prone Areas	N	
Stormwater Service Fees	Y	
Capital Improvement Project Funding	Y	
Community Development Block Grants	Y	
<b>Education &amp; Outreach Capabilities</b>		
Local Citizen Groups That Communicate Hazard Risks		
Firewise	N	
StormReady	N	
Other (Public Outreach Events, Social Media and Web page)	Y	Public information program/outlet, Environmental Education Program

## 2.6.1 HAZARD RELATED PROGRAMS, POLICIES, REGULATIONS AND CODES

The City of Westminster has several policies, regulations and codes that guide how the city manages development of hazard-prone areas. Many of these policies have multiple objectives. Those that are directly related to reducing losses to future development or the protection of critical facilities and/or vulnerable populations are summarized here.

### **Westminster Comprehensive Plan**

The Westminster Comprehensive Plan, updated in 2015, guides the future development of the city. The Plan recognizes the influences the floodplains and topography, have over land use patterns. **Chapter 8 Public Utilities and Services** speaks to the city's water supply both current and future, the waste water system, stormwater quality in terms of stormwater management and flood control, and public safety.

The Plan established guiding principles that build on the city's vision statement. These principles include the following:

- Distinctive city with a Strong Identity
- Vibrant Community with a Diverse, Healthy Economy
- Comprehensive, Integrated Parks and Open Space System
- Well-Designed, Attractive Neighborhoods
- Balanced Housing Mix
- Mixed Use and Transit-Oriented Development
- Balanced Transportation System
- Environmental Stewardship and Water Resource Management
- Safe and Healthy Communities

### ***Fire and Emergency Medical Service Master Plan***

An update to the Fire and Emergency Medical Service Master Plan was completed in 2006. The fire department is undergoing an accreditation process which involves conducting a community risk assessment, addressing those risks and long-term planning. The City of Westminster Fire Department (WFD) is responsible for the protection of life and property through fire prevention, education, fire suppression, and emergency medical and rescue services, as well as emergency management. The Fire Department has six fire stations strategically located around the city:

Each station operates 24 hours per day, seven days per week and is equipped to respond to fire, medical, and other emergencies. Medical calls accounted for 70 percent of the 8,125 calls for service in 2017.

The master plan service standards are as follows:

- Respond with basic life support within six minutes 80 percent of the time.
- WFD strives to maintain a five-minute average response time to all emergency calls, and responding to 80 percent of all calls within six minutes.
- The following seven philosophies provide general direction when establishing goals and objectives for fire protection in the City of Westminster:
- Shared Responsibility for Fire Protection—the city emphasizes private sector self-protection through code regulations and design incentives. Installation of automatic fire sprinkler systems is now required by ordinance for many uses.
- Balance between Built-In Fire Protection and Public Fire Protection Service—
  - Municipal fire protection requires a balance between services provided by the city through fire stations, apparatus, and personnel and that provided by built-in automatic fire systems. Automatic systems offer a high degree of protection from fire originating in those protected properties. City-provided protection supplements the built-in systems and is designed to handle fires in non-protected buildings, outside fires, medical emergencies, and non-fire emergencies and events.
- Generalist Theory of Operation—The Fire–Rescue Department believes that each fire apparatus should have diverse equipment and that the firefighters should be generalists rather than specialists. Every front-line fire truck has firefighting and rescue equipment along with emergency medical supplies. Each firefighter must pass a comprehensive training program that supports that generalist approach. State of Colorado emergency medical technician certification is required, and every firefighter's training includes firefighting, hazardous materials response, and training for rescues involving vehicle accidents, fires, water, and ice incidents.
- Basic Level of Emergency Medical Service— Westminster Fire Department provides basic and advanced life support services. The EMS delivery system is a two-tiered system. All medical and trauma related alarms require an ambulance and engine response. EMT's and paramedics respond on fire apparatus along with a WFD ALS ambulance which is often staffed with two paramedics.

- **Specialist Capabilities**—In addition to the traditional general fire and emergency medical capabilities, the Fire–Rescue Department provides services that are more specialized:
  - The Water Rescue Team provides swift water rescue and water rescue/recovery services for accidents in lakes and ponds.
  - The Hazardous Materials Team operating through a regional team helps to reduce the threat or release hazardous substances.
  - The Wildland Fire Team provides response capability to wildland fires that occur within the City of Westminster, to other Colorado jurisdictions through a State-wide mutual aid agreement, and to other States as designated through Federal wildland management plans.
- **Training**—The Fire/Rescue Department offers a wide variety of services to the citizens of Westminster. To maintain an adequate level of proficiency in many areas of emergency service, the department conducts extensive training in all service areas including firefighting, fire prevention, emergency medical care, hazardous materials, rescue and public education. Joint training exercises are conducted with other agencies.
- **Impact of Infill**—city fire stations are strategically located to meet the emergency response service standards.

Anticipated infill projects typically utilize the urbanized mixed-use concept where many different uses, i.e. business, commercial and residential are intertwined within the project design concept. Mixed-use developments represent a unique challenge from both a fire protection and EMS services perspective. Proposed population densities potentially add to a fire protection and EMS delivery system that is not designed for this potential impact. Limited access points, reduced street widths, lack of emergency apparatus/vehicle staging and deployment opportunities and traffic control features present challenges to responding emergency units. Changes in building sizes and configurations, internally and externally, present challenges unique to each infill project. A close working relationship with Community Development has and will continue to serve the community well in coordinating the Fire Department’s response to challenges presented by future infill projects.

### ***West Nile Virus Management Plan***

The City of Westminster has had a comprehensive mosquito management plan since 1986. With the onset of West Nile Virus this plan was adapted to confront this serious disease. West Nile virus is a disease that can be transmitted to humans by mosquitoes. It has been common in Africa, west Asia and the Middle East for decades. It first appeared in the US in 1999 in New York. It has since traveled westward across the country and now is in Colorado. Mosquito season in Colorado starts in the spring and ends in mid-September. The West Nile virus is carried long distances by infected birds and then spread locally by mosquitoes that bite these birds. Infected mosquitoes can then bite and pass the virus to humans and animals, primarily birds and horses. There is a vaccine for horses, but none for humans. House pets do not spread the illness. Health departments across the state are closely monitoring human and horse illnesses and tracking the virus by testing dead birds and trapping mosquitoes. Westminster uses the services of Colorado Mosquito Control, Inc. to provide an integrated pest management (IPM) program that effectively controls all aspects of the mosquito lifecycle. All areas of the city, both public and private, are managed through this program.

### ***Emergency Plan and Management Systems***

The purpose of the EPMS is to delineate task assignments and responsibilities for the operational actions that will be taken prior to, during and following an emergency or disaster affecting local government to alleviate suffering, save lives and protect property. As described in the plan, the city operates and maintains compliance with the National Incident Management System (NIMS).

### ***Emergency Warning and Evacuation System***

The existing 911 database of telephone numbers and addresses is used in combination with detailed maps to help determine the geographic boundaries of an impacted area. The system can make up to 1,200 calls per minute. It is designed to deliver recorded information to endangered people in advance of a disaster. Messages can be delivered in various languages. They can also be sent to pagers and the Emergency Alert System.

### ***CodeRed***

Cell Phone users and VoIP customers can register their phone numbers to receive emergency notifications from Westminster police and fire. The system works in a similar manner to what is commonly referred to as "Reverse 911." When a need exists to notify citizens in a certain area of the city, notifications can be sent over landlines, cell and VoIP phones.

The service, which is managed by the Jefferson County E911 Authority, is available to all city residents, whether they live in Adams or Jefferson County. Residents who are served by the Westminster Police and Fire departments can register their cell-phone or internet phone number.

### ***Cable Television Interrupt***

Programming on all television channels can be immediately interrupted for any emergency that has a significant effect on public safety or for any unusual situation that requires evacuation. The screen can be blanked out and the emergency message transmitted.

### ***Emergency Alert System***

Emergency Alert System (EAS) is a national public warning system that requires broadcasters, cable television systems, wireless cable systems, satellite digital audio radio service (SDARS) providers, and direct broadcast satellite (DBS) providers to provide the communications capability to the President to address the American public during a national emergency. The system also may be used by Westminster to deliver important emergency information notifications.

### ***NOAA Weather Radio All Hazards***

NOAA Weather Radio All Hazards is a service of the National Oceanic and Atmospheric Administration (NOAA). It provides continuous broadcasts of the weather information directly from National Weather Service offices. Weather messages are repeated every four to six minutes and are routinely revised every two to three hours, or more frequently if needed. The broadcasts are tailored to weather information needs of people within the receiving area. During severe weather, National Weather Service forecasters can interrupt the routine weather broadcasts and substitute special warning messages. Special weather radio receivers are available for purchase at local electronics stores or online. NOAA classifies coverage in Westminster as reliable.

### ***Metropolitan Emergency Telephone System***

The Metropolitan Emergency Telephone System (METS) is a specially designed telephone system for alerting law enforcement, other response agencies and Denver media of emergency situations. The value of METS to the Westminster Dispatch Center is the ability to instantly notify all Denver media of any life-threatening situations in Westminster that can be immediately broadcast on all Denver radio and television stations. Since many Westminster residents watch Denver television and listen to Denver radio stations, this is a very valuable warning system for Westminster.

### ***City of Westminster Code of Ordinances***

The city is a municipal corporation duly organized and existing under the laws of the State of Colorado. Westminster is a home rule city and adopted a charter pursuant to Article XX of the Constitution of the State of Colorado on October 30, 1917. The city's Code of Ordinances, Title XI regulates includes several chapters that regulate land development and growth procedures. Several of these regulations relate to hazard mitigation including:

- Floodplain regulations – Chapter 8
- Building Code – Chapter 9
- Fire Code – Chapter 10
- Site Development Standards – Chapter 7

### ***NFIP and CRS Program Participation***

The city joined the NFIP on September 30, 1988, which allows private property owners to purchase affordable flood insurance and enables the community to retain its eligibility to receive certain federally backed monies and disaster relief funds. The city also participates in the NFIP's Community Rating System (CRS). The CRS is a voluntary program for NFIP-participating communities. It provides flood insurance discounts to policyholders in communities that provide extra measures of flood protection above the minimum NFIP requirements. The City of Westminster entered the CRS on October 1, 1991. The city has a Class 6 rating which provides a 20 percent discount for flood insurance policyholders within a special flood hazard area (SFHA) and a 10 percent discount for those outside of an SFHA.

### ***Economic Development and Redevelopment Strategies***

The City of Westminster economic development strategy focuses on maintaining a vital, diverse and sustainable economy. The strategy looks at capturing industries and growing small local businesses throughout the city over the next 20 years. The strategy focuses on infill and redevelopment. The redevelopment strategy which is implemented by the Westminster Economic Development Authority, focuses on and oversees redevelopment within and throughout the city. The areas of the city with strong economic and redevelopment emphasis include:

- Area around current St. Anthony North Hospital
- Areas along the Wadsworth Corridor
- Former AT&T manufacturing facility
- The Mandalay Urban Renewal District
- The North Huron Urban Renewal District
- The South Sheridan Urban Renewal District
- The South Westminster Urban Renewal District
- The Westminster Center East Urban Renewal District
- The Westminster Center Urban Renewal District

## **2.6.2 HAZARD MANAGEMENT CAPABILITIES OF OTHER STATE AND REGIONAL AGENCIES**

### ***Colorado Water Conservation Board***

The Colorado Water Conservation Board (CWCB) is an agency of the State of Colorado. The CWCB Flood Protection Program is directed to review and approve statewide floodplain studies and designations prior to adoption by local governments. The CWCB is also responsible for the coordination of the National Flood Insurance Program (NFIP) in Colorado and for providing assistance to local communities in meeting NFIP requirements. This includes CWCB prepared or partnered local floodplain studies. The CWCB has promulgated new floodplain rules and regulations that became effective on January 14, 2011. Increased protection for public health, safety and welfare in the state is the primary reason for updating Colorado's floodplain rules. The CWCB's rules aim to reduce flood losses through sound flood protection actions, which are implemented at the local level and supported by State and Federal programs. Key provisions of the new floodplain rules include: higher freeboard for structures, a 0.5-foot floodway and additional protection for "critical facilities" in the 100-year floodplain.

### ***Urban Drainage and Flood Control District***

The Urban Drainage and Flood Control District (UDFCD) was established by the Colorado legislature in 1969 to help local governments in the Denver metropolitan area with multi-jurisdictional drainage and flood control problems. The UDFCD covers 1,608 square miles and includes all or parts of 34 incorporated

cities and towns, including the City of Westminster. There are about 1,600 miles of “major drainageways” that are defined as draining at least 1,000 acres. The population of the district is approximately 2.8 million.

The district provides services related to floodplain mapping; flood safety and early warning; new developments; and planning, design, construction and maintenance of watershed and stream improvements. The district helps local governments in maintaining and preserving floodways and floodplains in areas eligible for UDFCD maintenance. UDFCD maintenance is limited to facilities that are publicly owned or are in a public drainage easement and are categorized into routine, restoration and rehabilitation projects. Routine maintenance consists of scheduled mowing and trash and debris pickup on major drainageways during the growing season. It may also include small revegetation efforts and limited weed control. Restoration projects address local erosion problems, existing structure repair, detention pond restoration, tree thinning, removal of sediment deposits from flood control facilities and revegetation work. The district also assists with developing community flood warning capabilities, including implementation of early flood detection systems and providing early notifications concerning potential and imminent flood threats. In the past, the city and UDFCD have worked together to map the floodplains throughout Westminster. Currently, they are working as partners to complete a study on the drainage capacity of existing infrastructure to help determine maintenance needs throughout the city.

### ***Colorado Division of Homeland Security and Emergency Management***

The Colorado Division of Homeland Security and Emergency Management (DHSEM) is responsible for the state’s comprehensive emergency management program, which supports local and state agencies. Activities and services cover all aspects of emergency management. Assistance to local governments includes financial and technical assistance as well as training and exercise support. Services are made available through local emergency managers supported by CO OEM staff assigned to specific areas of the state. DHSEM also provides guidance and technical assistance on mitigation grant applications.

### ***Colorado Geological Survey***

The Colorado Geological Survey is a state government agency within the Colorado Department of Natural Resources whose mission is to help reduce the impact of geologic hazards on the citizens of Colorado, to promote responsible economic development of mineral and energy resources, provide geologic insight into water resources, provide avalanche safety training and forecasting, and to provide geologic advice and information to a variety of constituencies.

### ***Colorado Department of Water Resources – Office of State Engineer***

The Colorado Division of Water Resources (DWR), also known as the Office of the State Engineer, administers water rights, issues water well permits, represents Colorado in interstate water compact proceedings, monitors streamflow and water use, approves construction and repair of dams and performs dam safety inspections, issues licenses for well drillers and assures the safe and proper construction of water wells, and maintains numerous databases of Colorado water information. As it relates to hazard mitigation it is the department’s mission to ensure public safety through safe dams and properly permitted and constructed water wells.

The Dam Safety branch is responsible for the safety of all existing dams in the state of Colorado. The branch carries out two principal duties of the State Engineer: to determine the safe storage level of the reservoir dams in the state and to approve the plans and specifications for the construction and repair of Jurisdictional dams. Dam Safety engineers regularly inspect jurisdictional dams throughout the state.

Whenever there is a dam emergency, dam owners are requested to immediately follow their *Emergency Action Plan*, notify the local enforcement authority (ex. sheriff or 911), notify the Colorado Division of Emergency Management and notify the State of Colorado’s Dam Safety Branch.

### ***Colorado Department of Transportation***

The Colorado Department of Transportation (CDOT) conducts planning and projects that relate to hazard mitigation. These include design of bridges to withstand scouring and convey flood flows in addition to rockfall hazard identification and mitigation along the State’s highway system. CDOT employs message

signs, road closure devices, and radio advisories to warn motorists of dangerous driving conditions and road closures due to severe weather or rockfall incidents. CDOT has developed a US 36 Traffic Incident Management Plan for the Boulder Turnpike.

## 3 PLANNING PROCESS

### PLANNING REQUIREMENTS

#### **Requirements §201.6 (b) and §201.6(c)(1):**

*An open public involvement process is essential to the development of an effective plan. In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include:*

- 1) An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval;*
- 2) An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and nonprofit interests to be involved in the planning process; and*
- 3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.*

*[The plan shall document] the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.*

### 3.1 BACKGROUND ON MITIGATION PLANNING IN THE CITY OF WESTMINSTER

The planning process and development of the City of Westminster Hazard Mitigation Plan has its roots in the 2003 Denver Regional Council of Governments Hazard Mitigation Plan. The city participated in the regional plan and several of the actions listed in the regional plan were identified by the HMPC in the 2010 Natural Hazard Mitigation Plan as actions and strategies that influenced or were incorporated into city planning efforts or projects. The city determined that a single jurisdictional hazard mitigation plan would be beneficial to the community and began the planning process with meetings and activities starting in 2009. The first version of the plan was approved by FEMA in 2010. The plan underwent comprehensive updates in 2017-2018 to comply with the five-year update cycle required by DMA 2000. The city has worked with a consultant, Wood plc. (formerly Amec Foster Wheeler Environment and Infrastructure) to facilitate and develop the plan. Wood plc's role was to:

- Ensure compliance with the Disaster Mitigation Act of 2000 (DMA) and Community Rating System
- Meet the DMA requirements as established by federal regulations and following the Federal Emergency Management Agency's (FEMA) planning guidance
- Facilitate the planning process
- Identify the data requirements that HMPC participants could provide and conduct the research and documentation necessary to augment that data
- Produce the draft and final plan documents
- Coordinate the Colorado Division of Emergency Management and Homeland Security and FEMA Region VIII plan reviews.

### 3.2 PLAN SELECTION REVIEW AND ANALYSIS – 2018 UPDATE

This hazard mitigation plan update involves a comprehensive review and update of each section of the 2010 plan and includes an assessment of the success of the city in evaluating, monitoring and implementing the mitigation strategy outlined in the initial plan. Since the original development of the plan, FEMA guidance for local hazard mitigation plans has been refined and updated. The process followed to review and revise chapters of the plan during the 2018 update is detailed in **Table 3.1**. As part of this plan update, all sections of the plan were reviewed and updated to reflect new data on hazards and risk, the

risk analysis processes, capabilities, participating stakeholders and mitigation strategies. Only the information and data still valid from the 2010 plan was carried forward as applicable to this LHMP update.

**Table 3.1 2018 Plan Update Summary of Changes by Chapter**

Plan Section	Update Review and Analysis
1.0 Introduction	<ul style="list-style-type: none"> <li>Updated language to describe purpose and requirements of the City of Westminster Local Hazard Mitigation Plan update process.</li> </ul>
2.0 Community Profile	<ul style="list-style-type: none"> <li>Updated language and information in community profile.</li> <li>Included updated version of capabilities assessment.</li> </ul>
3.0 Planning Process	<ul style="list-style-type: none"> <li>Described and documented the planning process for the 2017-2018 update, including coordination among agencies and integration with other planning efforts.</li> <li>Described any changes in participation in detail.</li> <li>Described 2017-2018 public participation process.</li> </ul>
4.0 Risk Assessment	<ul style="list-style-type: none"> <li>Updated hazards identified to include hazards that were not included in 2010.</li> <li>Updated risk assessment for existing and additional hazards.</li> </ul>
5.0 Mitigation Strategy	<ul style="list-style-type: none"> <li>Updated Chapter 5 based on the results of the updated risk assessment, completed mitigation actions, and implementation obstacles and opportunities since the completion of the previous plan.</li> </ul>
5.1 Goals and Objectives	<ul style="list-style-type: none"> <li>Reviewed goals and objectives to determine if they are still representative of the city's mitigation strategy.</li> <li>Revised the goals and objectives based on HMPC input.</li> </ul>
5.2 Identified Mitigation Measures and Alternatives	<ul style="list-style-type: none"> <li>Revised to include more information on the categories of mitigation measures (structural projects, natural resource protection, emergency services, etc.) and how they are reviewed when considering the options for mitigation.</li> <li>Included more information on how actions are prioritized.</li> </ul>
5.3 Mitigation Actions	<ul style="list-style-type: none"> <li>Reviewed mitigation actions from the 2010 plan and developed a status report for each; identified if action has been completed or is ongoing.</li> <li>Identified "Mitigation Success Stories" to highlight positive movement on actions identified in 2010 plan.</li> <li>Identified and detailed new mitigation actions proposed by the HMPC.</li> <li>Identified projects that will be likely candidates for pre-vs. post disaster mitigation funding.</li> </ul>
6.0 Plan Adoption	<ul style="list-style-type: none"> <li>No changes to section but updated with resolution in Appendix B.</li> </ul>
7.0 Plan Implementation and Maintenance	<ul style="list-style-type: none"> <li>Reviewed and updated procedures for monitoring, evaluating, and updating the plan.</li> <li>Revised to reflect current methods.</li> <li>Updated the system for monitoring progress of mitigation activities by identifying additional criteria for plan monitoring and maintenance.</li> </ul>
Appendices	<ul style="list-style-type: none"> <li>Appendix A – References</li> <li>Appendix B – Planning Process</li> <li>Appendix C – Adoption Resolution</li> <li>Appendix D – Mitigation Categories, Alternatives, and Selection Criteria</li> </ul>

### 3.3 LOCAL GOVERNMENT PARTICIPATION

The DMA planning regulations and guidance stress that each local government seeking FEMA approval of their mitigation plan must participate in the planning effort in the following ways:

- Participate in the process

- Detail areas within the planning area where the risk differs from that facing the entire area
- Identify specific projects to be eligible for funding
- Have the governing board formally adopt the plan.

For the City of Westminster’s HMPC committee members, “participation” meant:

- Attending and participating in the HMPC meetings
- Providing available data requested of the HMPC coordinator or Wood plc’s project manager
- Providing or updating hazard profiles and vulnerability details specific to the city
- Developing or updating the local mitigation strategies (action items and progress to date)
- Reviewing and commenting on the plan drafts
- Advertising, coordinating, and participating in the public input process
- Coordinating the formal adoption of the plan by the City of Westminster’s council.

The city’s Emergency Management Coordinator took the lead on the plan’s initial development in 2010 as well as the 2017-2018 update.

### 3.4 THE 10-STEP PLANNING PROCESS

Wood plc. established the planning process for updating the City of Westminster’s plan using the DMA planning requirements and FEMA’s associated guidance. The original FEMA planning guidance is structured around a four-phase process:

1. Organize Resources
2. Assess Risks
3. Develop the Mitigation Plan
4. Implement the Plan and Monitor Progress

FEMA’s March 2013 Local Mitigation Planning Handbook recommends a nine-step process within the original four phase process. Into this four-phase process, Wood plc. integrated a more detailed 10-step planning process used for FEMA’s Community Rating System (CRS) and the Flood Mitigation Assistance program. Thus, the modified 10-step process used for this plan meets the funding eligibility requirements of the Hazard Mitigation Assistance grants (including Hazard Mitigation Grant Program, Pre-Disaster Mitigation Program, Flood Mitigation Assistance), Community Rating System, and the flood control projects authorized by the U.S. Army Corps of Engineers (USACE). **Table 3.2** summarizes the four-phase DMA process, the detailed CRS planning steps and work plan used to develop the plan, the nine handbook planning tasks from FEMA’s 2013 Local Mitigation Planning Handbook, and where the results are captured in the Plan.

**Table 3.2 Mitigation Planning Process Used to Update the Plan**

FEMA 4 Phase Guidance	Community Rating System (CRS) Planning Steps (Activity 510) and Wood plc. Work Plan Steps	FEMA Local Mitigation Planning Handbook Tasks (44 CFR Part 201)	Location in Plan
Phase I: Organize Resources	Step 1. Organize Resources	1: Determine the Planning Area and Resources	Chapters 1, 2 and 3
		2: Build the Planning Team 44 CFR 201.6(c)(1)	Chapter 3, Section 3.1
	Step 2. Involve the public	3: Create an Outreach Strategy y 44 CFR 201.6(b)(1)	Chapter 3, Section 3.1, 3.3.1
	Step 3. Coordinate with Other Agencies	4: Review Community Capabilities 44 CFR 201.6(b)(2) & (3)	Chapter 3, Section 3.1, 3.3.1 Chapter 4, Section 4.4
Phase II: Assess Risks	Step 4. Assess the hazard	5: Conduct a Risk Assessment 44 CFR 201.6(c)(2)(i) 44 CFR 201.6(c)(2)(ii) & (iii)	Chapter 4, Sections 4.1-4.3
	Step 5. Assess the problem		Chapter 4, Sections 4.3
Phase III: Develop the Mitigation Strategy	Step 6. Set goals	6: Develop a Mitigation Strategy 44 CFR 201.6(c)(3)(i); 44 CFR 201.6(c)(3)(ii); and 44 CFR 201.6(c)(3)(iii)	Chapter 5, Sections 5.1 and 5.2
	Step 7. Review possible activities		Chapter 5, Section 5.3
	Step 8. Draft an action plan		Chapter 5, Section 5.4
Phase IV: Adopt and Implement the Plan	Step 9. Adopt the plan	8: Review and Adopt the Plan 44 CFR 201.6(c)(3)	Chapter 6, Appendix A
	Step 10. Implement, evaluate, revise	7: Keep the Plan Current	Chapter 7
		9: Create a Safe and Resilient Community 44 CFR 201.6(c)(4)	Chapter 7

The planning process that follows describes the process which Wood plc. and the city used in the 2017-2018 plan update.

### 3.4.1 PHASE 1: ORGANIZE RESOURCES

#### Planning Step 1: Organize the Planning Effort

With the City of Westminster’s commitment to participate in the DMA planning process, Wood plc. worked with the city’s Emergency Management Coordinator to establish the framework and organization for development of the plan. The HMPC, which was comprised of key city stakeholders and other local government representatives, developed the plan with leadership from the City of Westminster’s Emergency Management Coordinator and facilitation by Wood plc. **Appendix B: Planning Process**, contains the sign-in sheets from each HMPC meeting, highlighting which members participated in each meeting. Among the participants was the City’s Principal Planner, who is responsible for the land use and comprehensive planning in the City of Westminster. The table below list the participants comprising the City of Westminster HMPC:

**Table 3.3 City of Westminster HMPC Members**

Title	City Department
City Attorney	City Attorney’s Office
Deputy City Attorney	City Attorney’s Office
Special Assistant to the City Manager	City Manager’s Office
Policy and Budget Analyst	City Manager’s Office
Policy and Budget Manager	City Manager’s Office
Deputy City Manager	City Manager’s Office
Communications and Outreach Coordinator	City Manager’s Office
Chief Sustainability Officer	City Manager’s Office
City Manager	City Manager’s Office
Senior Transportation and Mobility Planner	Community Development
Community Development Director	Community Development
City Engineer	Community Development
GIS Specialist	Community Development
GIS Coordinator	Community Development
Senior Project Engineer	Community Development
GIS Specialist	Community Development
Principal Planner	Community Development
Senior Project Engineer	Community Development
Economic Development Director	Economic Development
Administrative Assistant	Economic Development
Accountant	Finance
Finance Director	Finance
Procurement Officer	Finance
Contract Coordinator	Finance
Management Analyst	Fire Department
Fire Chief	Fire Department
Fire Marshall	Fire Department
Intern	Fire Department

Title	City Department
Emergency Management Coordinator	Fire Department
Administrative Assistant	Fire Department
General Services Director	General Services
Facilities Manager	General Services
Energy and Facilities Project Manager	General Services
Business Operations Coordinator	General Services
Human Resources Manager – Risk	Human Resources
Human Resources Director	Human Resources
Software Engineering Manager	Information Technology
Information Systems Manager	Information Technology
Probation Supervisor	Municipal Court
Library Services Manager	Parks, Recreation and Libraries
Parks, Recreation and Libraries Director	Parks, Recreation and Libraries
Open Space Manager	Parks, Recreation and Libraries
Senior Management Analyst	Parks, Recreation and Libraries
Deputy Chief	Police Department
Sergeant	Police Department
Water Resource and Quality Manager	Public Works and Utilities
Street Operations Manager	Public Works and Utilities
Water Quality Administrator	Public Works and Utilities
Water Resource Analyst	Public Works and Utilities
Utilities Operations and Manager	Public Works and Utilities
City Forester	Public Works and Utilities
Public Works and Utilities Director	Public Works and Utilities
Engineer	Public Works and Utilities
Senior Engineer	Public Works and Utilities
Senior Engineer	Public Works and Utilities
<b>Other Government and Stakeholder Representatives</b>	
Title	Organization
Emergency Manager	Adams County
Senior Planner	Adams County
General Manager	The Farmers' High Line Canal
Manager	Church Ditch Water Authority
President and Water Resource Manager	Womans Creek Res. Auth. And City of Northglenn
Senior Policy Analyst	City of Thornton
Program Manager	Urban Drainage and Flood Control District
Warning Coordination Meteorologist	NOAA/NWS Denver/Boulder CO

The City of Westminster's HMPC members have varying degrees of experience related to natural hazard mitigation projects and planning. The table below outlines staff expertise and overall capability and

expertise within the six mitigation categories outlined in Activity 510 in the National Flood Insurance Program's Community Rating System.

**Table 3.4 City of Westminster Staff Expertise with Mitigation Categories**

Community Department/Office	Prevention	Property Protection	Natural Resource Protection	Emergency Services	Structural Flood Control Projects	Public Information
Police Department				✓		✓
Fire Department	✓	✓	✓	✓		✓
Fire department – Emergency Management	✓	✓		✓		✓
City Manager's Office			✓			✓
Community Development – Planning Division	✓	✓	✓		✓	✓
Community Development – Engineering Division	✓	✓	✓		✓	
Geographic Information Systems	✓		✓			✓
Parks, Recreation, and Libraries	✓		✓		✓	✓
Public Works and Utilities – Street Operations Division	✓	✓			✓	
Public Works and Utilities – Utilities Operations Division	✓	✓			✓	
Public Works and Utilities – Water Resources & Quality Division	✓	✓	✓		✓	
Public Works and Utilities – Utilities Engineering Division	✓	✓			✓	
Finance Department	✓				✓	
Human Resources – Risk Management	✓					✓
Information Technology	✓					
Economic Development	✓	✓				

During the planning process, the HMPC communicated through face-to-face meetings, e-mail, and social media (Facebook). The HMPC formally met two times during the planning period (August 31<sup>st</sup>, 2017 – April 19<sup>th</sup>, 2018). Meetings and workshops were also held before and after the kick-off meeting with city department heads and with the local power provider Tri-State Generation. The purpose of these meetings and workshops is described in **Table 3.5**. Agendas for each meeting and lists of attendees are included in **Appendix B**

**Table 3.5 Schedule of Meetings**

Meeting Date	Meeting Topic	Audience	Associated CRS Planning Steps*
June 27 <sup>th</sup> , 2017	Water Related Hazard Identification Meeting	Water Resources Management	1,3,4,5
July 13 <sup>th</sup> , 2017	Draft Risk Assessment and Hazard Identification	Stormwater and Floodplain Managers	1,3,4,5
July 18 <sup>th</sup> , 2017	Status of Plan Update Grant and Activities, Relationship between Risk Assessment and Existing Plans	City Department Directors and Managers	1,3,4,5
August 10 <sup>th</sup> , 2017	Risk Assessment Input and Scoring	Emergency Management Working Group	1,4,5
August 31 <sup>st</sup> , 2017	Kick-off and Hazard Identification Review Meeting	HMPC	1,2,3
September 29 <sup>th</sup> , 2017	Risk Assessment Workshop	Tri-State Generation	3,4
April 19 <sup>th</sup> , 2018	Risk Assessment, Goals Update and Mitigation Strategy Development Meeting	HMPC	4,5,6
			5,6,7,8

\* All 10 CRS Planning Steps were covered during the planning process. The text in this chapter provides more information on the fulfillment of the requirements for each step.

\* Steps 9 and 10 will take place once the plan is adopted.

The planning process officially began on August 31<sup>st</sup>, 2017, with a kick-off meeting in Westminster City Hall. The meeting covered the scope and purpose of the plan update, participation requirements of HMPC members, and the proposed project work plan and schedule. Wood plc. reviewed the list of identified hazards with HMPC members. Participants were encouraged to voice ideas for the project and to suggest other stakeholders that would be beneficial to the planning process. The meetings and workshops held before and after the kick-off meeting were specific to the directors of each city department, specific members of departments such as the stormwater, floodplain, and water resources managers, and the local power company, Tri-State Generation. Each meeting sought input from the participants to use their knowledge base to comment on the draft risk assessment and hazard identification. The sign-in sheets and agendas from each of these meetings can be found in **Appendix B**.

**Planning Step 2: Involve the Public**

The community outreach and engagement efforts for the planning process were led by the city’s Emergency Management Coordinator. Outreach has been a vital part of the update process beginning before the HMPC kickoff meeting with two community outreach events. Social media was a vital resource in garnering public input and awareness. Using the Westminster Emergency Management Facebook page, the Emergency Management Coordinator was able to engage thousands of citizens and invite them to participate in the risk assessment and plan update process. Outreach was also accomplished through articles in the city’s quarterly news publication, *The City Edition*, the city’s online weekly News, and the City of Westminster’s Facebook page asking for public participation and input in the planning process.

**Community Outreach Events**

A community outreach event was held on October 30, 2017 to allow the residents to provide input on local knowledge of hazards. Ten residents met with eight members of the HMPC, who briefed residents on the results of the risk assessment research. Resident participants were then given the opportunity to provide input on the identified hazards and risk scoring.

A second community outreach event was held on June 15, 2018 to invite public comment on the draft mitigation plan. The results of the community risk assessment and proposed mitigation projects were reviewed and discussed. Minor modifications to the relative risk rating of extreme heat and open space fire were made based on public comment. The eight residents attending this event also rated 16 of the 19

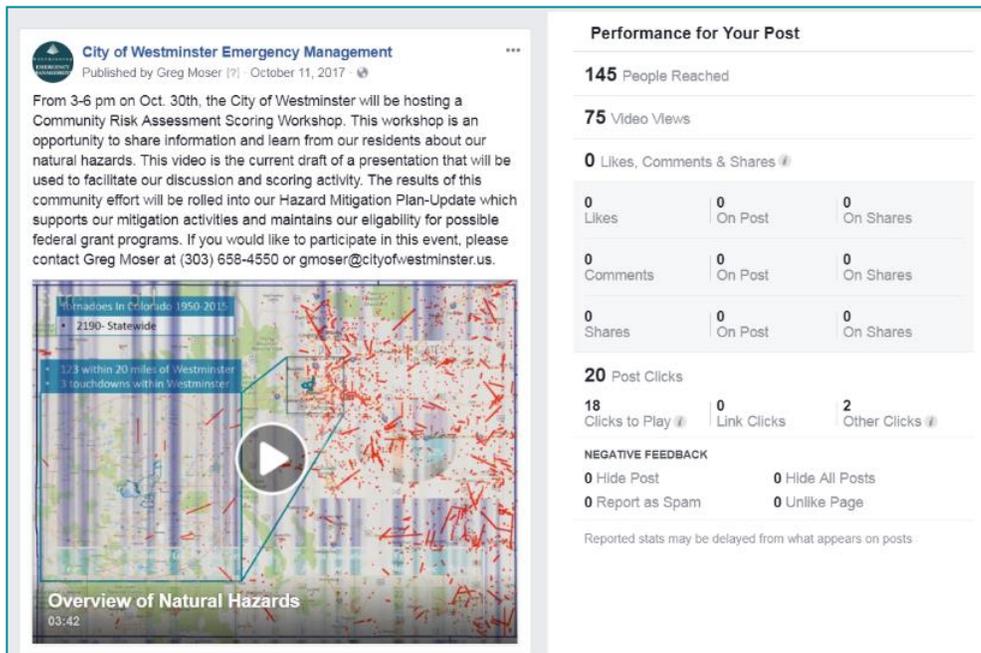
proposed mitigation projects as “high priority.” Although this lack of differentiation does not provide clear guidance on specific project priorities, it does reflect significant public support for the projects that have been identified.

Documentation of these meetings can be found in **Appendix B**.

### **Public Outreach through City Website and Social Media**

Westminster Emergency Management maintains an active Facebook page that as of June 2018, has 3,272 friends and 1,399 followers (see <https://www.facebook.com/City-of-Westminster-Emergency-Management-409969596020244/> ). Between April 2017 and June 2018, nineteen posts were related to natural hazard mitigation. Of those eight posts invited public participation in the risk assessment and plan update. Outreach through social media reached 11,229 people, produced 577 positive responses. The use of social media helped the HMPC improve the public’s awareness and engagement with the HMP-Update.

**Figure 3.1 Excerpts from Emergency Management Facebook Page**



**City of Westminster Emergency Management** shared **FEMA Federal Emergency Management Agency's** post. March 6 at 4:19pm

The City of Westminster is in the process of updating our natural hazard mitigation plan. These plans are based on a review of our natural hazards and the development priorities, strategies and projects to reduce the likelihood of these hazards or reduce their impact. If you would like to learn more or participate in our strategies workshop, please contact our Emergency Management Coordinator at 303 658-4550, or at [gmoser@cityofwestminster.us](mailto:gmoser@cityofwestminster.us).

**FEMA Federal Emergency Management Agency**  
March 6 at 12:05pm

2018 marks 30 years since the origin of our hazard mitigation programs, which help communities take measures to prevent damage from disasters. Hear from one of ...

See More

**0 Years**  
Hazard Mitigation Assistance

Look Back at 30 Years of Mitigation, helping communities rebuild stronger | FEMA.gov

This year marks the 30-year anniversary since the Robert T. Stafford Act was amended to include funding for hazard mitigation grants as a way to help...  
FEMA.GOV

643 people reached

**Performance for Your Post**

**643** People Reached

**56** Likes, Comments & Shares

50 Likes	50 On Post	0 On Shares
0 Comments	0 On Post	0 On Shares
6 Shares	6 On Post	0 On Shares

**12** Post Clicks

0 Photo Views	2 Link Clicks	10 Other Clicks
---------------	---------------	-----------------

**NEGATIVE FEEDBACK**

0 Hide Post	0 Hide All Posts
0 Report as Spam	0 Unlike Page

Insights activity is reported in the Pacific time zone. Ads activity is reported in the time zone of your ad account.

**City of Westminster Emergency Management** shared **NOAA NWS Space Weather Prediction Center's** video. May 9

We usually only concern ourselves with "is the sun shining, or is it cloudy?" Space (or solar) weather is a relatively new topic of concern for community preparedness. There are still many unknowns that science is trying to answer, but we know for certain that rare extreme solar events have the potential to significantly disrupt the power grid and communications systems. Geomagnetic storms are one of the hazards we are evaluating as part of our all-hazards community risk assessment. If you are interested in being part of our community risk assessment team, contact our Emergency Management Coordinator at [gmoser@cityofwestminster.us](mailto:gmoser@cityofwestminster.us) or (303) 658-4550. Be aware, be prepared, be safe.

**NOAA NWS Space Weather Prediction Center**  
June 19, 2014

Here is some fascinating imagery showing a filament eruption from 19 June, courtesy of NASA's Solar Dynamics Observatory (SDO) sun-orbit.

The attached please, is...

See More

27 people reached

**Performance for Your Post**

**27** People Reached

**0** Likes, Comments & Shares

0 Likes	0 On Post	0 On Shares
0 Comments	0 On Post	0 On Shares
0 Shares	0 On Post	0 On Shares

**0** Post Clicks

0 Photo Views	0 Link Clicks	0 Other Clicks
---------------	---------------	----------------

**NEGATIVE FEEDBACK**

0 Hide Post	0 Hide All Posts
0 Report as Spam	0 Unlike Page

Reported stats may be delayed from what appears on posts.

**City of Westminster Emergency Management** shared **Colorado United's** post. April 19

The floods of 2013 were record breaking for Colorado. A lot has been done to help the affected communities recover, but we all have to consider what we can do to make sure Westminster is as prepared as possible if we had a similar storm occur over us. The City recently receive a federal hazard mitigation planning grant that will help us assess our risk and develop mitigation strategies. Community engagement is a key part of the mitigation planning process. If you would like to participate in this effort, please contact our Emergency Management Coordinator at [gmoser@cityofwestminster.us](mailto:gmoser@cityofwestminster.us) or 303 658-4550.

**Colorado United**  
April 19

Hey Colorado! We just launched our Recovery Newsletter - Recovery in Colorado: The Latest on the 2013 Floods.

Check it out to learn more about the progress across...

See More

**Recovery in Colorado: The Latest on the 2013 Floods**

Colorado experienced the costliest disaster in state history in September of 2013. Record rainfall sent high-velocity floodwaters down mountain canyons and into the eastern plains. All told, the floods impacted 24 counties caused...

MAILCHL.MP

**Performance for Your Post**

**1,772** People Reached

**74** Reactions, Comments & Shares

70 Like	67 On Post	3 On Shares
2 Love	2 On Post	0 On Shares
1 Wow	1 On Post	0 On Shares
1 Comments	1 On Post	0 On Shares
0 Shares	0 On Post	0 On Shares

**69** Post Clicks

0 Photo Views	34 Link Clicks	35 Other Clicks
---------------	----------------	-----------------

**NEGATIVE FEEDBACK**

0 Hide Post	1 Hide All Posts
0 Report as Spam	0 Unlike Page

Insights activity is reported in the Pacific time zone. Ads activity is reported in the time zone of your ad account.

Published Posts				+	Create
Posts	Reach	Clicks/Actions	Published		
	3.2K	215	Jul 19, 2017 at 8:35am Greg Moser		
	87	1	Jan 8, 2018 at 9:18am Greg Moser		
	91	2	Jan 10, 2018 at 5:05pm Greg Moser		
	145	10	Oct 11, 2017 at 4:21pm Greg Moser		
	181	3	Apr 20, 2017 at 5:17pm Greg Moser		
	179	9	Jan 3, 2018 at 11:26am Greg Moser		
	13	1	Feb 1, 2017 at 9:58am Greg Moser		
	100	3	Jan 23, 2018 at 10:27am Greg Moser		
	112	4	Dec 3, 2017 at 10:39pm Greg Moser		
	0	0	Jan 31, 2017 at 11:00am Greg Moser		
	28	1	Mar 22, 2017 at 9:32am Greg Moser		
	11.8K	2	Oct 9, 2017 at 5:45pm Greg Moser		
	1.8K	110	Apr 19, 2017 at 7:35am Greg Moser		
	4.5K	210	Oct 10, 2017 at 5:20pm Greg Moser		
	643	57	Mar 6, 2018 at 5:19pm Greg Moser		
	10.6K	129	Oct 9, 2017 at 11:19am Greg Moser		

**City of Westminster Emergency Management** shared NOAA Climate Gov's post.  
July 19 at 8:35am

Colorado has warmed by 2 degrees in the past 30 years and 2.5 degrees in the past 50 years. (Source: [http://www.colorado.edu/.../Climate\\_Change\\_CO\\_Report\\_2014\\_FIN...](http://www.colorado.edu/.../Climate_Change_CO_Report_2014_FIN...)) Spring is coming 2-4 weeks earlier than it used to which increases our water usage. Our changing climate is one of the topics we will be considering in our updated natural hazard mitigation plan. If you would like to be part of our community risk assessment process, please contact our emergency management coordinator at (303) 658-4550 or [gmoser@cityofwestminster.us](mailto:gmoser@cityofwestminster.us). Be aware, be prepared, be safe.

**NOAA Climate Gov**  
July 18 at 8:35am

Confused about climate change and global warming? Brush up on the basics with our FAQ.



**Global Warming Frequently Asked Questions | NOAA Climate.gov**  
How do we know we can trust the historical surface temperature record? Did global warming stop in 1997? What actions can businesses or individuals...

**3,235** People Reached

**183** Reactions, Comments & Shares

77 Like	72 On Post	5 On Shares
2 Love	2 On Post	0 On Shares
4 Haha	4 On Post	0 On Shares
17 Wow	17 On Post	0 On Shares
16 Sad	16 On Post	0 On Shares
1 Angry	1 On Post	0 On Shares
67 Comments	60 On Post	7 On Shares
0 Shares	0 On Post	0 On Shares

**171** Post Clicks

0 Photo Views	27 Link Clicks	144 Other Clicks
---------------	----------------	------------------

**NEGATIVE FEEDBACK**

1 Hide Post	2 Hide All Posts
0 Report as Spam	0 Unlike Page

Insights activity is reported in the Pacific time zone. Ads activity is reported in the time zone of your ad account.

### Outreach through the City Edition

In addition to social media and community outreach events, citizen knowledge and engagement was also promoted through the city's quarterly news publication, the *City Edition*, which is mailed to all city residents and businesses and posted on the city's web site at <https://www.cityofwestminster.us/News/CityEdition>. The following articles related to the plan update were published in the City Edition during 2017-2018.

# Mitigation Just Makes Sense



Storm water running down an improved culvert is an example of mitigation by an alteration that reduces erosion and maintains water quality.

PREVIOUS ARTICLES ASKED YOU TO THINK about preparedness and assessing the hazards in our community. Anything you can do to ensure you and your family are prepared to shelter-in-place or evacuate helps make our community more resilient. Understanding our natural and human-caused hazards helps you be mentally prepared to act, and it brings us to the question of mitigation.

Emergency managers define mitigation as actions taken to reduce the loss of life and property by lessening the impact of disasters.

We refer to the four A's of mitigation: avoid, alter, adapt and accept.

- **Avoid** mitigation strategies are often the simplest, and involve such steps as not building in flood prone areas. This strategy has been used successfully in various areas of Westminster and was part of the decision-making and planning process behind our creation of open space along the Big Dry and Little Dry creeks.

- **Altering** strategies usually involves engineering and construction. Improving drainage ditches and culvert are examples of altering our flood hazards.

- **Adapting** to a hazard often has to do with the decisions we make when we build things. Using hail and fire resistant roofing materials is a good example of adapting to two hazards that are common in Colorado.

- **Accepting** a hazard means we recognize it and choose to live with it. Although we accept that winter storms are part of life in Westminster, we can still mitigate their effects by dressing warmly, maintaining emergency kits at home and in our cars, and keeping our snow blowers gassed up.

As part of our comprehensive emergency management program, the city is in the early stages of updating our natural hazard mitigation plan. The mitigation planning process is focused on assessing our natural hazards and identifying practical mitigation actions and projects that can help us build a more resilient community.

Past experience nationwide has proven that the best mitigation plans are the result of an all-community process. If you are interested in learning more about our mitigation planning efforts or participating in this process, contact the city's emergency management coordinator at 303 658-4550 or [gmoser@cityofwestminster.us](mailto:gmoser@cityofwestminster.us).

# Citizen Input Needed for Hazard Mitigation Planning



**Residents are needed to participate in a hazardous risk scoring workshop and development of mitigation priorities.**

Mitigation planning is one of the key elements of comprehensive emergency management and the creation of a safer, more resilient community. The city recently received a natural hazard mitigation planning grant, which will be used to update our community risk assessment and identify potential mitigation projects and priorities. Having and maintaining a hazard mitigation plan helps identify opportunities to reduce our vulnerability to natural hazards, and is a requirement for our eligibility for possible federal hazard mitigation project funds.

Citizen involvement is an essential element of our plan development. Interested citizens will be invited to participate in our risk scoring workshop and in the development of our possible mitigation projects and priorities.

The risk scoring workshop will review historical information on past natural hazard events and

consider how our changing environment may influence future events. Once our hazards have been scored, we will identify options to reduce the likelihood or impact of each hazard.

We anticipate up to two community events/workshops of about four hours each.

In addition to providing your input, it will be a fun way to meet other Westy residents and learn about what we can do to make our community as safe and resilient as possible. Your time is counted as part of the grant's requirement for the city to provide matching resources and community involvement.

If you would like to learn more or if you are interested in participating in either or both of the workshops, contact Emergency Management Coordinator Greg Moser at [gmoser@cityofwestminster.us](mailto:gmoser@cityofwestminster.us) or 303 6588-4550.

Figure 3.4 City Edition Article October – November 2017 Edition

### Faults and Earthquakes Near Westminister, CO

- Quaternary Fault
- Colorado Faults
- Historically Sig. EQs

## Volunteers Needed to Assess Natural Hazards

Blizzards, floods, drought, earthquakes and tornados are just a few of the natural hazards we face in Westminister. Which ones are most likely? How often do they occur? How serious are they when they do occur? These are all questions we have to consider when assessing our natural hazards. Based on our answers, we are able to prioritize the hazards and start developing strategies to reduce the likelihood of many hazards and reduce the potential impact of all hazards.

The City of Westminister recently received a grant through the state from the Federal Emergency Management Agency (FEMA) to help us assess our natural hazards and develop mitigation strategies and priorities. And we're asking for your help.

One of the principals of whole-community emergency management is to involve the community in our risk assessment and mitigation planning effort. It is a great opportunity to get the benefit of the local knowledge and concerns to make sure the plan reflects the priorities of our residents.

Westminister Emergency Management will be scheduling a natural hazard scoring workshop as soon as we can identify a group of volunteers who are interested in helping us evaluate and rank our natural hazards.

This event will include a free meal and a presentation of the hazard research already done by city staff, and then wrap up with a fun and interactive hazard scoring activity where residents will be invited to score the likelihood and impact of our various natural hazards.

If you would like to participate in the workshop, please contact Emergency Management Coordinator Greg Moser at [gmoser@cityofwestminister](mailto:gmoser@cityofwestminister) or 303 658-4550.

Figure 3.5 City Edition Article April-May 2018 Edition

# Natural Hazard Mitigation Plan Update

		Natural Hazard/Threat Summary					
Likelihood	Most	E	• Windstorm	• Lightning • Hail	• Severe Winter Storm	• Invasive & Noxious Species	• Climate Change • Drought
	D	• Open Space Fire		• Extreme Cold	• Drainage Flooding		
	C				• Street Flooding		
	B		• Extreme Heat		• Tornado	• Pandemic	
	Least	A			• Earthquake		• Geomagnetic Storm
			1	2	3	4	5
			Consequences				
			Lowest				Highest

Westminister's natural hazards were identified and ranked by community stakeholders and citizens working on this data over the last few months.

Droughts, floods, winter storms and earthquakes are a few of the natural hazards that could impact Westminister. Over the past few months, city staff has been working with community stakeholders and interested citizens to identify and rank our natural hazards. Now that we are wrapping up the risk assessment process, we need to think about what we can do to mitigate these hazards.

The purpose of mitigation is to reduce the likelihood of natural disasters and reduce their impacts when they do occur. What we do to mitigate a hazard is generally very specific to the hazard. For example, what we can do to mitigate the impact of a drought is very different from what we can do to mitigate a flood. Mitigation activities often include both structural and non-

structural mitigation actions. In the case of flooding, we can improve drainage and retention structures and encourage property owners in the floodplain to participate in the National Flood Insurance Program.

As with preparedness, mitigation is a shared responsibility of the whole community. We all need to understand our natural hazards and consider what we can do to protect our families, pets, property and businesses.

If you would like to learn more about our mitigation planning efforts or participate in the development of our mitigation plan, please contact Emergency Management Coordinator Greg Moser at [gmoser@cityofwestminister.us](mailto:gmoser@cityofwestminister.us) or 303 658-4550.

**Figure 3.6 Notice of Public Input Posted on City of Westminster Website**



### **Planning Step 3: Coordinate with Other Departments and Agencies**

Early in the planning process, the HMPC determined that data collection, mitigation strategy development and plan approval would be greatly enhanced by inviting other local, state and regional agencies and organizations to participate in the process. Based on their involvement in hazard mitigation projects or planning, and/or their interest as a neighboring jurisdiction, representatives from the following agencies were invited to participate on the HMPC. These are noted under planning step 1. Some of these representatives participated at HMPC meetings while others stayed in the loop by email and reviewed drafts of the plan.

In addition to those listed in the HMPC table under Other Government Stakeholder Representatives, the HMPC used technical data, reports and studies from the following agencies and groups. The HMPC obtained this information either from online or directly from the organization. The information gained from these agencies and organizations were used in the update of this plan. More specific references can be found in **Appendix A**.

- Big Dry Creek Watershed Association
- Center for Disease Control
- City of Arvada
- City of Broomfield
- Colorado Department of Agriculture
- Colorado Department of Public Health and Environment
- Colorado Department of Water Resources
- Colorado Division of Homeland Security and Emergency Management
- Colorado Earthquake Hazard Mitigation Council
- Colorado Geologic Survey
- Colorado Intergovernmental Risk Sharing Agency
- Colorado Parks and Wildlife
- Colorado State Forest Service
- Colorado State University
- Colorado Water Conservation Board
- Commission to Assess the Threat to the U.S. from Electromagnetic Pulse (EMP) Attack

- Committee on the societal and Economical Impacts of Severe Space Weather events Workshop
- Congressional Research Service
- Department of Homeland Security
- Earth System Research Laboratory
- Environmental Protection Agency
- Federal Bureau of Investigation
- Federal Emergency Management Agency
- Homeland Infrastructure Foundation
- Insurance Institute for Business and Home Safety
- International Federation of Red Cross and Red Crescent
- Massachusetts Institute of Technology Information Systems
- National Center for Environmental Health
- National Cybersecurity and Communications Integration Center
- National Geographic
- National Institute of Standards and Technology
- National Intelligence Council
- National Oceanic and Atmospheric Administration National Center for Environmental Information
- National Severe Storms Laboratory
- National Transportation Safety Board
- National Weather Service
- Natural Resource Conservation Service
- Rocky Mountain Insurance Information
- Senate Armed Services Committee
- State and Federal Historic Preservation Offices
- U.S. Department of Agriculture
- U.S. Geological Survey
- U.S. Global Change Research Program
- University Corporation for Atmospheric Research
- Western Regional Climate Center
- World Health Organization

### ***Other Community Planning Efforts and Hazard Mitigation Activities***

Hazard mitigation planning involves identifying existing policies, tools, and actions that will reduce a community's risk and vulnerability from natural hazards. As such, this plan was coordinated with, and builds from, other related planning efforts that help reduce hazard losses. The City of Westminster uses a variety of comprehensive planning mechanisms, such as a master plan, an emergency response plan and city policies, to guide growth and development. Integrating existing planning efforts and mitigation policies and action strategies into this multi-hazard mitigation plan establishes a credible and comprehensive plan that ties into and supports other community programs. The development of this plan incorporated information from the following existing plans, studies, reports and initiatives as well as other relevant data from Adams and Jefferson Counties and the State of Colorado. These and other related plans are discussed further in **Section 2.5 Assessing Capabilities**.

#### **These plans include:**

- 2007 Storm Drainage Study (City of Westminster)
- 2013 State of Colorado Natural Hazard Mitigation Plan
- City of Westminster Comprehensive Plan
- City of Westminster Drought Plan
- City of Westminster Emergency Plan and Management System
- City of Westminster Strategic Plan
- City of Westminster Sustainability Plan (2019)
- Colorado Communities for Climate Change Study
- FEMA Flood Insurance Study

- Open Space Master Plan (City of Westminster)
- Police Service Program
- Source Water Protection Plan
- State of Colorado Emergency Operations Plan
- Various Flood Studies
- Watershed Fire Study

Surrounding counties and communities' mitigation plans

- Adams County Hazard Mitigation Plan
- City and County of Broomfield Hazard Mitigation Plan
- Jefferson County Multi-Hazard Mitigation Plan
- Thornton//Federal Heights/Northglenn Hazard Mitigation Plan

Other documents were reviewed and considered, as appropriate, during the collection of data to support Planning Steps 4 and 5, which include the hazard identification, vulnerability assessment and capability assessment.

### 3.4.2 PHASE 2: ASSESS RISKS

#### **Planning Steps 4 and 5: Identify the Hazards and Assess the Risks**

The Emergency Management Coordinator researched and identified all the natural hazards that have, or could impact the city. Where data permitted, geographic information systems (GIS) were used to display, analyze and quantify hazards and vulnerabilities. The HMPC also updated a mitigation capability assessment to review and document the city's current capabilities to mitigate risk and reduce vulnerability from natural hazards. By collecting information about existing government programs, policies, regulations, ordinances and emergency plans, the HMPC can assess those activities and measures already in place that contribute to mitigating some of the risks and vulnerabilities previously identified. A more detailed description of the risk assessment process and the results are included in **Chapter 4: Risk Assessment**; the Capability Assessment is described in **Section 2.5**.

### 3.4.3 PHASE 3: DEVELOP THE MITIGATION PLAN

#### **Planning Steps 6 and 7: Set Goals and Review Possible Activities**

Wood plc. facilitated brainstorming and discussion sessions with the HMPC that described the purpose and the process of developing planning goals and objectives, a comprehensive range of mitigation alternatives and a method of selecting and defending recommended mitigation actions using a series of selection criteria. This information is included in **Chapter 5: Mitigation Strategy**. Additional documentation on the process the HMPC used to develop the goals and strategy is in **Appendix B**.

#### **Planning Step 8: Draft an Action Plan**

Based on input from the HMPC regarding the draft risk assessment and the goals and activities identified in Planning Steps 6 and 7, Wood plc. produced a complete draft of the updated plan. Other agencies were invited to comment on this draft as well. HMPC and agency comments were integrated into the second updated draft, which was advertised and posted for review and comment on the city's website. Wood plc. integrated comments and issues from the public, as appropriate, along with additional internal review comments and produced a final draft for the Colorado Division of Homeland Security and Emergency Management and FEMA Region VIII to review and approve, contingent on final adoption by the City Council.

### 3.4.4 PHASE 4: IMPLEMENT THE PLAN AND MONITOR PROGRESS

#### **Planning Step 9 Adopt the Plan**

To secure buy-in and officially implement the plan, the plan was adopted by the City of Westminster City Council on the dates included in the adoption resolution in **Appendix C: Adoption Resolution**. Once the adoption is complete, final approval by FEMA occurs.

#### **Planning Step 10: Implement, Evaluate, and Revise the Plan**

The HMPC developed and agreed upon an overall strategy for plan implementation and for monitoring and maintaining the plan over time. Since its initial development the City of Westminster has been proactive in implementing the mitigation actions identified in the plan. A discussion on the progress with implementation is included in **Chapter 5**. Each recommended mitigation action includes key descriptors, such as a lead manager and possible funding sources, to help initiate implementation. An overall implementation strategy is described in **Chapter 7: Plan Implementation and Maintenance**.

Finally, there are numerous organizations within the city whose goals and interests interface with hazard mitigation. Coordination with these other planning efforts, as addressed in Planning Step 3, is paramount to the ongoing success of this plan and mitigation in the City of Westminster and is addressed further in **Chapter 7**. An updated overall implementation strategy and maintenance and a strategy for continued public involvement are also included in **Chapter 7**.

## 4 RISK ASSESSMENT

***Requirement §201.6(c)(2): [The risk assessment shall provide the] factual basis for activities proposed in the strategy to reduce losses from identified hazards. Local risk assessments must provide sufficient information to enable the jurisdiction to identify and prioritize appropriate mitigation actions to reduce losses from identified hazards.***

A simple way to define risk is the relationship between hazards and vulnerabilities. Reducing community risk through preparedness, mitigation, prevention, protection, response, continuity and recovery is the primary purpose of emergency management. To address community risk, we must first develop a robust, evidence-based assessment of our hazards and vulnerabilities and recognize that both change over time.

Hazards encompass both natural and human-caused phenomenon that have the potential to cause harm. Natural hazards are primarily meteorological, geological, environmental or epidemiological. Natural hazards generally provide extensive historical records to support our analysis and understanding. However, as recent trends in global weather are demonstrating, natural hazards are not a steady state and the historical record supports the observation that the environment goes through cycles which may be influenced by human activity.

Historically, pandemics have been the greatest threat to our communities and as a result, public health programs were among our first efforts to mitigate natural hazards. Human-caused hazards (technical/industrial), are a result of our technological development. Some aspects of technical/industrial hazards, such as chemicals, have a well establish history as a hazard. Other technologies, such as cyber infrastructures, are more recent developments and our understanding of the inherent hazards associated with this technology is continuing to develop. Technical/industrial hazards change much more quickly than natural hazards. They are also generally limited in their geographic extent, but some hazards such as radiological contamination resulting from the Chernobyl and Fukushima nuclear accidents have had global impacts.

Threats are a sub-category of human-caused hazards. Threats are intentional and include crime, terrorism and war. Civil defense, the predecessor of today's comprehensive emergency management, was created to help protect our communities from the dangers of war. Each of these hazards present unique potential to cause harm to our human, material, economic and environmental assets. Hazards may also occur concurrently or sequentially with or without a direct relationship

### 4.1 COMMUNITY DESCRIPTION

#### 4.1.1 POPULATION AND DEMOGRAPHICS

The city has approximately 115,545 residents and the average age is just over 35 years old. The average household income in 2013 was \$63,520. Westminster is the 7th most populace city in Colorado and 247th most populace city in the United States. Its population density is 3,363 per square mile.

10.5% of the population is foreign born and 17.2% speaks a language other than English in the home. In 2010, 7% of the population was under 5 and 9.1% was over 65 years of age. 34.6% of the persons over 25 years old have a bachelor's degree or higher.

There are approximately 41,821 households with an average size of 2.6 persons. The median household income in 2014 was \$66,300 and the per capita income was \$31,694. 10.6% of the population live below the American Community Survey poverty line. (City-Data.com 2016) (Wikipedia 2016) (Census 2015)

- 80% White
- 20% Asian, Black, Native American and other
- 22.2% are ethnically Hispanic (primarily in southern Westminster)
- Approximately 10-15% of the population has access or functional needs

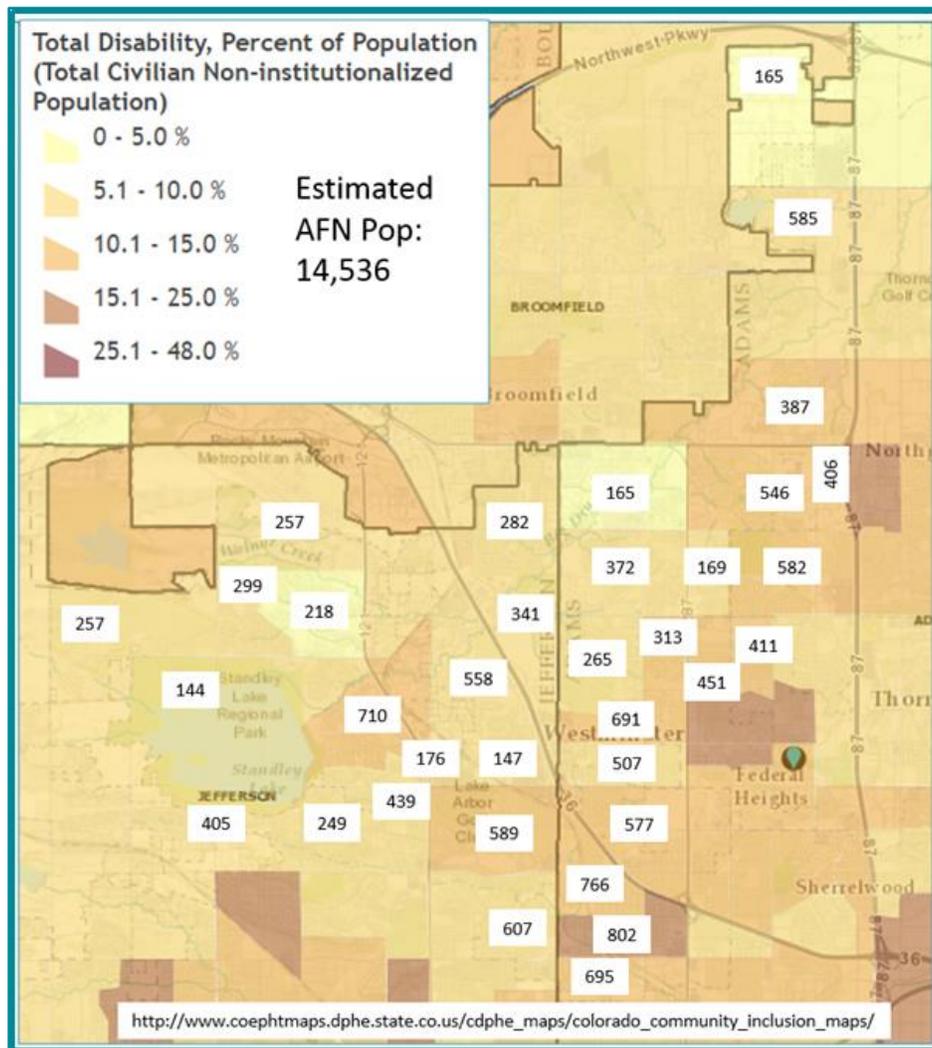
- Education Attainment:
- 33.2% hold bachelor degrees
- 10.8% hold master's, professional, or doctoral degrees
- Households: 45,725 (60.4% owner occupied, 36.3% rental)

#### 4.1.2 HIGH VULNERABILITY POPULATIONS

##### ACCESS AND FUNCTIONAL NEEDS

The Colorado Department of Public Health and Environment data indicates that approximately 14,536 Westminster residents have some form of disability (i.e. mobility, cognitive, sensory, independent living and self-care). CDPHE's web site on Community Inclusion in Colorado maintains detailed AFN demographic and community resource information. (C. D. Environment 2016)

**Figure 4.1 Percent of Population with Total Disability**



Source: CDPHE

##### HOMELESS AND ECONOMICALLY VULNERABLE

Poverty, food security, affordable housing and homelessness continue to be a challenge to our overall quality of life, resilience and sense of community. The cost of living in Colorado rose by 32% between

2001 and 2015. Our poverty level has doubled to 9% during the past ten years. Homelessness and food security are also growing.

- 60% of our homeless population are employed
- 100 – the approximate number of people living on the streets, in camps or in cars on any given day
- An estimated 1000 Westminster K-12 students meet the Department of Education’s definition of homeless
- 2,500 – the approximate number dependent on temporary housing with family and friends on a given day (based on Department of Education standards)
- 7,500 - estimated number of homeless associated with, but not captured in DOE methodology
- 10,000 (9%) of our population living at or below the poverty rate.
- In 2017, 12.9% of households were below the poverty level and 15.8% of children were in households with supplemental security income, cash public assistance income of Food Stamps/SNAP benefits.
- Westminster has approximately 762 mobile home units.

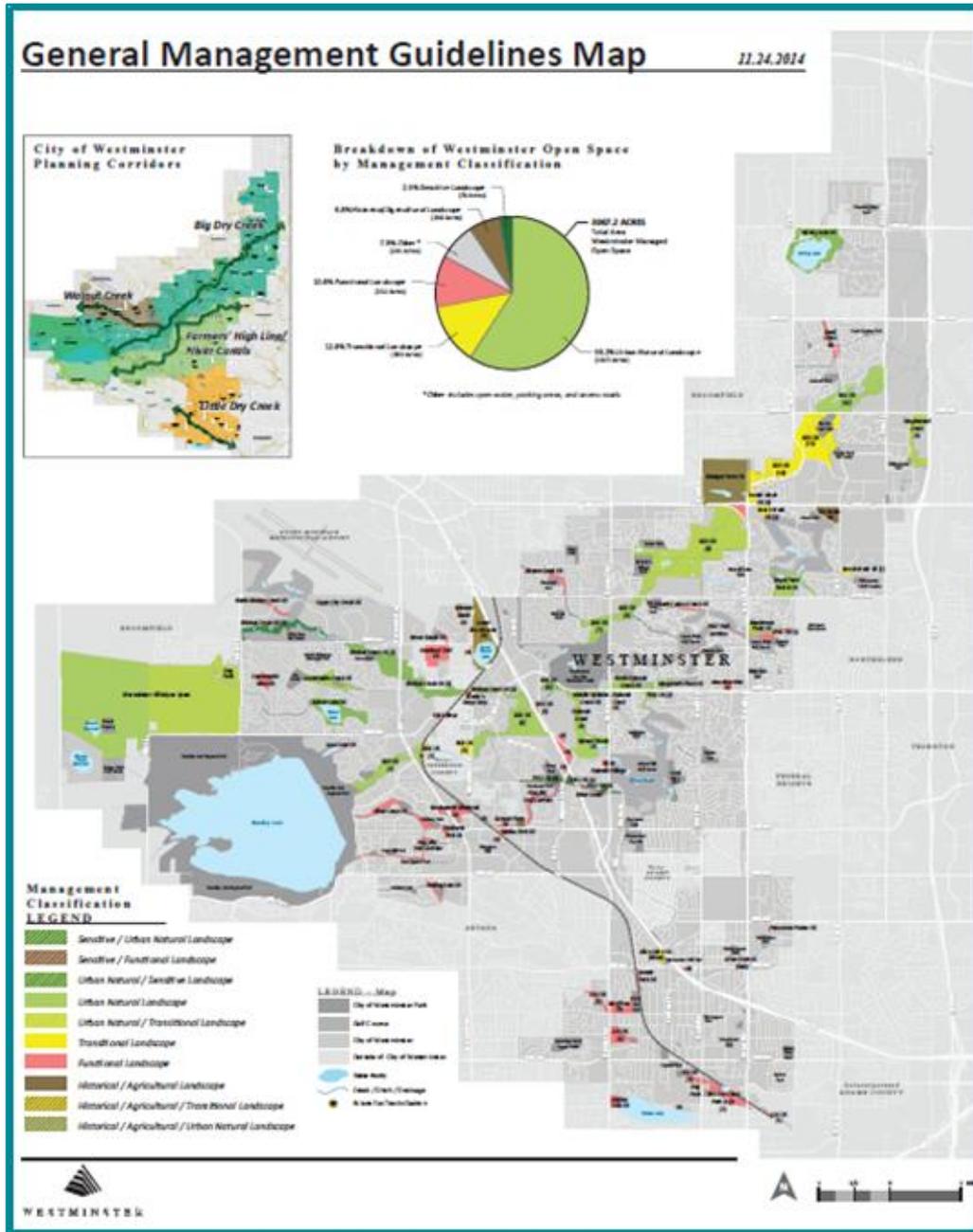
Our emergency/disaster planning efforts must ensure our AFN, homeless, and economically vulnerable populations are provided equal access and provided reasonable accommodation.

### 4.1.3 OPEN SPACE

In 1985, the city established the goal to maintain 15% of the area as open space. As a result, we have 3067.2 acres of managed open space that preserves our environment and enhances life for our residents:

- Urban and Natural Landscape - 1,815 acres
- Transitional Landscape – 393 acres
- Functional Landscape – 332 acres
- Historic/Agricultural – 208 acres
- Sensitive Landscape - 78 acres
- Other – 241 acres (Studio CPG and ERO Resource Corporation 2014)

Figure 4.2 City of Westminster General Management Guidelines



Source: City of Westminster

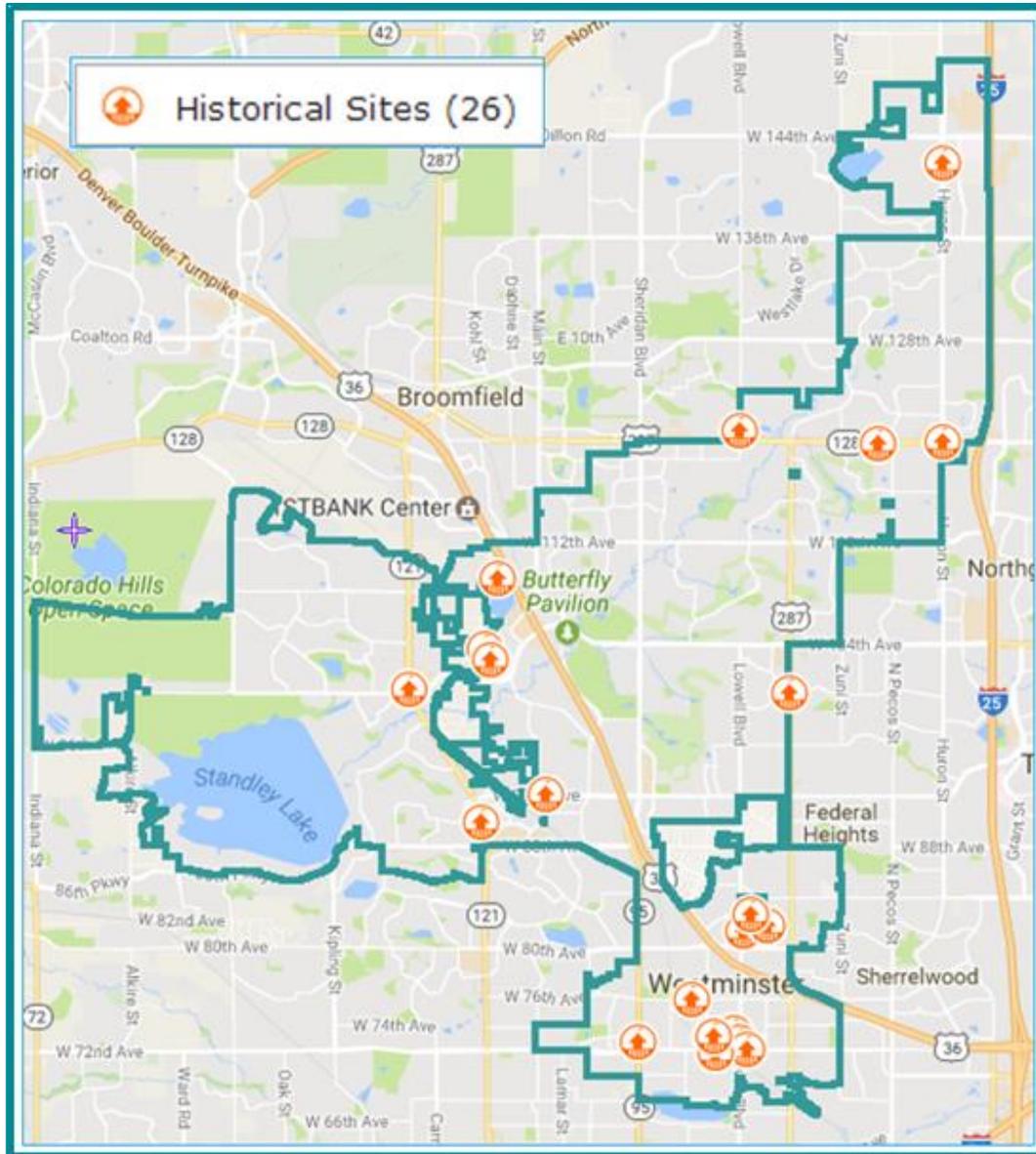
#### 4.1.4 HISTORIC SITES

There are 26 identified historic sites in the city. The city web site also identifies 13 local landmarks, 4 locally landmarked residences and 7 sites on the State and/or National Register of Historic Places.

- 6 X Residences
- 9 X Farm, ranch, agriculture related
- 4 X Commercial
- 2 X Civic/government

- 4 X Educational
- 1 X Cemetery

**Figure 4.3 Historic Sites in City of Westminster**



Source: City of Westminster

#### 4.1.5 CITY CRITICAL INFRASTRUCTURE

The City of Westminster’s Municipal Code, Section 11-8-20 identifies the following categories of critical fatalities:

1. Essential service facilities including public safety, emergency response, emergency medical, designated emergency shelters, communications, public utilities plants and transportation lifelines.

2. Hazardous materials facilities include facilities that produce or store highly volatile, flammable, explosive, toxic and/or water-reactive materials
3. At-risk populations, facilities include medical care, congregate care, and schools
4. Facilities vital to restoring normal services including government operations

Westminster has a relatively young infrastructure with much of it having been built in the last 30 years. As a result, much of its infrastructure is comparatively young and has benefited from modern codes and standards. The city owns 309 insured structures with a cumulative 2016 value of \$372,623,059 (CIRSA 2016).

## **PUBLIC SAFETY AND EMERGENCY RESPONSE FACILITIES**

The city maintains a robust Emergency Response capability with the following resources.

### Facilities:

- 1 X Public Safety Center with combined dispatch
- 6 X Fire Stations

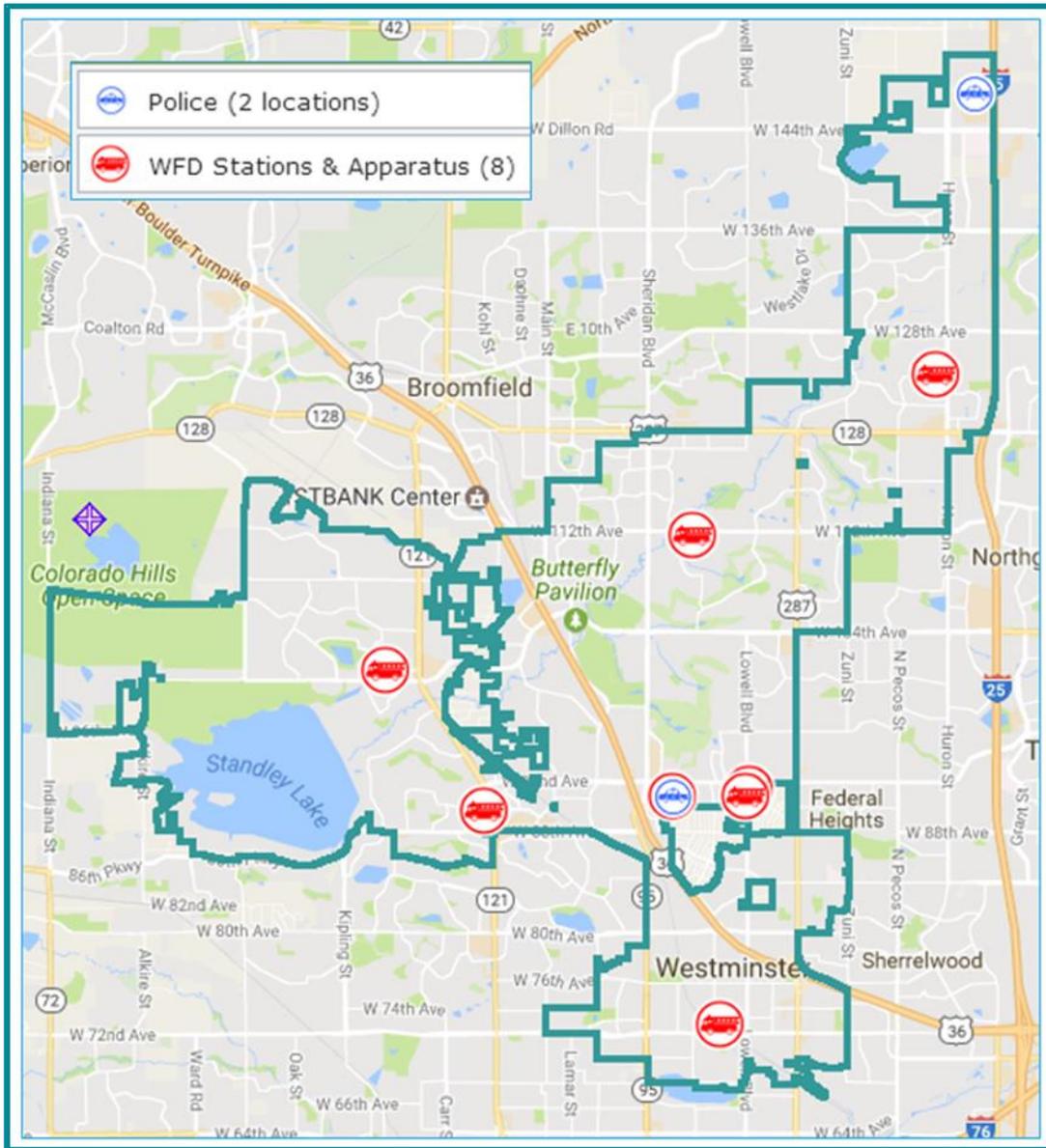
### Fire Apparatus:

- 6 X Type II ALS Ambulances
- 7 X Type I Fire Engines
- 2 X Type VI Brush Trucks
- 3 X Type I Fire Trucks
- 1 X Dive Boat with trailer
- 1 X Hazmat Response Vehicle (AJHA)
- 1 X Heavy Rescue
- 1 X MERV
- 4 X Command Vehicles

### Police Vehicles:

- 37 X Ford CVs
- 15 X Harley Davidsons
- 16 X Ford Interceptors
- 18 X Various vehicles
- 3 X Trailers
- 1X SWAT vehicle

**Figure 4.4 Location of Emergency Response Facilities**



Source: City of Westminister

### **EMERGENCY MEDICAL FACILITIES**

The following facilities are within Westminister city limits:

- St. Anthony's North Hospital (Trauma III)
- St. Anthony's Community Medical (Trauma IV)

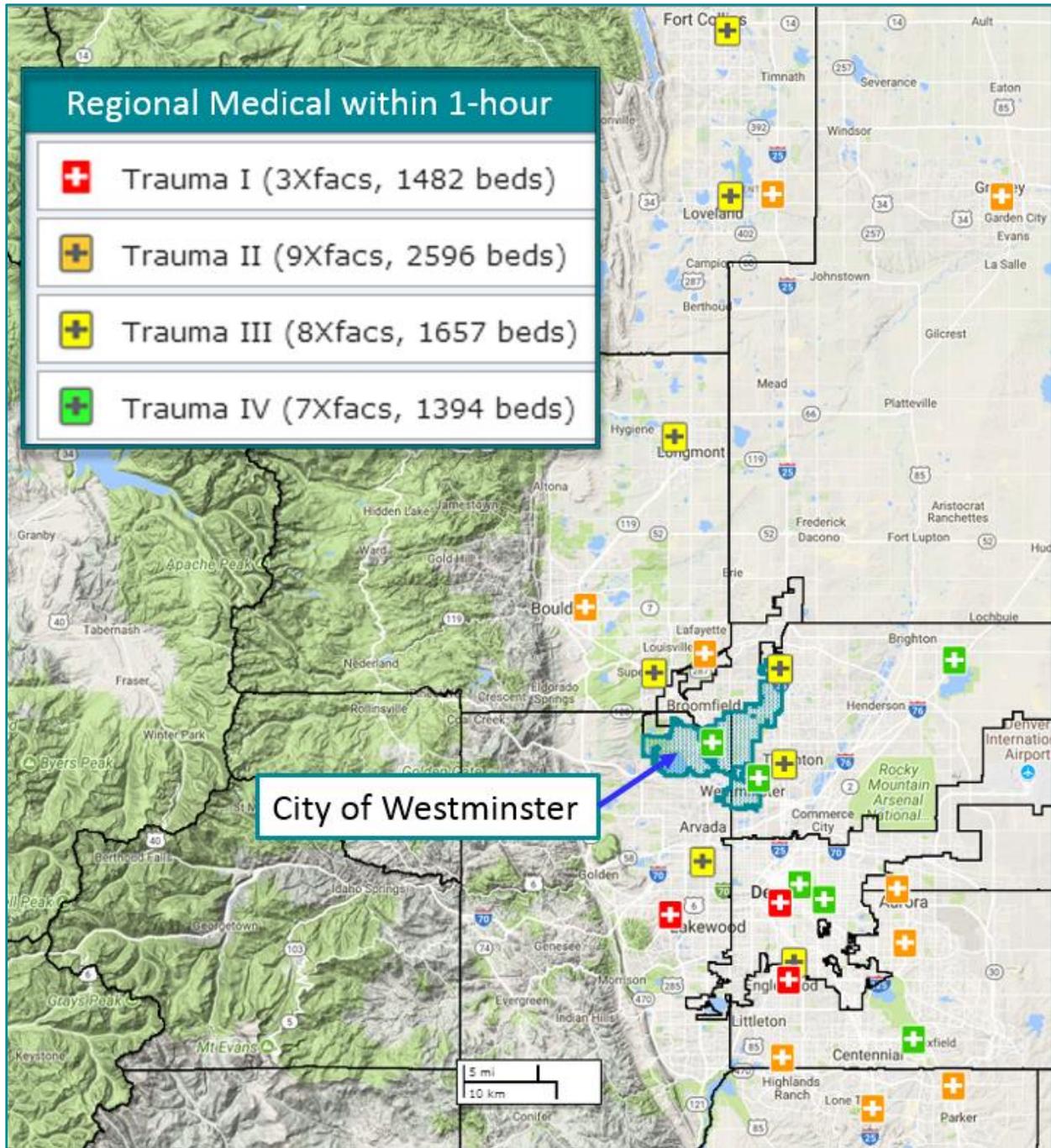
There are 27 medical facilities with associated trauma capacity and a total of 7,133 hospital beds within 1-hour of Westminister.

- 3 X Trauma I
- 9 X Trauma II

- 8 X Trauma III
- 7 X Trauma IV

There are also numerous specialty and chronic care clinics and hospitals in the Denver metro area.

**Figure 4.5 Regional Medical Facilities**



Source: City of Westminster

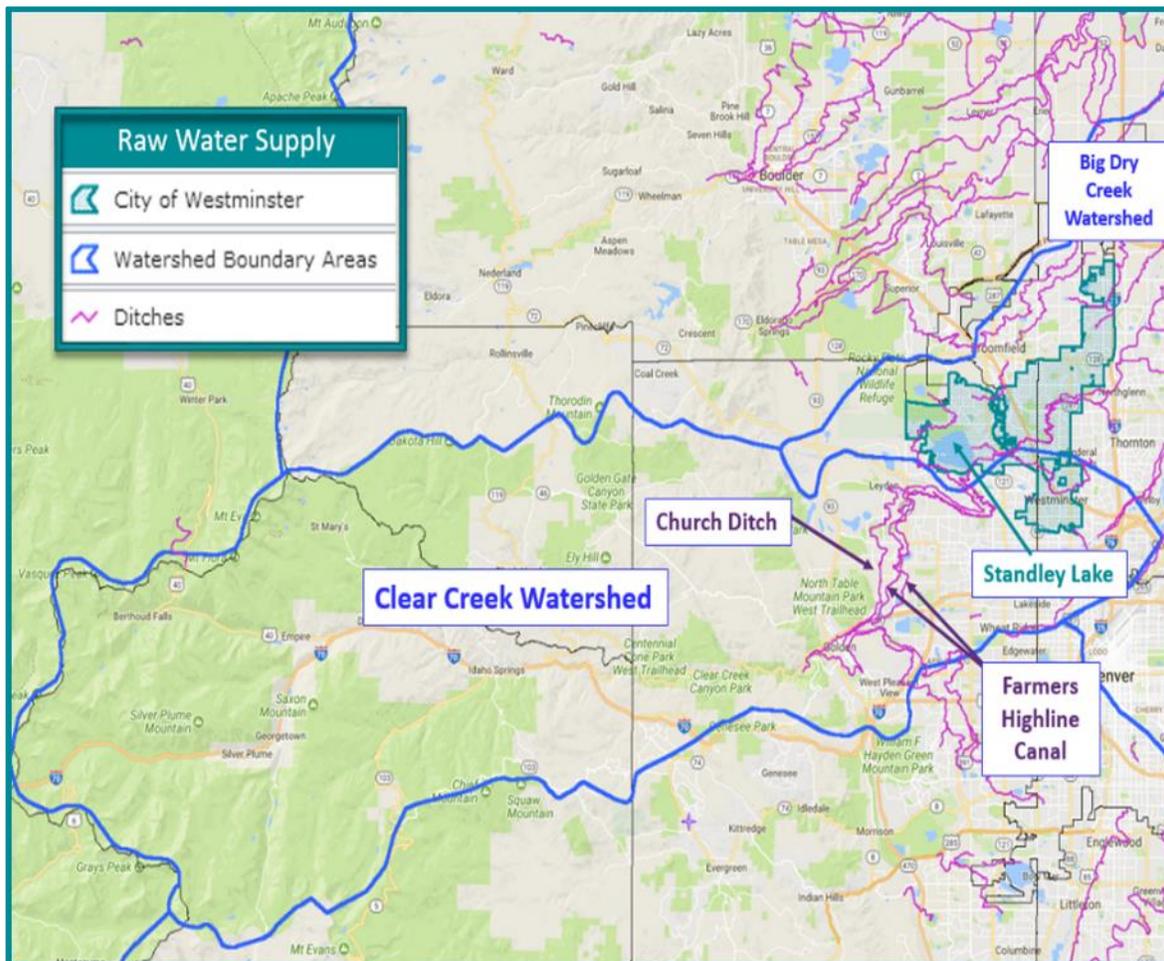
## PUBLIC UTILITIES

Early in its development, Westminster depended on well water. Rising demand and water quality issues drove the city to establish cooperative agreements with the agricultural entities in the area to use the existing network of irrigation ditches to bring water from Clear Creek near Golden and share Standley Lake as the city's primary water storage facility. Much of the city's water originates as snowpack in the Clear Creek watershed (90 %) and is carried to Standley Lake via canals/ditches and stored in Standley Lake. (Wright Water Engineers)

While this supply has historically been reliable and high quality, low snow pack and watershed degradation due to wildfire, invasive species and other factors has the potential to reduce the quantity and quality of the city's raw water supply. Continuing growth and development are also contributing to the stress on this critical resource.

The city manages raw water resources, purification, distribution, waste water treatment and storm water. (Wright Water Engineers)

**Figure 4.6 City of Westminster Water Supply Sources**

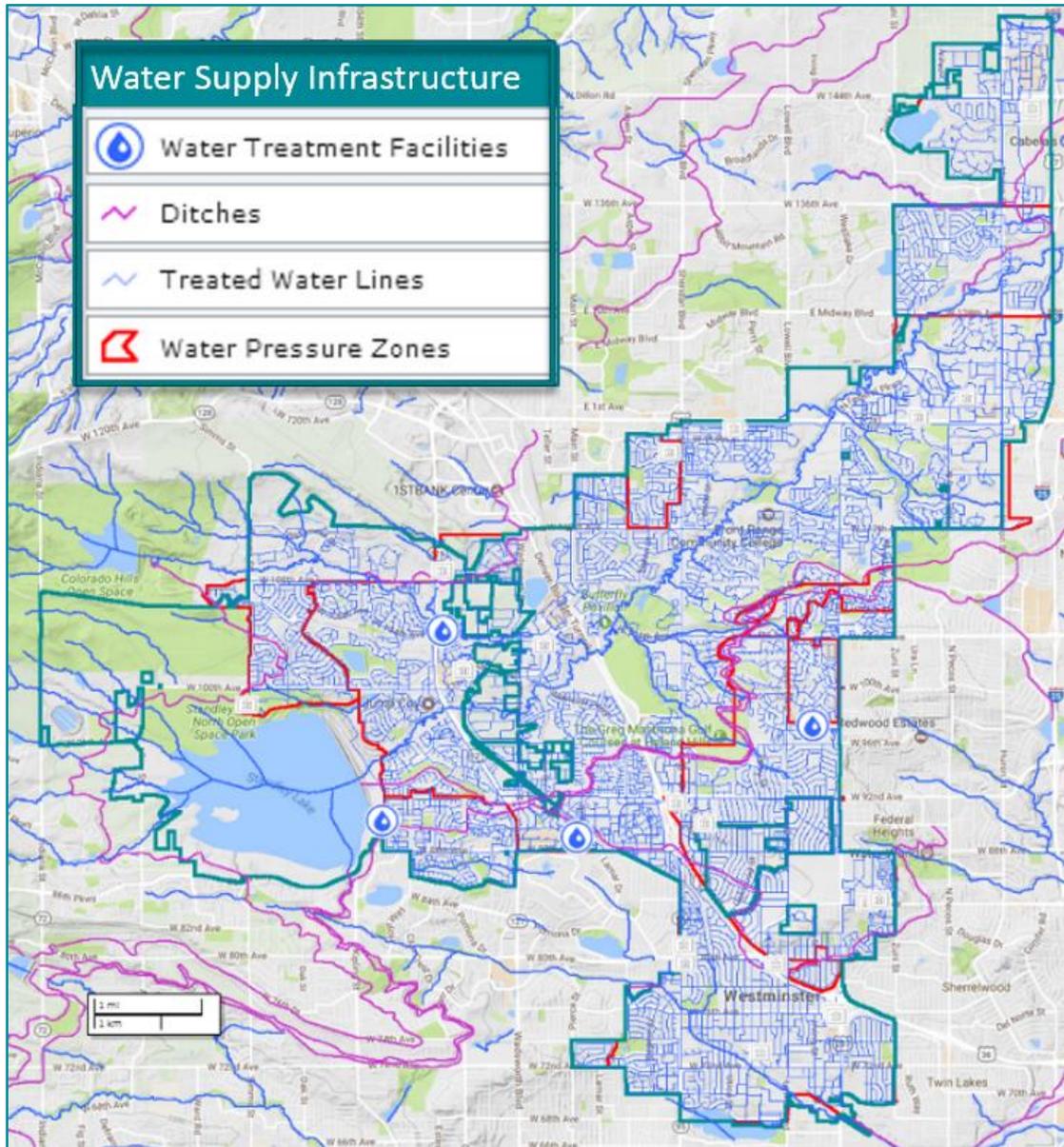


Source: City of Westminster

- Standley Lake – 43,000 acre-feet of water (primary water storage)

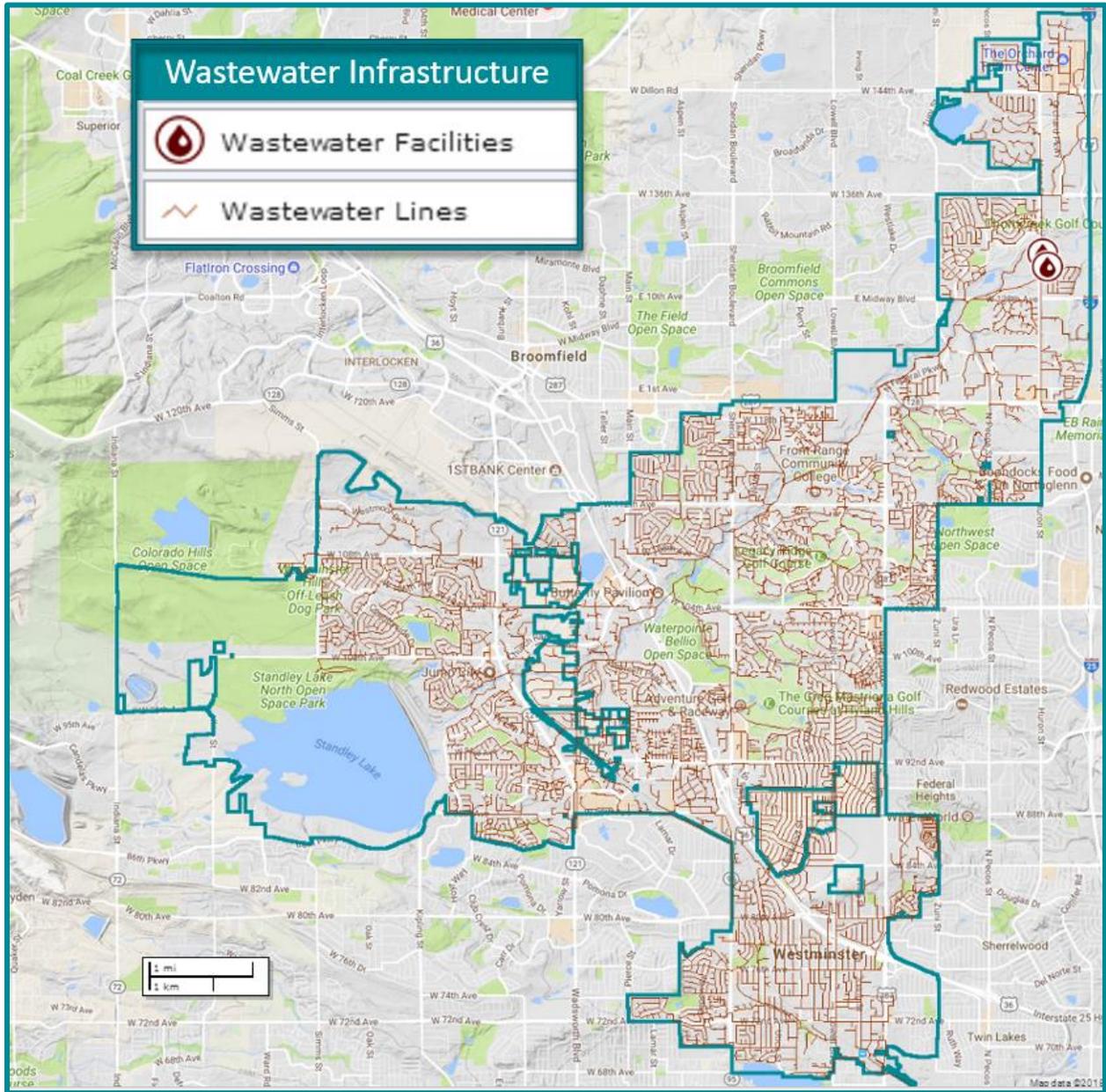
- Semper Water Treatment Plant
- Dry Creek Waste Water Treatment
- Treated Water Lines – 553.55 miles
- Waste Water Lines – 414.73 miles
- Water Meter Accounts – 32,746
- Pressure Zones – 13 (Nolte 2016)

**Figure 4.7 City of Westminster Water Supply Infrastructure**



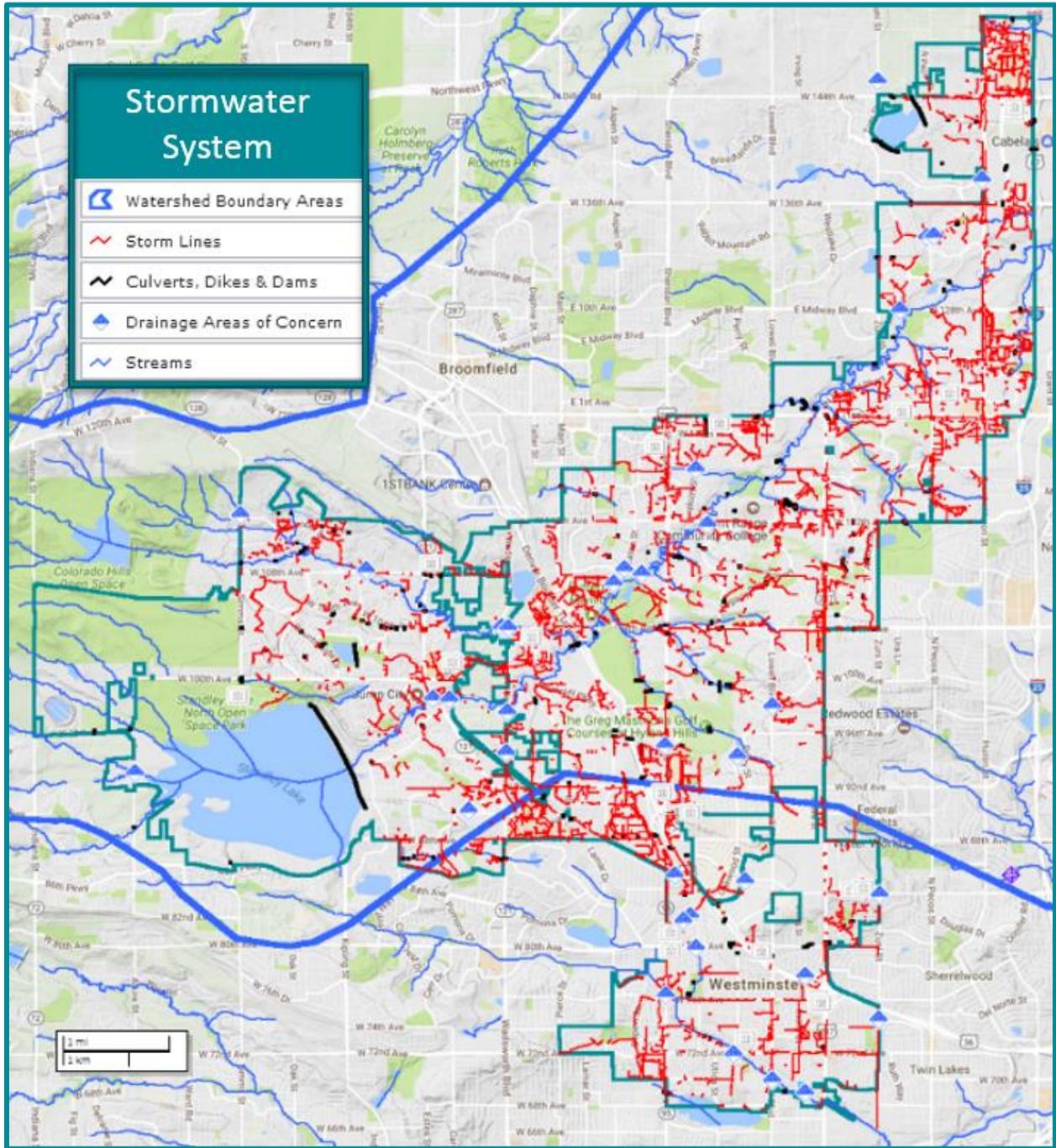
Source: City of Westminster

Figure 4.8 City of Westminster Waste Water Infrastructure



Source: City of Westminster

Figure 4.9 City of Westminster Stormwater Infrastructure



Source: City of Westminster

### HAZARDOUS MATERIALS

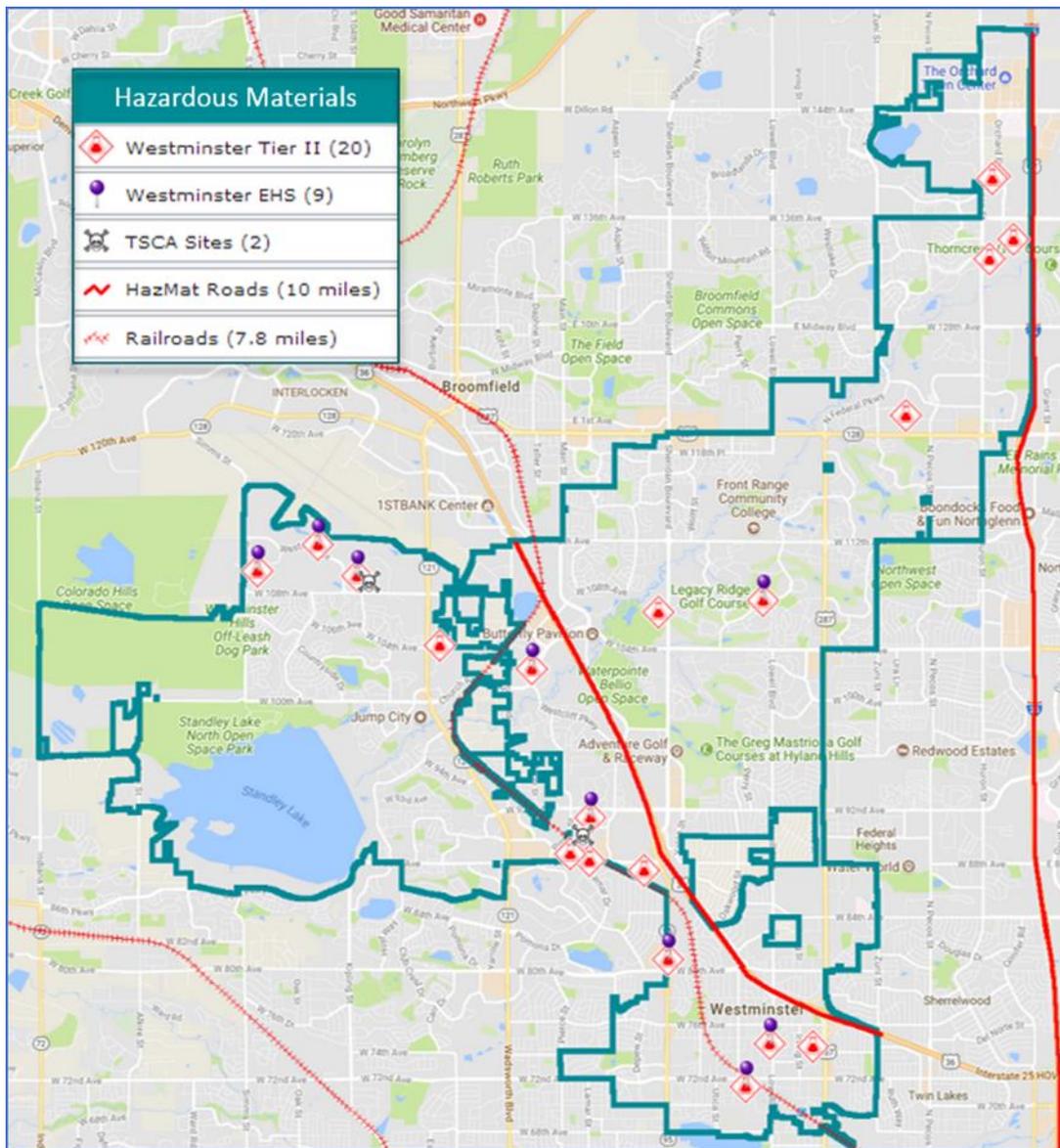
The city is bordered by four miles of I-25 and is transected by approximately eight miles of US 36 and the BNSF rail line which are designated routes for hazardous materials.

There are 403 EPA regulated sites within the city. There are hazardous materials associated with commercial and public utilities activities at 20 locations within the city. Several of these locations report under multiple federal requirements.

- 20 X Tier II Sites
- 9 X Extremely Hazardous Substance Sites
- 2 X Toxic Substance Control Act Sites

There are no reported Toxic Release Inventory or Risk Management Plan required sites within the city.

**Figure 4.10 Types and Locations of Hazardous Materials**



Source: City of Westminster

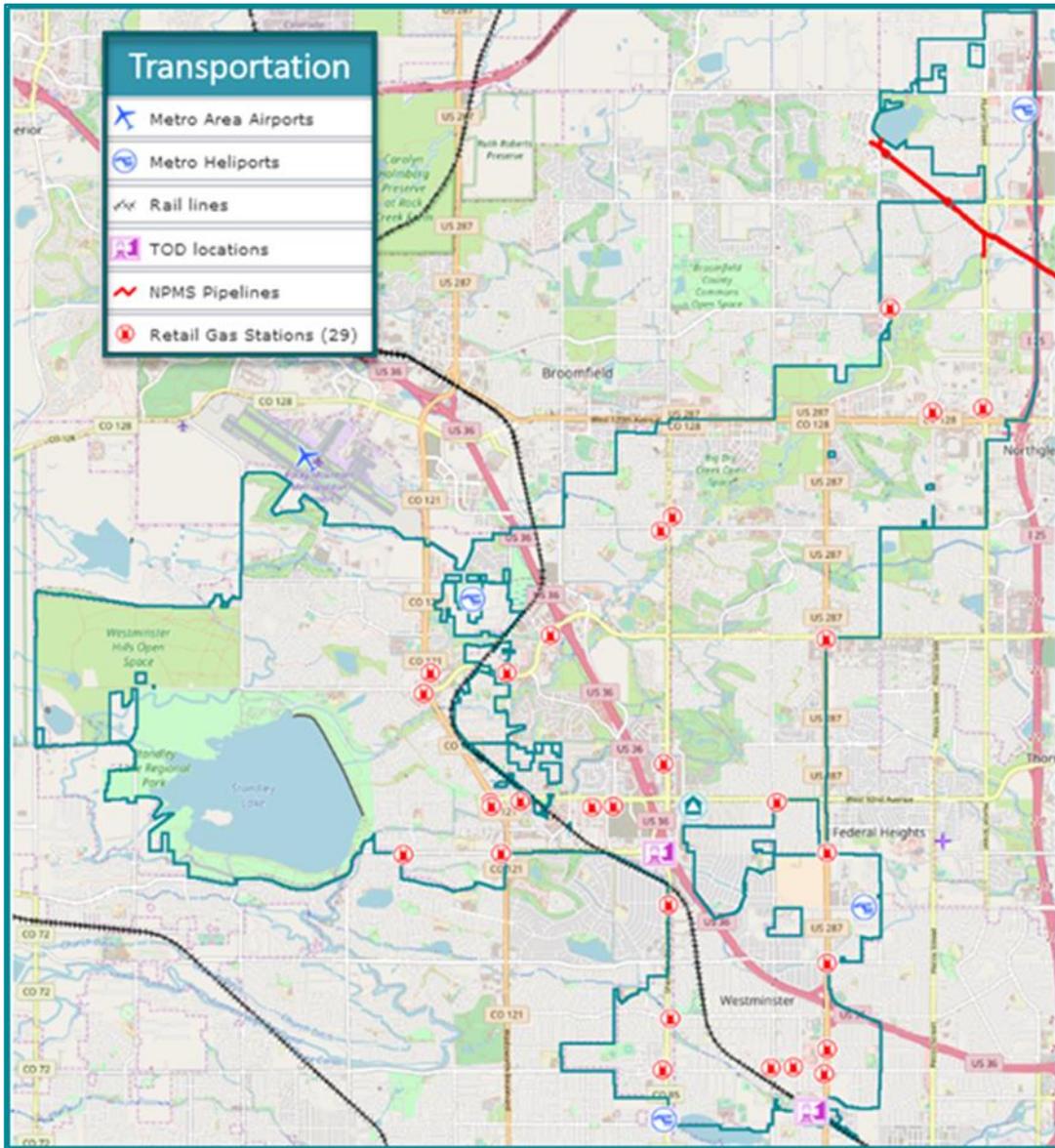
## **TRANSPORTATION INFRASTRUCTURE**

### ***City Streets***

The city's proximity to I-25, I-70, US 36 and other state highways afford it immediate access to regional ground transportation. The Regional Transportation District (RTD) provides bus service to the city and commuter rail is being developed. In 2016, the city welcomed its first Commuter Rail Station and planning for future stations is ongoing.

- Paved Roads – 602 miles (1,120 lane miles)
- Bridges – 68 bridges
- Parking Lots – 100
- Street Lights – 7716
- Street Signs – 17,875
- Street Signals – 113
- Storm Sewer Inlets – 2,104 (Cantu 2016)

Figure 4.11 TRANSPORTATION INFRASTRUCTURE



Source: City of Westminister

### ***Railroad, Air and Pipeline Infrastructure***

The Burlington Northern and Santa Fe (BNSF) Railway has approximately 7.5 miles of line that cross the city from northwest to south. Several trains daily carry coal, petroleum, hazardous materials and a wide variety of other cargo. There are no active rail yards in Westminister.

The Rocky Mountain Regional Airport (RMRA) borders the NW corner of the city and provides limited air service with approximately 450 air operations daily. The majority of aircraft operating at this airport are small (<25 passenger), but aircraft up to a 737 (with up to 200 passengers) routinely use this facility. Approximately 4 miles of the eastern approach and take-off pattern for the airport is over Westminister. There are also three heliports in the city. (City Profile 2015/16)

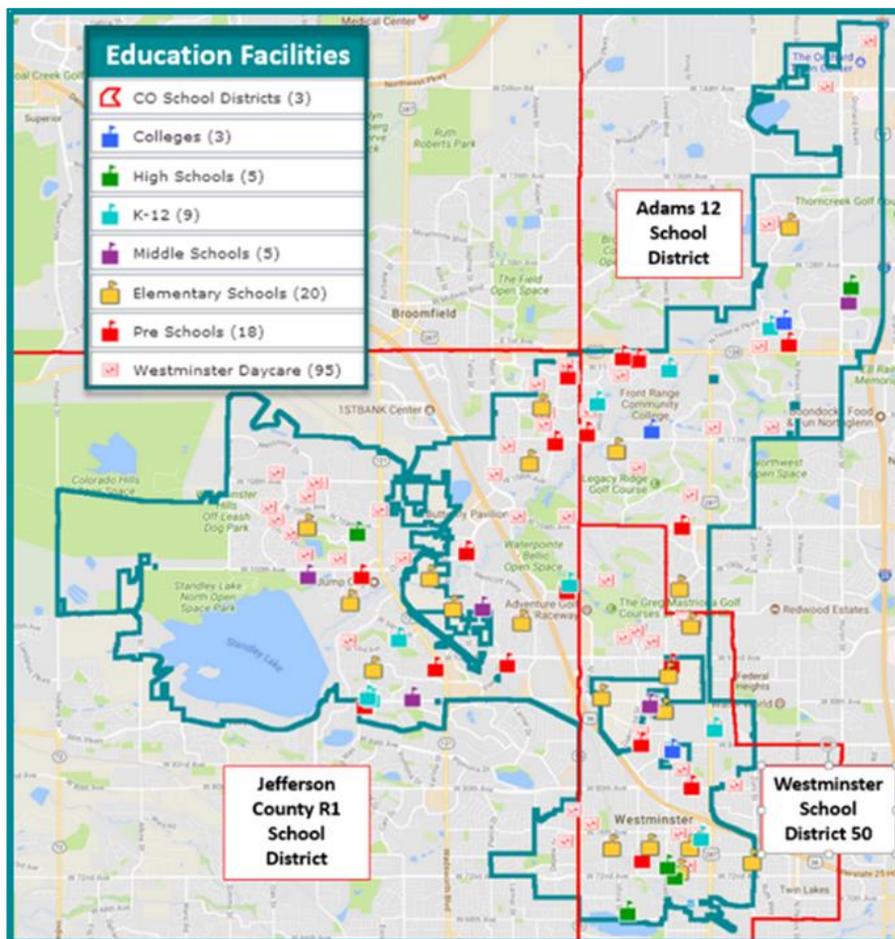
There are approximately 29 service stations and 55 bulk storage fuel facilities in Westminster according to the Colorado Department of Labor and Employment. The largest liquid fuel tanks hold 20,000 gallons. There is a small number of LPG tanks that hold up to 1250 gallons. According to the National Gas Pipeline Mapping Service, Westminster is bordered by several major gas transmission lines.

## EDUCATIONAL INSTITUTIONS

Westminster is served by 3 School Districts (Jefferson County R1, Adams 12 Five Star School and Westminster School District 50) and 59 public and private facilities that provide education from pre-school through graduate programs.

- 3 X school districts
- 5 X high schools
- 9 X K-12
- 5 X middle schools
- 20 X elementary schools
- 3 X colleges
- 95 X Daycare facilities

**Figure 4.12 Types and Locations of Educational Facilities**



Source: City of Westminster

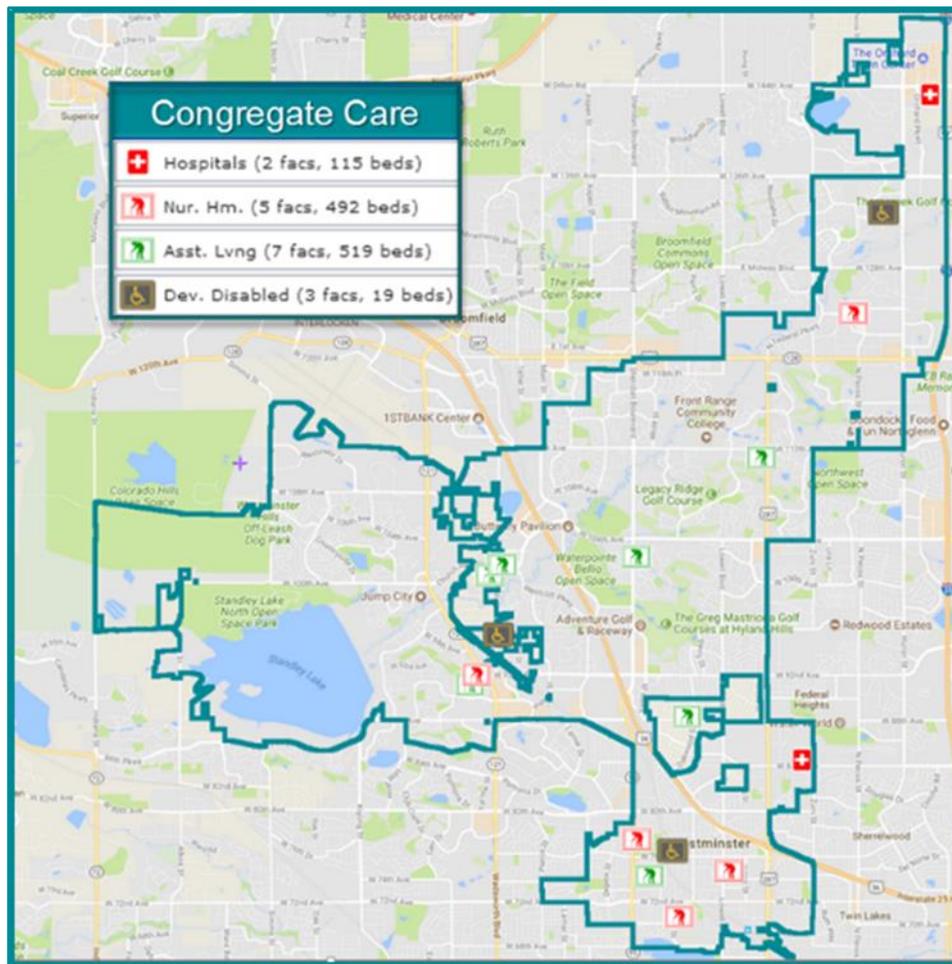
## MEDICAL AND CONGREGATE CARE

The following facilities are within Westminster city limits:

- St. Anthony's North Hospital (Trauma III, 92 beds)
- St. Anthony's Community Medical (Trauma IV, 23 beds)
- 7 X Assisted living facilities (519 beds of which 106 are secure)
- 5 X Nursing homes (492 beds)
- 3 X Developmentally Disabled homes (19 beds)

Between Adams and Jefferson County, Westminster has between 5,000-7,000 residents per every full time primary care physician (C. D. Environment 2016).

**Figure 4.13** Types and Locations of Congregate Care



Source: City of Westminster

## CYBER INFRASTRUCTURE

The city has a Wide Area Network (WAN) to connect more than 40 city facility locations. The core of the WAN consists of two Cisco Nexus backbone switches and four core routers. The city telephone systems are standardized on Avaya Voice over IP (VoIP) telephone systems. Voice mail, auto attendants, as well as the make and model of switches are determined by the size and mission of the facility they are attached to. The Dell Power Edge line of servers is utilized by Westminster and the city carries an

inventory of spare parts for use in most of the servers. The city has also standardized on the Dell line of desktops and laptop computers with Microsoft Windows operating systems. The Information Technology (IT) Department collaborates with regional partners in identifying infrastructure needs, sharing data and enhancing emergency communications. Additionally, the Center for Digital Government has Westminster placed in the top ten cities in the nation within the population category of 75,000-125,000 for the last 13 out of 14 years. The following table shows historical workload indicators for growth areas, staffing levels and annual operating budget for a four-year period starting in 2013:

**Table 4.1 City of Westminster Cyber Infrastructure**

Indicator	2013	2014	2015	2016
Number of E-mail users supported	1216	1241	1537	1632
Number of PCs supported	1060	1076	1276	1382
Number of network nodes supported	1902	2050	2050	2052
Web-based applications supported				44
Annual approved operating budget	2,868,926	2,992,253	3,173,708	3,261,797
Number of city mobile applications supported			14	14
Total Authorized IT Department FTEs (including IT Systems & Software Interns)	26.3	26.3	27.3	31

Source: City of Westminster

## POWER AND NATURAL GAS INFRASTRUCTURE

Xcel Energy provides electricity and gas service throughout Westminster. A small portion of the city is served by United Power. There is one Xcel substation within city limit (Semper) and the city is served by seven substations outside city limits (Arvada, Broomfield, Federal Heights, North Glenn, Simms and Washington). There are 20 power generation plants within 25 miles of the city. The primary fuel for these plant is natural gas with some using solar and other renewables.

There is a total of 39 separate feeders that provide electrical load and backup to the city. The following is a summary of Xcel power and gas services in Westminster.

### Facility footprint

- Electric Transmission – 16.91 miles
- Gas Transmission – 3.63 miles
- Electric Distribution – 615.55 miles
- Gas Distribution – 575.47 miles

### Customer count

- Electric only – 2,871
- Gas only – 140
- Gas and Electric – 48,012
- Locations with solar – 1,590 (Warner 2017)

Most services are underground, but some powerlines are above ground in the older part of the city.

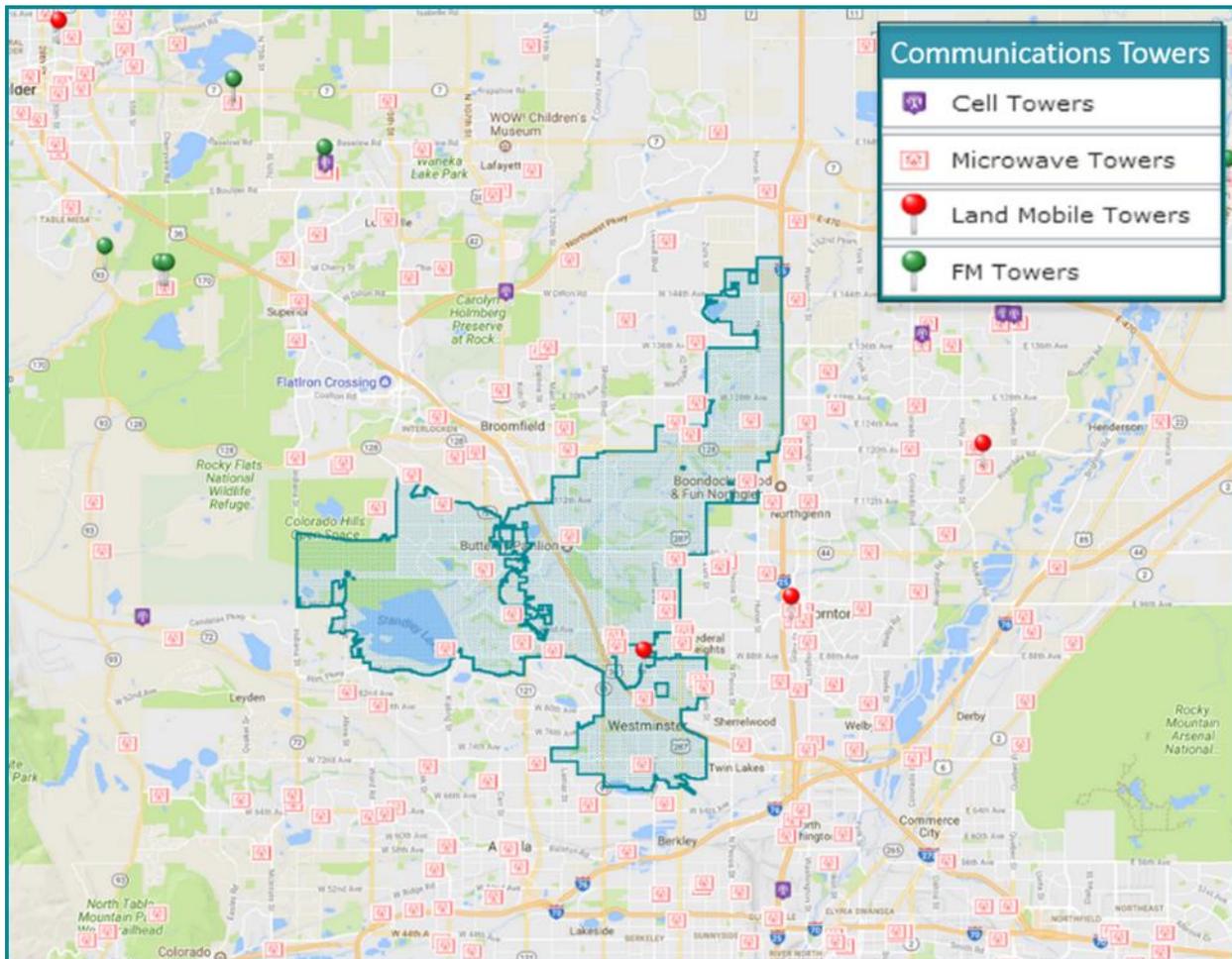


**Table 4.2 Utility Service Providers in City of Westminster**

Service	Provider
DSL	CenturyLink
Wireless Data	Sprint, Verizon, AT&T, T-Mobile
High Speed Cable Internet	Comcast
Satellite Internet	HughesNet
Fiber Optic Network	CenturyLink, Comcast, Level 3

Source: City of Westminster

**Figure 4.15 Types and Locations of Communication Towers**



Source: City of Westminster

**CRITICAL INFRASTRUCTURE BY PRESIDENTIAL POLICY DIRECTIVE**

The following table is based on the Critical Infrastructure Sectors identified in Presidential Policy Directive 21. Many of the sectors in the national list are not present in Westminister. Several sectors are present at the “locally critical” level; the direct impacts of disruption or destruction would be limited to Westminister and the immediate vicinity. Disruption or destruction of some CI sector facilities in Westminister would have little local impact, but could disrupt critical services at the multi-state or national level.

**Table 4.3 Presidential Policy Directives**

PPD-21 CI Sectors	Scale of Significance			Comment/Explanation
	Municipal	Regional	National	
Chemical				No significant chemical facilities
Commercial	X	X		Alliance Data supports global business operations. Economically significant retail services/activities
Communications	X	X		Various switching facilities and transmission towers
Manufacturing	X			Ball Aerospace
Dams	X	X		Standley Lake drinking water supply, area ditches
Defense Industrial Base	X		X	Ball Aerospace, Trimble Navigation, Martin Marietta Materials, DigitalGlobe and several other local companies are significant to the local economy and they provide critical services to the defense industrial base.
Emergency Services	X	X		Local & regional services/mutual aid
Energy	X	X		Tri-State Generation Association, Xcel Energy, Colorado REA
Financial Services	X			Local banks & financial services
Food & Agriculture	X			Local grocery stores
Government Facilities	X	X		City offices and Colorado Dept. of Corrections
Healthcare & Public Health	X			St. Anthony's North, local clinics
Information Technology	X			Local Comcast & Verizon
Nuclear Reactor, Materials and Waste	X			Adjacent to WIPP shipment routes
Transportation Systems	X	X		I-25, US-36, BNSF, Rocky Mountain Regional Airport
Water and Wastewater	X	X		2 water treatment and 1 wastewater facility; Big Dry Creek drainage

Source: US Department of Homeland Security

Presidential Policy Directive 21 establishes national policy on critical infrastructure and resilience as a shared responsibility among federal, state, local, tribal and territorial entities, as well as, public and private owners and operators of critical infrastructure. The following is a list of identified significant infrastructures and unique economic activities in the City of Westminster:

**Table 4.4 Identified Significant Infrastructure in City of Westminster**

Geospatial Services	Software & IT	Bio-sciences	Financial Services	Energy Utilities	Communications Technology	R & D	Manufacturing
Digital Globe	Datalogix/ Oracle Data	Arca Biopharma (HQ)	Alliance Data Systems	Kahuna Ventures (HQ)	Ball Aerospace	Cintron Medical (HQ)	Air Comm Corp (HQ)
Trimble Navigation	General Dynamics Information Technologies	Cerapedics (HQ)	Alloya Corporate Operations Center FCU	Stonehenge Energy (HQ)	Lattice Technology (HQ)	Plato BioPharma	Ball Packaging (HQ)
	McKesson Technology Solutions	Flagship Biosciences (HQ)	Scottrade- TD Ameritrade	Tri-State Generation (HQ)	LGS Innovations	Protogenic (HQ)	Spring Fabrication
	Reed Group (HQ)	ProtoMED			Polycom	Synchroness (HQ)	
	TruEffect (HQ)	Surefire Medical (HQ)					
		Zimmer Biomet					
		St. Anthony's North					

Source: City of Westminster

## 4.2 IDENTIFYING HAZARDS

### 4.2.1 NATURAL HAZARDS INTRODUCTION

The City of Westminster has a limited history of natural disasters. The primary concerns are extreme winter and summer events which impact transportation, business operations and can endanger life and property. The city is located at the headwaters of the Big Dry Creek and Little Dry Creek. Big Dry Creek is a tributary to the South Platte River and Little Dry Creek is a tributary to Clear Creek before becoming a tributary stream to the South Platte River. This limits our riverine and street flooding hazard to events related to extreme precipitation over the immediate catchment area of Big Dry Creek and Little Dry Creek.

Eastern Colorado is largely aseismic, but a repeat of the region's 1882 earthquake is expected to result in damages to building facades, roads and pipelines. Swelling soils are a pervasive hazard that causes significant damage to foundations, roads and sidewalks.

Water security will depend on our appreciation of the limitations of our semi-arid environment and our willingness to be proactive, responsible and strategic in managing water resources, demand and use. Drought and watershed degradation due to wildfire, invasive/noxious species and pollution is a perennial hazard for the entire Front Range. A multi-decade drought such as the ones recorded in the paleo record would dramatically impact our environment and economy.

While the long-term effects of climate change continue to be a topic of research and analysis, current evidence supports the conclusion that the environment is warming and we can expect greater swings in weather extremes; dryer and wetter periods, warmer and colder events. This trend raises the possibility of unprecedented extreme weather events such as the 2013 floods in nearby jurisdictions. Our natural hazards present a persistent and potentially increasing threat to our human, built and natural environment and our economic activities. Natural hazards are well understood, but the potential for more frequent and extreme events can only be anticipated. Just as the environment is a complex interconnected and interdependent system, natural hazards may also be connected resulting in cascading scenarios that can amplify the consequences far beyond a single incident. This assessment seeks to evaluate each hazard in support of developing hazard specific priorities and strategies. However, we must also be mindful of the interdependences and complexities that may challenge standalone mitigation efforts while we also seek to identify strategies that may provide multi hazard mitigation.

The Department of Homeland Security's "Threat and Hazard Identification and Risk Assessment Guide-Comprehensive Preparedness Guide (CPG 201)," characterizes threats and hazards as natural, technological, and human caused. The following table provides examples of each of these categories:

**Table 4.5 Categories of Threats and Hazards**

Natural	Technological	Human-caused
<ul style="list-style-type: none"> <li>▪ Avalanche</li> <li>▪ Animal disease outbreak</li> <li>▪ Drought</li> <li>▪ Earthquake</li> <li>▪ Epidemic</li> <li>▪ Flood</li> <li>▪ Hurricane</li> <li>▪ Landslide</li> <li>▪ Pandemic</li> <li>▪ Tornado</li> <li>▪ Tsunami</li> <li>▪ Volcanic eruption</li> <li>▪ Wildfire</li> <li>▪ Winter storm</li> </ul>	<ul style="list-style-type: none"> <li>▪ Airplane crash</li> <li>▪ Dam failure</li> <li>▪ Levee failure</li> <li>▪ Mine accident</li> <li>▪ Hazardous materials release</li> <li>▪ Power failure</li> <li>▪ Radiological release</li> <li>▪ Train derailment</li> <li>▪ Urban conflagration</li> </ul>	<ul style="list-style-type: none"> <li>▪ Biological attack</li> <li>▪ Chemical attack</li> <li>▪ Cyber incident</li> <li>▪ Explosives attack</li> <li>▪ Radiological attack</li> <li>▪ Sabotage</li> <li>▪ School and workplace violence</li> </ul>

Source: FEMA

For the purposes of this risk assessment, our Emergency Management Coordinator (EMC) reviewed the hazards and threats in CPG-201 and dropped those hazards which do not occur in Westminster (e.g. avalanche, hurricane, landslide, tsunami, volcanic eruption etc.) from consideration in our local risk assessment process. The EMC also reviewed the list of hazards and threats identified on the Ready.gov site and in the State of Colorado 2013 Natural Hazards Mitigation Plan to identify other natural hazards. All city departments and our Natural Hazards Mitigation Plan-Update committee and community stakeholders were invited to review and comment on this list of identified hazards and threats. As a result, we have identified and in some cases adapted, federal and state identified hazards to reflect our local environment and concerns. For example, the city has no wildland urban interface, but we are concerned about fire in our open spaces.

This risk assessment includes the natural hazard identified in our 2010 Natural Hazards Mitigation Plan and modifies the earlier list as indicated in the following table:

**Table 4.6 Risk Assessment Comparison**

2010 Risk Assessment	2018 Risk Assessment	Comment
Not Addressed	Climate Change	Added due to greater awareness and in compliance with HMP guidance
Drought	Drought & Water Security	Expanded to reflect greater complexity and the vulnerability of our water supply
Dam Failure	Dam Failure	No change
Earthquake	Earthquake	No change
Pandemic Flu	Epidemic/Pandemic	Expanded to include other pathogens and trends in emerging, re-emerging and resistant diseases
Not Addressed	Erosion, Deposition and Turbidity	Added due to this hazards potential as a cascading effect of other hazards.
Not Addressed	Expansive Soils	Added due to prevalence in Westminster and the opportunity to promote nonstructural mitigation activities by property owners
	Extreme Cold	Added due to the trend of more extreme weather events
	Extreme Heat	Added due to the trend of more extreme weather events

2010 Risk Assessment	2018 Risk Assessment	Comment
Riverine Flooding	Flooding	Expanded to include Urban and Street Flooding
Urban or Street Flooding		Included in flooding
Hail Storms	Hail	No change
	Invasive and Noxious Species	Added due to the growing presence of invasive and noxious species and its relationship to other hazards/cascading events
Lightning	Lightning	No change
	Severe Summer Storms	Added due to the trend of more extreme weather events
Winter Storm	Severe Winter Storms	No change
	Solar/Geomagnetic Storm	Added due to greater awareness of this hazard and associate impacts
Tornado	Tornado	No change
Wildland Fire	Open Space Fire (Wildfire)	Renamed due to the absence of a wildland/urban interface
High Wind Event	Windstorm	No change

Overall, our natural hazards have not changed significantly since the previous assessment. The inclusion of additional natural hazards and integration of others reflects the city's intent to be more comprehensive in its risk assessment and in recognizing the relationship between climate change and many of the previously identified hazards.

#### **Westminster Presidential Disaster Declaration History, 2000-2018**

- 2003 snowstorm
- 2006 snowstorm

The State of Colorado has received 21 Presidential major disaster declarations between 1955 and 2018. Fifteen of the state's declared disasters have been flooding related, 4 were related to wildfires and 2 were related to severe storms. (FEMA 2018)

The following flame chart indicates the risk rating of Westminster’s natural hazards relative to one another. This subjective assessment is based on community and stakeholder concerns and input. The relative risk rating on this chart may not match the risk ratings assigned in the individual hazard descriptions. Please see Appendix B for a summary of the scoring methodology.

**Figure 4.16 Natural Hazard Risk and Relative Ranking Summary**

		Natural Hazard Relative Risk Rating				
Likelihood	Most	E	<ul style="list-style-type: none"> <li>• Windstorm</li> <li>• Lightning</li> <li>• Hail</li> <li>• Swelling Soils</li> </ul>	<ul style="list-style-type: none"> <li>• Severe Winter Storms</li> </ul>	<ul style="list-style-type: none"> <li>• Invasive &amp; Noxious Species</li> <li>• Severe Summer Storms</li> </ul>	<ul style="list-style-type: none"> <li>• Climate Change</li> <li>• Drought</li> </ul>
	D		<ul style="list-style-type: none"> <li>• Open Space Fire</li> </ul>	<ul style="list-style-type: none"> <li>• Extreme Cold</li> <li>• Extreme Heat</li> </ul>	<ul style="list-style-type: none"> <li>• Flooding</li> <li>• Erosion, Deposition and Turbidity</li> </ul>	
	C					
	B				<ul style="list-style-type: none"> <li>• Tornado</li> </ul>	<ul style="list-style-type: none"> <li>• Pandemic</li> </ul>
	Least	A			<ul style="list-style-type: none"> <li>• Earthquake</li> </ul>	<ul style="list-style-type: none"> <li>• Geomagnetic Storm</li> </ul>
		1	2	3	4	5
		Lowest	Consequences			Highest

## 4.3 NATURAL HAZARDS PROFILE AND VULNERABILITY

### 4.3.1 CLIMATE CHANGE

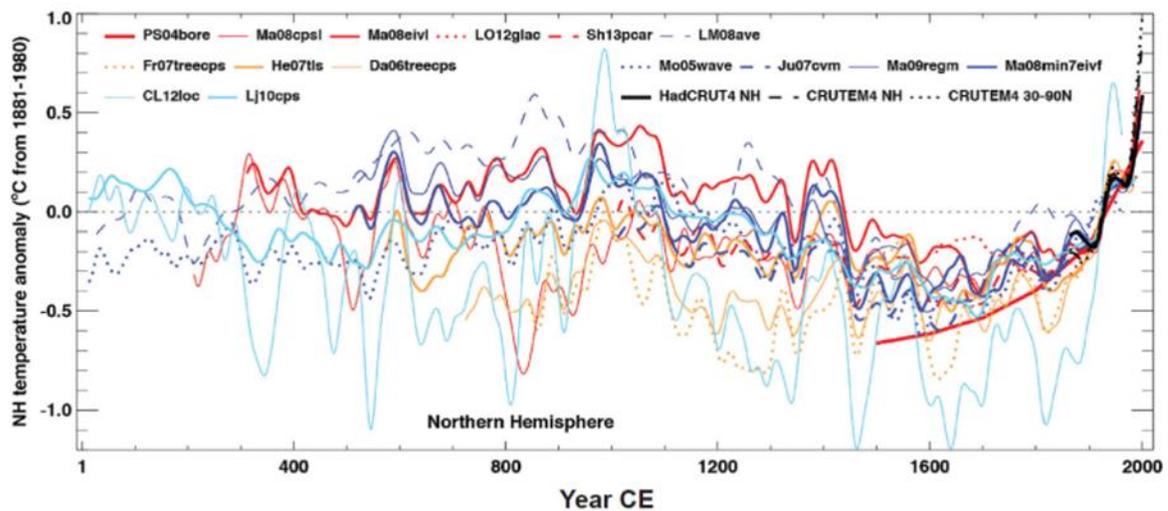
Hazard	Likelihood (A-E)	Impact			Overall Impact Sum of Impact divided by 3
		Scale (1-5)	Durations (1-5)	Consequences (1-5) X 2	
Climate Change	E	5	5	10	E5*

\*Note: Individual risk rating was done based on the information provided in the hazard description and vulnerability assessment and does not consider the hazard relative to other hazards. Individual hazard scores may not be the same as the scores in 4.16.

**Definition:** A non-random change in climate that is measured over several decades or longer. The change may be due to natural or human-induced causes (NOAA 2017).

**Description:** The paleoclimatic record of the past 2,000 years includes a previous warm anomaly in the northern hemisphere (950-1250) and a “Little Ice Age,” (1450-1850). The first decade of the 21st century was the warmest recorded since weather record keeping began. The years between 1983 and 2012 are assessed to have been the warmest 30-year period of the last 800-1400 years.

**Figure 4.17 Reconstructed Northern Hemisphere Annual Temperatures**



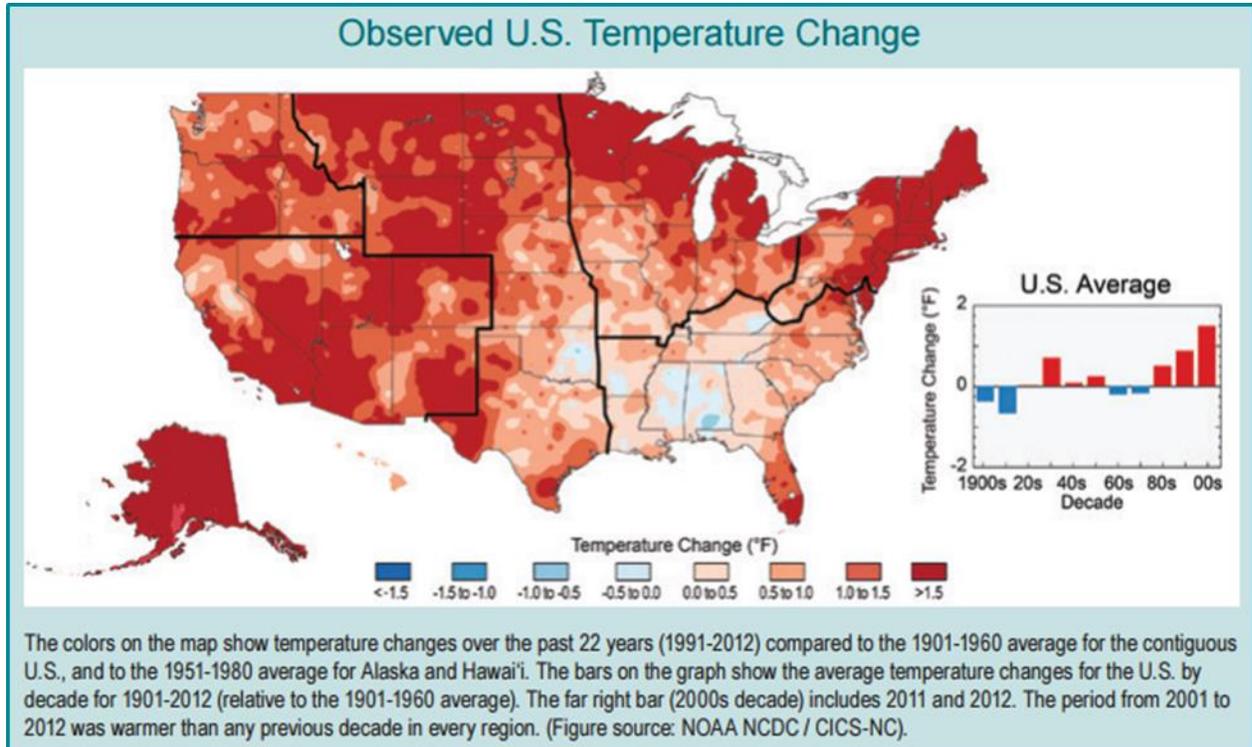
Reconstructed Northern Hemisphere annual temperature during the last 2,000 years. Individual reconstructions are grouped by color, red: land-only all latitudes, orange: land-only extratropical latitudes, light blue: land and sea extratropical latitudes, dark blue: land and sea all latitudes. Instrumental temperatures are shown in black. All series are anomalies from the 1881–1980 mean and have been smoothed with a filter that reduces variations on time scales less than about 50 years. Time series sources: PS04bore = Pollack and Smerdon (2004); Fr07treecps = Frank et al. (2007); CL12loc = Christiansen and Ljungqvist (2012); Ma08cpsl, Ma08eivl, Ma08eivf, Ma08min7eivf = Mann et al. (2008); He07tls = Hegerl et al. (2007); Lj10cps = Ljungqvist (2010); Da06treecps = D’Arrigo et al. (2006); LO12glac = Leclercq and Oerlemans (2012); Sh13pcar = Shi et al. (2013); LM08ave = Loehle and McCulloch (2008); Mo05wave = Moberg et al. (2005); Ju07cvm = Juckes et al. (2007); Ma09regm = Mann et al. (2009); HadCRUT4 = Hadley Center/Climatic Research Unit surface temperature over land and sea; CRUTEM4 = Climatic Research Unit near-surface air temperature over land. Graphic from the Intergovernmental Panel on Climate Change Fifth Assessment Report.

Source: NOAA National Centers for Environmental Information 2017

Global surface temperatures in 2016 were the warmest since official records began in 1880. It was the third year in a row to set a new heat record, and the fifth time the record has been broken since the start of the 21st century.” (NOAA 2017)

In addition to the historic record of major regional droughts in the 1930's the 1950's, the paleo record includes "megadroughts" that lasted over 30 years in the 11th-12th centuries and were probably tied to the decline of the Anasazi and Pueblo peoples of the Colorado Plateau (Howard 2015).

**Figure 4.18 U.S Temperature Change**

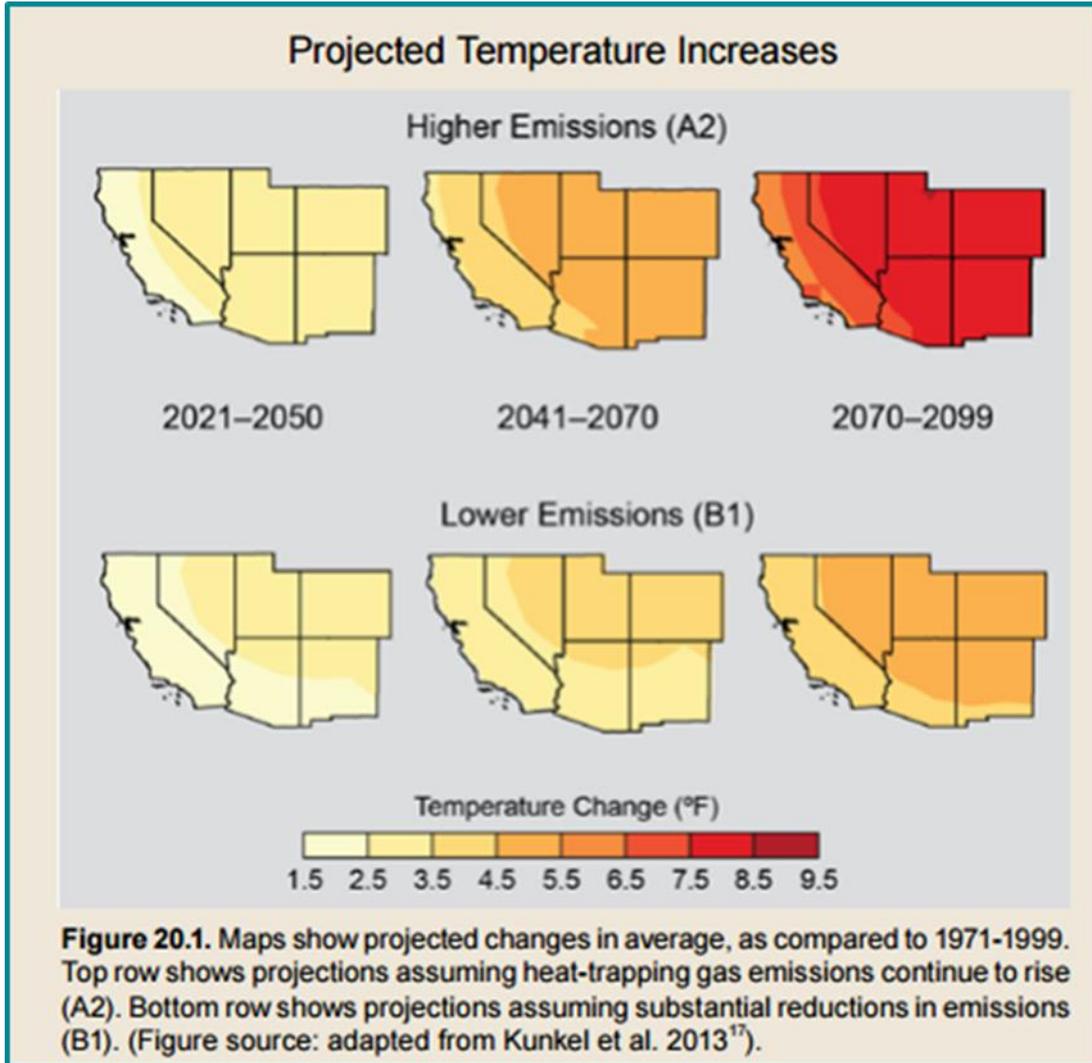


Source: U.S. Global Change Research Program GlobalChange.gov 2014

### **SOUTHWEST REGION CLIMATE TRENDS**

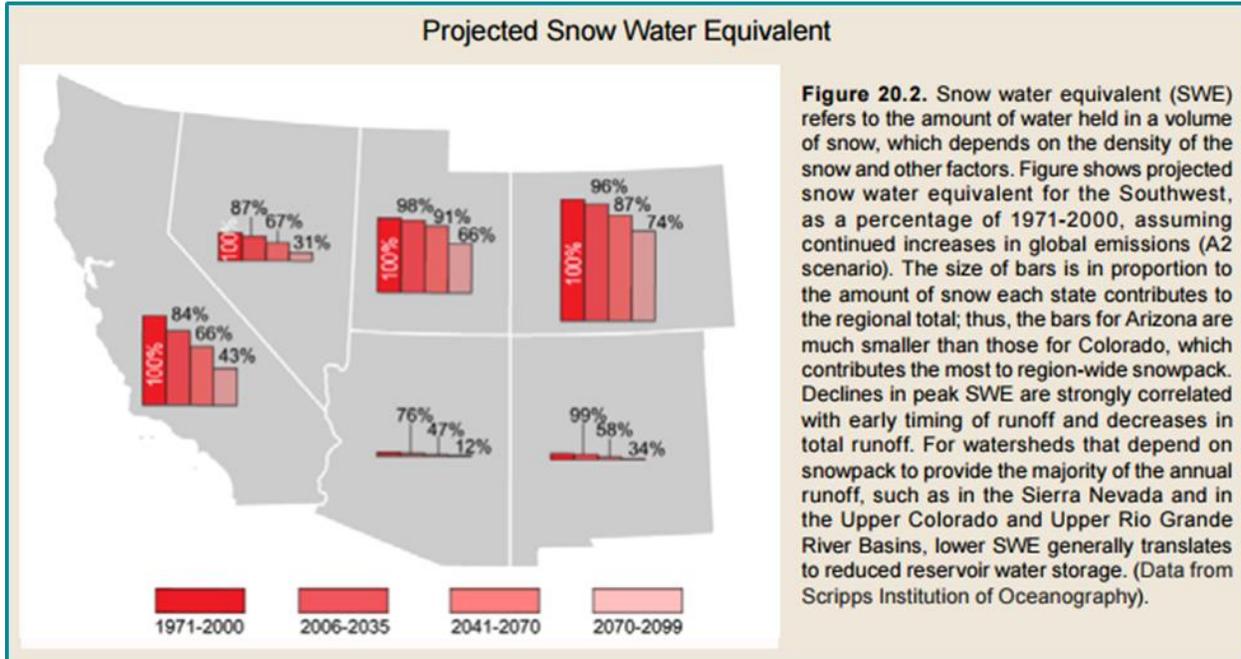
According to the 2014 Climate Change Impacts in the United States, the Southwest has heated up significantly in recent decades and the period since 1950 has been hotter than any comparable period in the last 600 years. Regional average temperatures are projected to rise by 2.5F to 5.5F degrees between 2041-2070 and by 5.5 to 9.5 degrees between 2070-2099 with continued growth in global CO2 emissions. A reduction in CO2 emissions could result in a smaller increase in temperatures. As a result of increasing temperatures, snowpack will likely see a significant decline in the coming decades.

Figure 4.19 Projected Temperature Increases in Western U.S.



Source: U.S. Global Change Research Program GlobalChange.gov 2014

**Figure 4.20 Projected Snow Water Equivalent in Western United States**



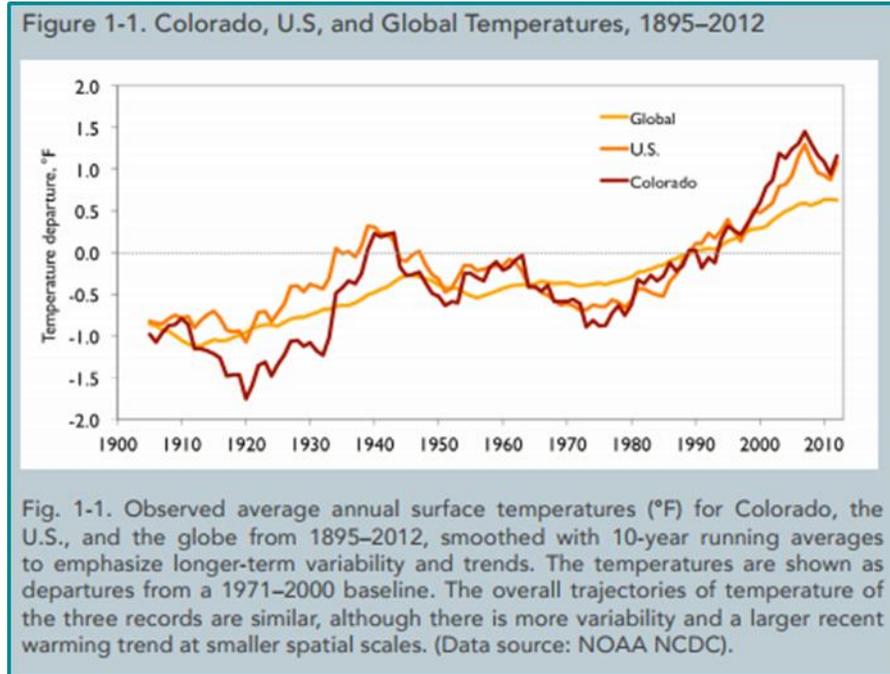
Source: U.S. Global Change Research Program GlobalChange.gov 2014

## CLIMATE CHANGE IN COLORADO

The 2014 Climate Change in Colorado report by the Colorado Water Conservation Board provided the following observations:

- Colorado has warmed by 2 degrees F during the past 30 years and 2.5 degrees Fahrenheit during the past 50 years
- There are no clear long-term trends in precipitation.
- Snowmelt and peak runoff has shifted earlier in the spring by 1-4 weeks over the past 30 years.
- There is a trend towards severe soil-moisture drought over the past 30 years
- Tree ring studies show multiple droughts prior to 1900 that were more severe and sustained than any in the recent observed record (Lukas 2014).

**Figure 4.21 Colorado, U.S. and Global Temperature Changes 1895-2012**



Source: U.S. Global Change Research Program GlobalChange.gov 2014

**WESTMINSTER AND CLIMATE TRENDS**

The following tables are based on Stapleton Airport/Denver International Airport weather reports 1946-2017 and indicate our area is becoming warmer and dryer punctuated by extreme snow and rain events.

**Table 4.7 Monthly Highest Max Temperatures for Denver Stapleton/Denver International Airport, Co (°F)**

Monthly Highest Max Temperatures for Denver Stapleton/Denver International, Co (°F)												
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean	65	67	73	80	87	95	98	96	92	83	73	66
Max (Year)	74 (2015)	83 (2017)	84 (1971)	90 (1992)	96 (2003)	104 (2012)	104 (2005)	102 (2008)	97 (2002)	89 (1991)	81 (2006)	75 (1980)
Min (Year)	51 (1949)	52 (2010)	64 (1958)	72 (1957)	78 (2015)	85 (1967)	91 (1950)	90 (1984)	85 (2006)	74 (1986)	60 (2000)	52 (1983)

Source: NOAA-NWS

**Monthly High Temperature Summary:**

- Average hottest month: July
- Highest temperature: 104 degrees
- Monthly high trend: 8 of 12 monthly highs since 2002.
- Monthly coolest high trend: 4 of 12 coolest highs temperatures since 2000. (National Weather Service Forecast Office 2017)
- Conclusion: We are seeing more frequent monthly record highs since 2002. We are seeing fewer record low highs since 2000. Overall, we appear to be warming.

**Table 4.8 Monthly Lowest Min Temperatures for Denver Stapleton/Denver International Airport, Co (°F)**

Monthly Lowest Min Temperatures for Denver Stapleton/Denver International, Co (°F)												
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean	-5	0	8	20	31	43	52	50	35	23	7	-3
Max (Year)	14 2006	21 1992	24 2000	30 2012	40 1992	51 2015	59 2012	56 1983	45 1981	31 2015	22 1949	13 2001
Min (Year)	-25 1963	-25 1951	-10 1948	-2 1975	22 1954	30 1951	43 1972	41 1964	17 1985	3 1969	-10 2014	-25 1990

Source: NOAA-NWS

Monthly Low Temperature Summary:

- Average coldest month: January
- Record low temperature: -25
- Record lowest temperature trend: All but one of the minimum low temperatures occurred prior to 1990.
- Record warmest low temperature trend: Seven of the warmest low temperatures have occurred since 2000. (National Weather Service Forecast Office 2017)
- Conclusion: In general, our low temperatures have been warmer since 2000.

**Table 4.9 Monthly Highest Precipitation for Denver Stapleton/Denver International Airport, Co**

Monthly Highest Precipitation for Denver Stapleton/Denver International, Co (inches)													
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean	0.25	0.25	1.21	1.77	2.46	1.73	2.03	1.64	1.34	1.00	0.79	0.57	15.55
Max (Year)	1.44 1948	2.06 2015	4.81 2003	5.35 1999	7.31 1957	7.37 2015	6.99 1998	5.85 1979	13.89 2013	4.17 1969	2.67 1991	2.84 1973	25.14 2013
Min (Year)	T 2003	0.01 1970	T 2012	0.03 1963	0.06 1974	0.03 2006	0.15 2008	0.06 1960	0.01 1992	0.05 1962	0.01 1949	T 2002	7.51 1954

Source: NOAA-NWS

Precipitation Summary

- Wettest Month on Average: May, 2.46 inches
- Wettest Month on Record: Sep. 2013, 13.89 inches
- Monthly High Precipitation Trends: 4 of the 12 wettest months on record since 2003
- Monthly Low Precipitation Trends: 5 of 12 lowest precipitation months occurred after 2000, little or no precipitation in any given month is not unusual for Westminster.  
(National Weather Service Forecast Office 2017)
- Conclusion: Overall, Westminster has been dryer since 2000, but extreme precipitation events have also occurred. “These projections are generally consistent within the clear scientific consensus that across most of the United States heavy precipitation events have become heavier and more frequent, and with further climate change are expected to increase across the entire country, even in areas where total precipitation is expected to decline. This is because of the basic principle of physics that warmer air can hold more moisture, and so higher temperatures should lead to more precipitation extremes.” (Stephen Saunders 2016)

**Table 4.10 Monthly Total Snowfall for Denver Stapleton/Denver International Airport, Co**

Monthly Total Snowfall for Denver Stapleton/Denver International, Co (inches)													
Year	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Annual
Mean	T	T	1.3	3.9	8.2	7.8	7.4	7.5	11.8	8.0	1.7	0.0	58.6
Max (Year)	T 1992	T 1991	17.2 1971	31.2 1969	29.6 1991	30.8 1973	24.3 1992	29.2 2015	35.2 2003	25.5 1957	13.7 1950	0.5 1953	99.3 1959
Min (Year)	0.0 2016	0.0 2016	0.0 2016	0.0 2016	0.0 1949	T 2002	T 2003	0.3 1992	T 2017	0.0 1992	0.0 2012	0.0 2016	24.6 2011

Source: NOAA-NWS

**Snowfall Summary**

- Snowiest Month on Average: March, 11.8 inches
- Snowiest Month on Record: March 2003, 35.2 inches
- Maximum Snowfall Trends: 2 of 12 monthly snow records were set after 2000 (including record monthly snowfall)
- Minimum Snowfall Trends: 6 of the 9-minimum monthly (September thru May) records were set after 2000 (National Weather Service 2017).
- Conclusion: Although extreme snowfall events have occurred since 2000, overall snowfall appears to be decreasing.

**VULNERABILITY SUMMARY**

Colorado and the Southwest are the warmest and driest part of the United States. Water has been, and will continue to be, a determining factor in the growth and development of the city and the Front Range. Persistent warming and drying trends and the potential of major droughts or a megadrought (20-50 years) would have drastic impacts that could result in extreme events becoming more common and more extreme. A persistently warm and dry climate could stress the forests that characterize the watershed upon which the city depends and make these critical areas more susceptible to wildfire, and insects. Reduced snowpack will result in decreasing the availability and reliability of our water supply. (GlobalChange.gov 2014) Climate change could endanger or redefine our urban landscapes, lawns, trees and open space. Higher temperatures and longer warm periods/heat waves are expected to result in increased energy demands, stress on critical infrastructures and endanger at-risk populations such as the elderly. If the climatic trends of the past 30 years continue as predicted, many of the natural hazards in this study could be more significant than the historic record indicates.

**4.3.2 DROUGHT**

Hazard	Likelihood (A-E)	Impact			Overall Impact
		Scale (1-5)	Durations (1-5)	Consequences (1-5) X 2	Sum of Impact divided by 3
Drought	B	5	5	4	B5

**Definition:** Drought is a deficiency in precipitation over an extended period, usually a season or more, resulting in a water shortage causing adverse impacts on vegetation, animals and/or people. It is a normal, recurrent feature of climate that occurs in virtually all climate zones, from very wet to very dry. Drought is a temporary aberration from normal climatic conditions, thus it can vary significantly from one region to another. Drought is different than aridity, which is a permanent feature of climate in regions where low precipitation is the norm, as in a desert. (NOAA, Drought Public Fact Sheet 2008)

Drought is one of the most serious and complex hazards we face. Although trends in precipitation, snowmelt and retention may provide indicators, the onset of a prolonged drought will be ambiguous. The 2013 State of Colorado Drought Mitigation and Response Plan documents the recurrent statewide drought hazard, its complexity and its regional effects:

- Meteorological drought is usually defined by a period of below average precipitation.

- Agricultural drought occurs when there is an inadequate water supply to meet the needs of the state's crops and other agricultural operations such as livestock.
- Hydrological drought is defined as deficiencies in surface and subsurface water supplies.
- It is generally measured as streamflow, snowpack, and as lake, reservoir, and groundwater levels.
- Socioeconomic drought occurs when a drought impacts health, well-being, and quality of life, or when a drought starts to have an adverse economic impact on a region.

Of these effects, hydrological and socioeconomic are the most pertinent to the City of Westminster. As indicated in the Drought Impact Reporter of Colorado (1935-2013), the city is among the areas of greatest impact historically.

**Description:** Westminster is dependent on snow melt from Bear/Clear and Boulder creeks for its water. These are relatively small watersheds which makes them more vulnerable to drought and degradation due to wildfire and invasive/noxious species. Most of the city is within the headwaters of Big Dry Creek which is a small tributary of the South Platte River Basin.

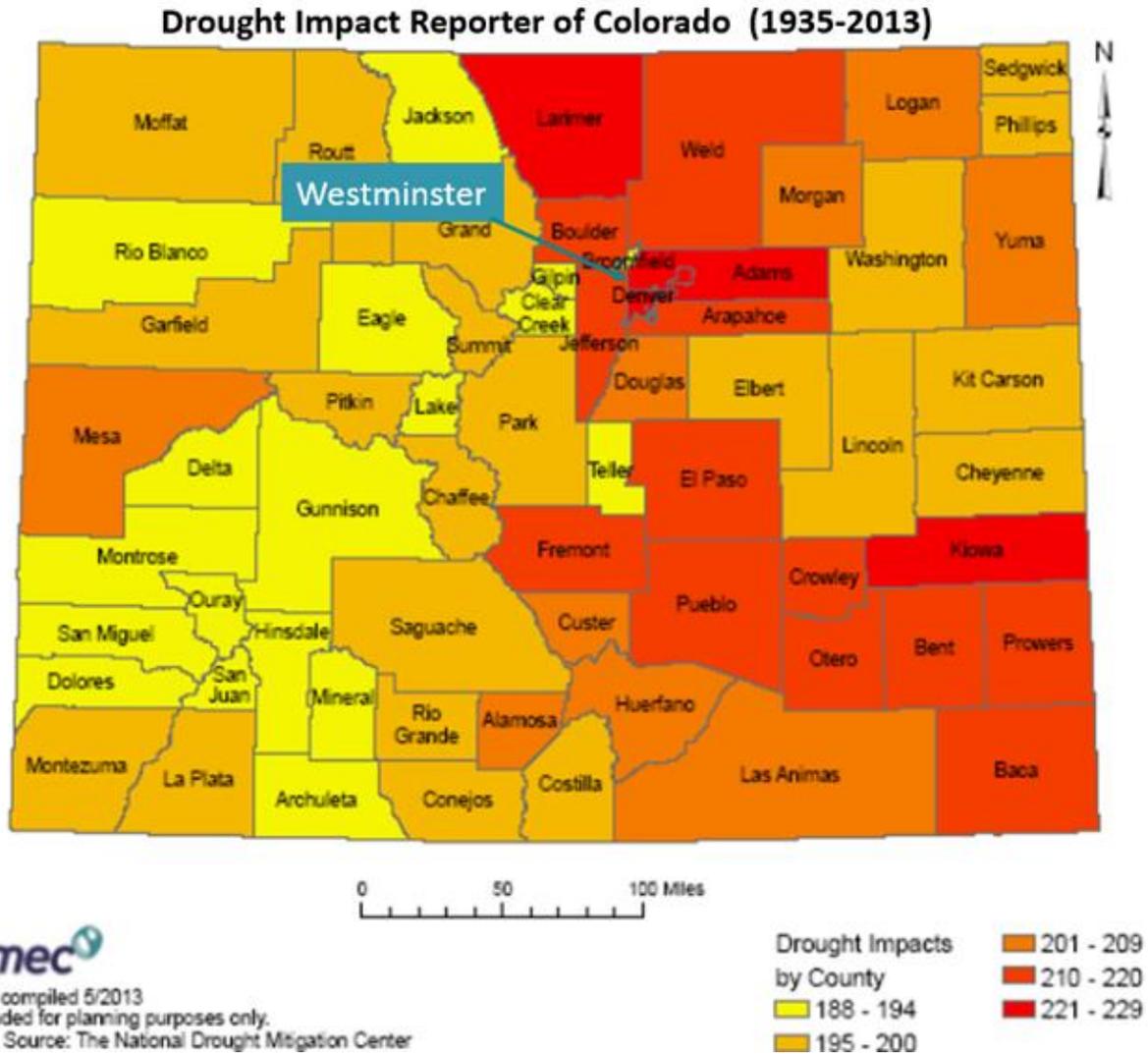
Due to the city's geographic location in a semi-arid climate, the area has experienced periods of drought. History suggests severe and extended droughts are inevitable and part of the natural climate cycle. The Southwest United States experienced significant droughts in the 1930's, 1950's and the paleoclimate records show severe megadroughts that were at least 50 years long. (GlobalChange.gov 2014) The USDA issued Disaster Declarations for Adams and Jefferson counties in 2002, 2011, 2012 and 2013. (DHSEM 2013) The recurrence of drought is inevitable, roughly once in each decade, but its duration is difficult to predict.

The U.S. Drought Monitor classifies droughts into different categories, from D0 (Abnormally Dry) to D4 (Exceptional Drought). Periods of dryness are classified in one of these categories as the drought's life cycle is tracked. Colorado has experienced D4 conditions, and it is possible that Westminster could experience this upper end of the Drought Monitor extent range.

Future droughts will be a combination of both increasing demand and periodic, prolonged reductions in the availability of precipitation. The South Platte Basin encompasses Colorado's most densely populated communities and is expected to significantly increase its population by 51% between 2000 and 2020. (C. W. Board 2017)

The 2011 gap analysis done for the Colorado Water Conservation Board indicates a potential gap between water supply and demand could begin as soon as 2030. (CDM 2011)

Figure 4.22 Drought Impacts in Colorado 1935-2013

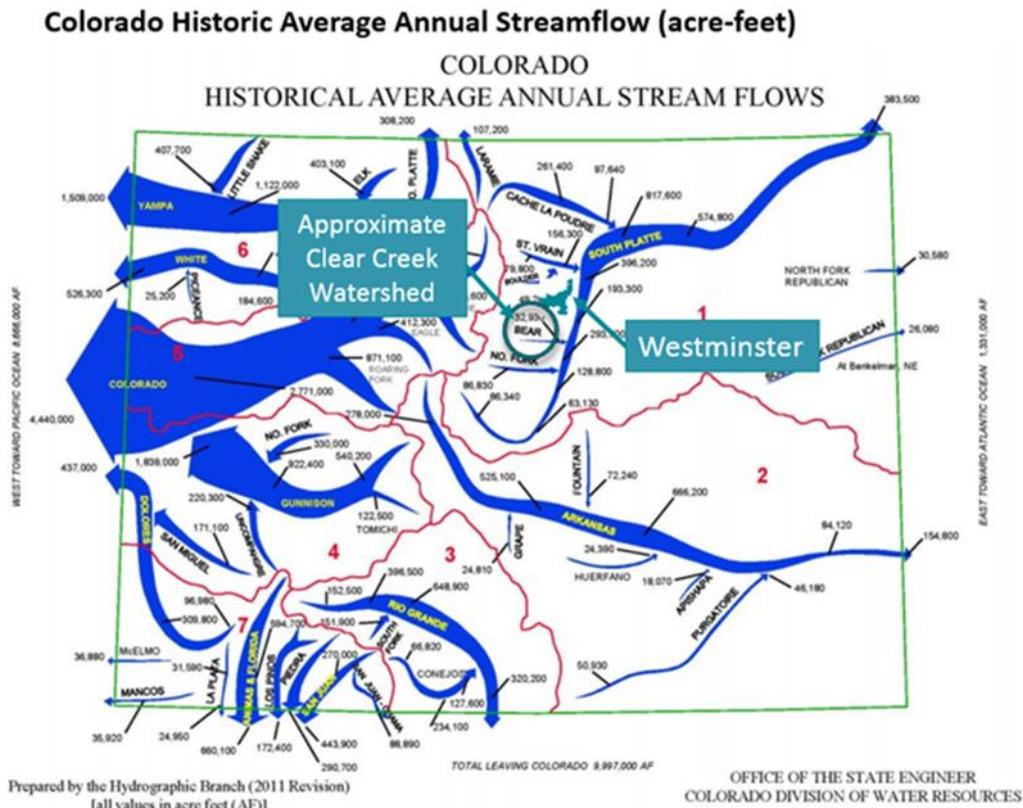


**Table 4.11 South Platte Basin Population Projections**

Subbasin Designation	2000 Population	2030 Population	Increase in Population 2000 to 2030	Percent Change 2000 to 2030	Percent Annual Growth Rate
Denver Metro	1,432,700	2,157,200	724,500	51	1.4
South Metro	685,800	1,146,400	460,600	67	1.7
Upper Mountain	39,200	125,300	86,100	220	3.9
High Plains	24,900	28,800	3,900	16	0.5
Northern	747,200	1,364,600	617,400	83	2.0
Lower Platte	55,800	89,300	33,500	60	1.6
<b>TOTAL</b>	<b>2,985,600</b>	<b>4,911,600</b>	<b>1,926,000</b>	<b>65</b>	<b>1.7</b>

Source: Colorado Water Conservation Board

**Figure 4.23 Colorado Historic Annual Average Annual Streamflow**



**Table 4.12 Water Supply Gap Analysis**

**Municipal and Industrial Gap and Estimated Beginning Year for 100%, Inter basin Compact Committee (IBCC) Alternative Portfolio (Optimistic), and Status Quo Portfolio (Realistic) Scenarios**

Basin/Area	Gap under 100% Scenario (AF)	Gap Begins	Gap when IPPs at IBCC Alternative Portfolio (Optimistic) Scenario (AF)	Gap Begins	Gap when IPPs at Status Quo Portfolio (Realistic) Scenario (AF)	Gap Begins
South Platte Basin	55,000	2040	110,000	2025	130,000	2025
Metro Basin	66,000	2045	130,000	2030	150,000	2030
Arkansas Basin	54,000	2040	64,000	2035	78,000	2035
Front Range <sup>1</sup>	150,000	2040	270,000	2030	320,000	2030
Colorado Basin	27,000	2040	33,000	2040	33,000	2040
Gunnison Basin	3,600	2045	5,200	2040	5,200	2040
Yampa - White Basin	36,000	2020	37,000	2020	37,000	2020
Southwest Basin	7,600	2040	12,000	2035	12,000	2035
Rio Grande Basin	2,800	2040	3,500	2040	3,500	2040
North Platte Basin	0	2055	0	2050	0	2050
<b>Statewide</b>	<b>250,000</b>	<b>2040</b>	<b>390,000</b>	<b>2030</b>	<b>450,000</b>	<b>2030</b>

1) Front Range includes South Platte Northern, Denver Metro, South Metro, Arkansas Urban Counties

Source: CWCB

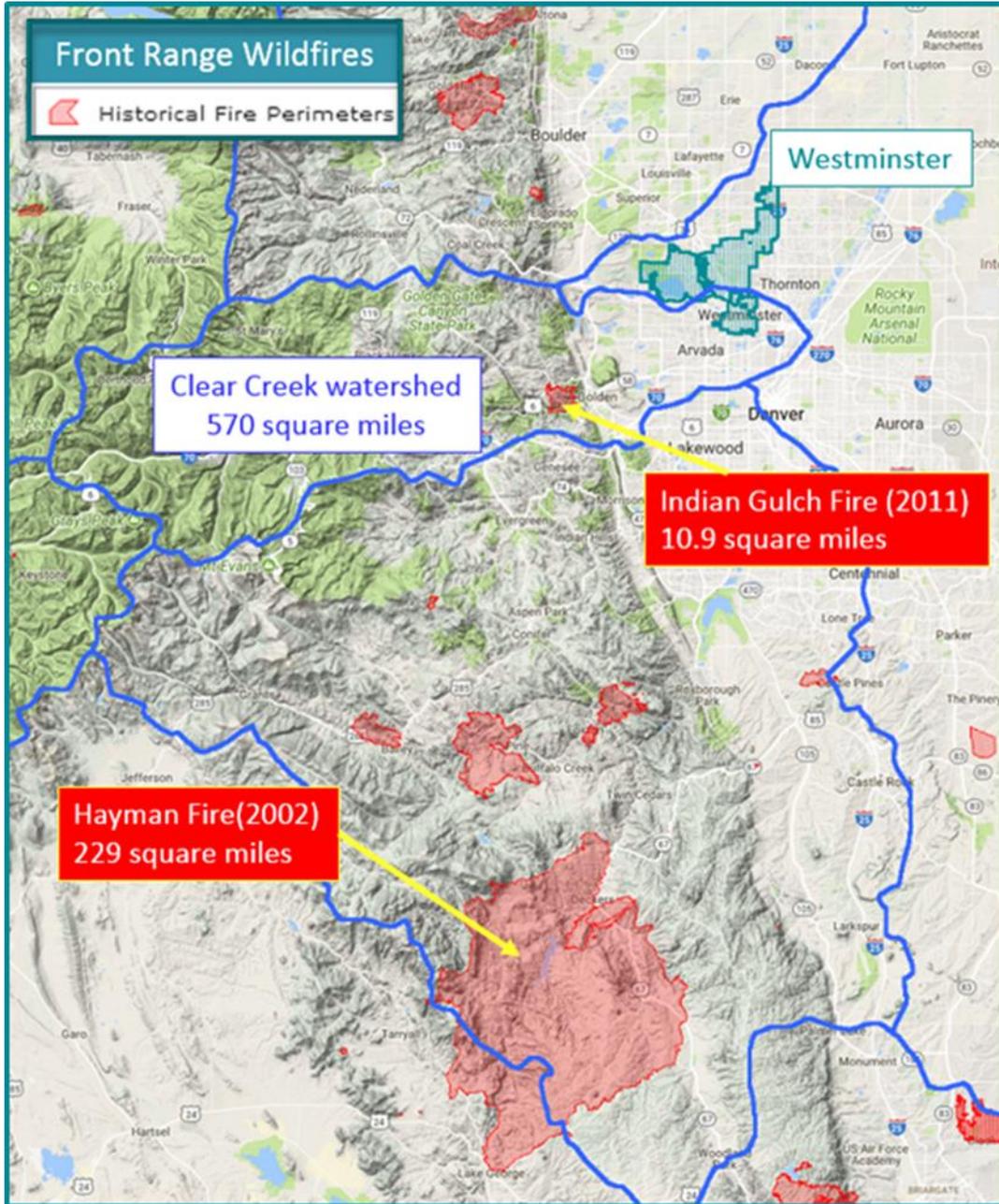
The city’s current water management practices have been shaped by snowmelt, the timing and duration of its runoff, the capacity of Standley Lake, current water-sharing agreements and our limited population. Factors such as earlier runoff seasons coupled with longer and warmer springs and summers, and a growing population will require changes in our storage capacity and water use practices. Our drought resilience will depend on the anticipation and management of not just supply and demand, but also the form of the precipitation, its natural flow/retention, our storage capacity, and our wise management of this essential natural resource to meet future demands.

In addition to (and in conjunction with) drought, the city’s overall water security is endangered by several factors that affect the overall health of the watersheds of the Front Range. These essential biomes are susceptible to degradation due to potential contamination from the historic mine locations, the impact of potential wildfires and invasive species. Any factor (or combination of factors) that degrades the health of our watersheds has the potential to reduce the quantity and quality of our raw water and can have impacts on the city’s water treatment and distribution system.

The Rocky Flat nuclear weapons site is approximately 2.5 miles west to the city. Clean-up of this site was completed in 2005 and Woman Creek Reservoir was constructed to interrupt any potential runoff from entering the city’s water supply. The Department of Energy retains management of 1,308 acres of the site due to the presence of residual contamination and continued groundwater treatment.

The Central City & Idaho Springs Mining District is a superfund site (in Clear Creek and Gilpin counties) that has the potential to impact the city’s water supply. This superfund site covers 400 square miles of the drainage basin of Clear Creek which has been affected by a number of mines. The state and EPA are managing clean up and mitigation efforts which include the Argo Tunnel Water Treatment Facility which prevents 900 pounds of metals per day from entering Clear Creek. If the flow control measures in the Argo Tunnel were overwhelmed or fail, the water supply of about 250,000 people (including Westminster) would be compromised. (Colorado Department of Public Health & Environment 2016)

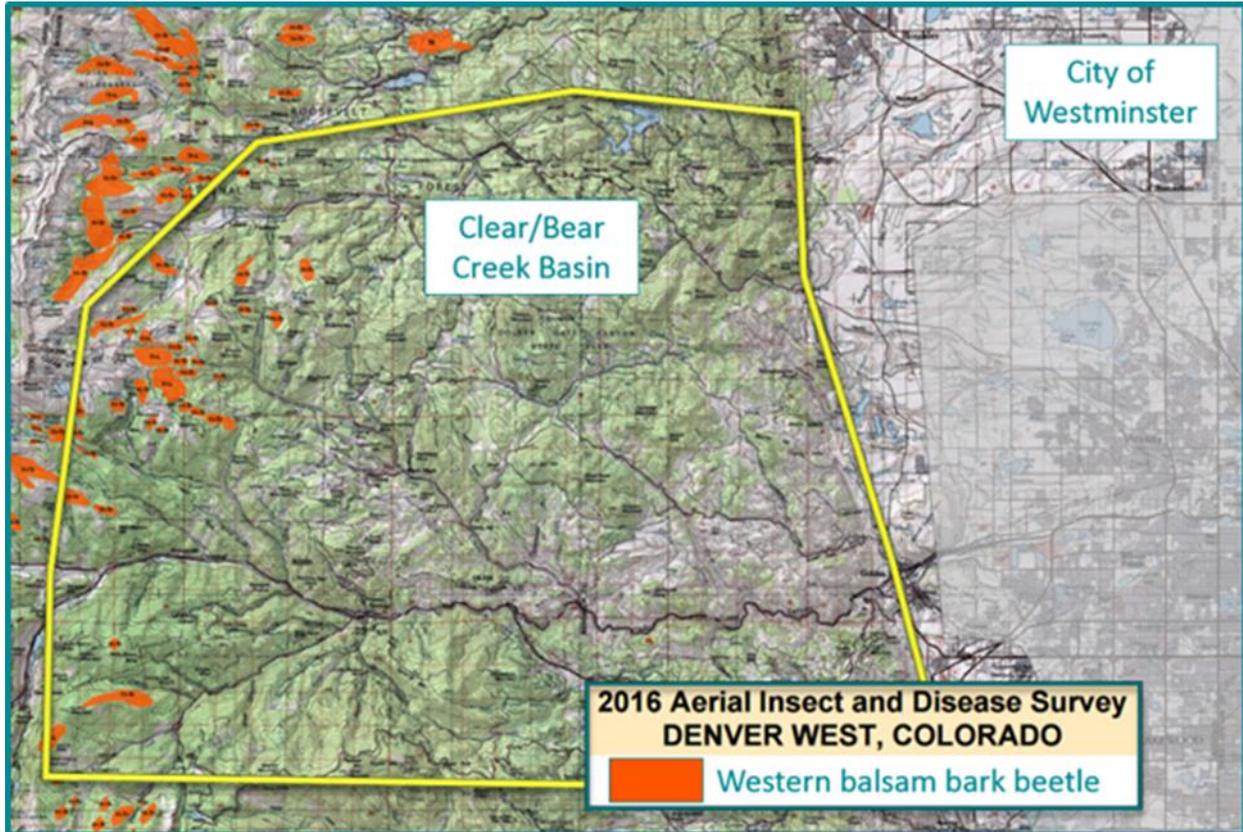
Figure 4.24 Proximity of Historic Wildfire to City of Westminster



Source: City of Westminster

The Western Balsam Bark Beetle is endemic to the Rocky Mountain region and has entered the upper Clear, Bear and Ralston basins. Our forests have been stressed by persistent and seasonal droughts in recent years making them more susceptible to a wide range of other invasive species as well as large wildfires. These hazards, separately and in combinations, present a significant ongoing hazard to the quality and availability of our water supply. Severe wildfires also damage the soil greatly delaying environmental restoration and increasing the erosion and turbidity.

Figure 4.25 2016 Aerial Insect and Disease Survey



Source: USDA-Forest Service 2016

### VULNERABILITY SUMMARY

The primary potential impact of drought on Westminster is a reduction in the quantity and quality of its water supply. Drought also kills and stresses plants increasing their susceptibility to wildfire and invasive/noxious species. Drought can have catastrophic economic, social and ecological consequences. (CRS study) Drought can impact municipal reservoir storage and lead to water shortages. Water restrictions could impact suburban landscapes (lawns, gardens and trees) and evaporative cooling (a significant form of cooling for our residents and businesses). A prolonged drought has the potential to significantly impact on the quality of life, economy and overall environment of the city.

#### 4.3.3 EARTHQUAKE

Hazard	Likelihood (A-E)	Impact			Overall Impact Sum of Impact divided by 3
		Scale (1-5)	Durations (1-5)	Consequences (1-5) X 2	
Earthquake	B	4	2	3	B4

**Definition:** Earthquake is a term used to describe both the sudden slip on a fault and the resulting ground shaking and radiated seismic energy caused by the slip, or by volcanic or magmatic activity, or other sudden stress changes in the earth. (USGS 2012)

**Description:** The Golden Fault (approximately 10 miles west of Westminster) is the only proximate fault identified by the US Geological Survey (USGS). The Golden, Walnut Creek and two random fault lines have been identified in the area surrounding Westminster. According to the USGS, eastern Colorado is

nearly aseismic. The USGS has recorded numerous small earthquakes in the Denver metro area. The most powerful earthquake ever recorded in Colorado (1882), is estimated to have been about 6.6 on the Richter scale. (USGS) A 2005 HAZUS report estimates a recurrence of this event would result in \$2.8 billion in damages. Colorado's most economically damaging earthquake (4.8) occurred in the northeast Denver metro area in 1967. This earthquake cracked windows, pavement and wall plaster resulting in over \$1 million dollars in damage. Although the 1967 earthquake is believed to have been triggered by deep well injection activity, at least two published studies propose that the Rocky Mountain Arsenal fault could produce a 6.0 earthquake which would cause more than \$10 billion damage. (C. E. Council 2008)

**Figure 4.26 Probability of Earthquakes in Colorado**

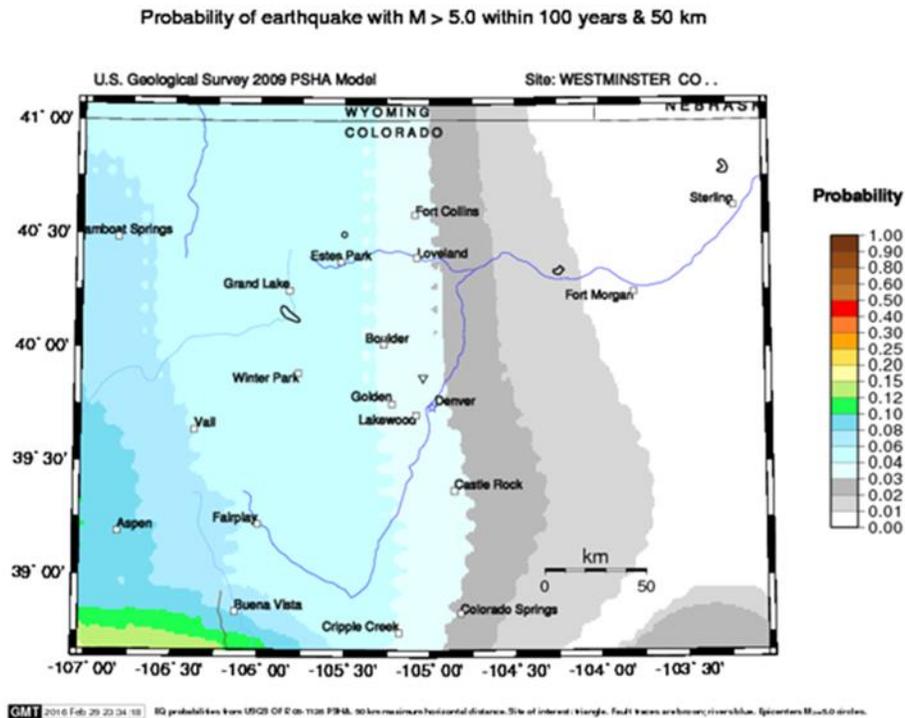
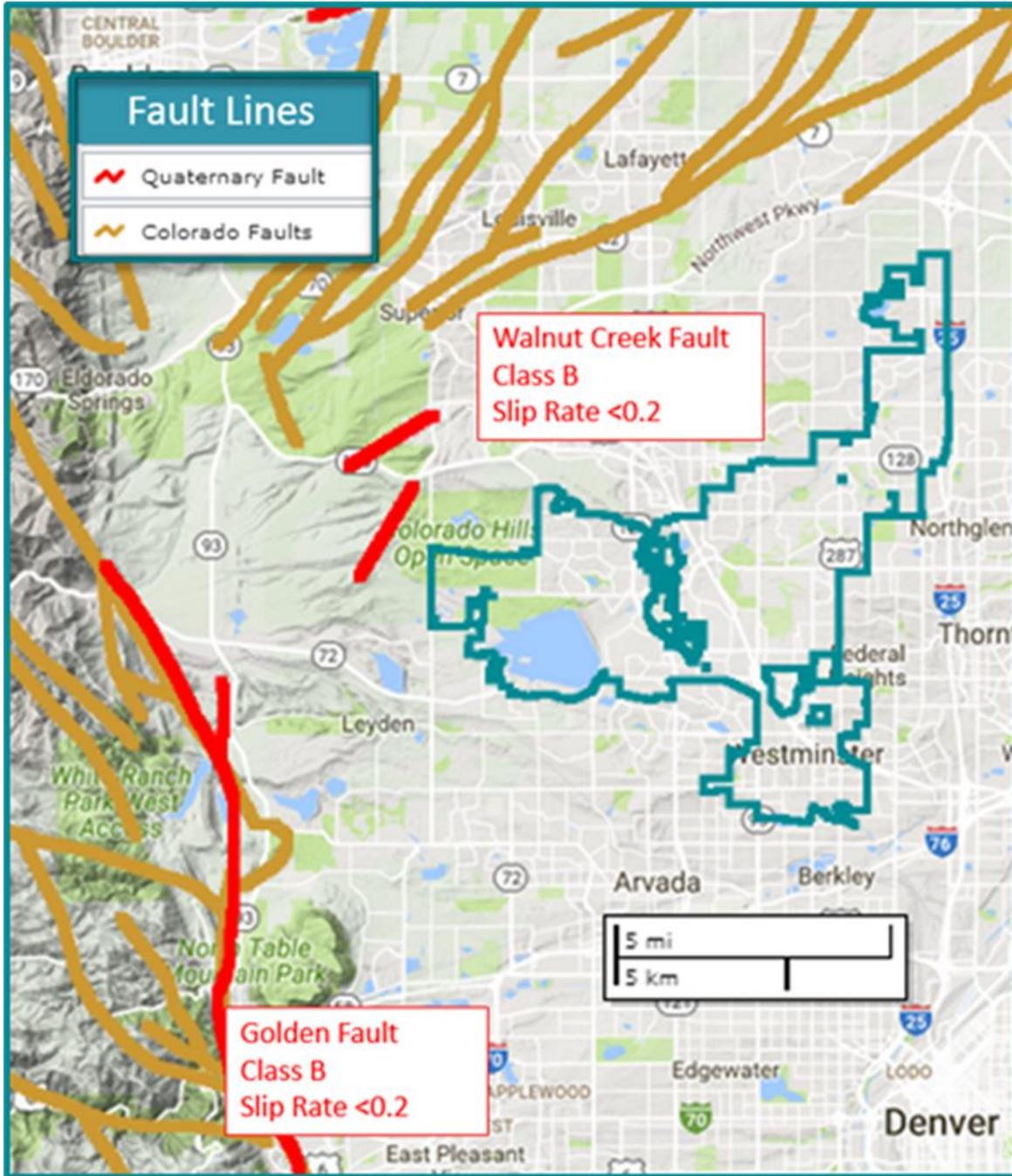
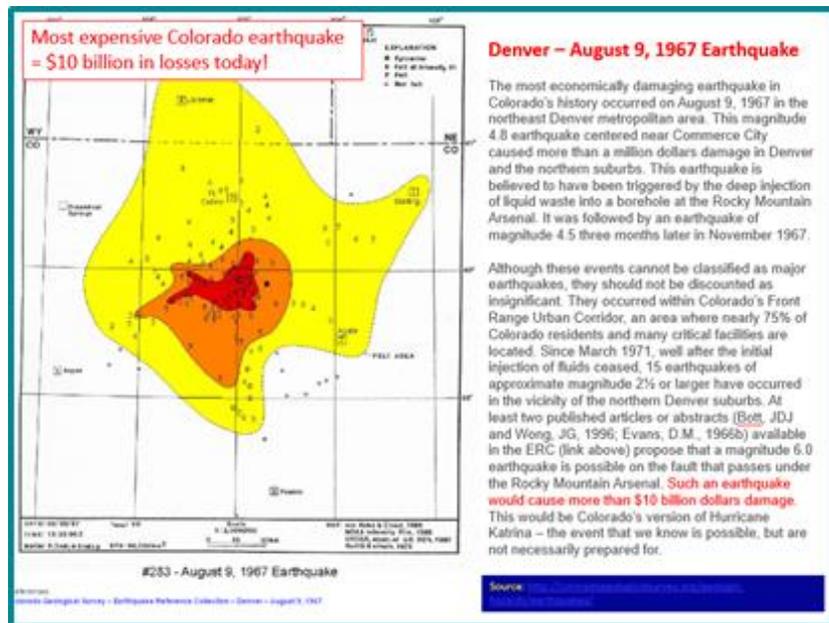
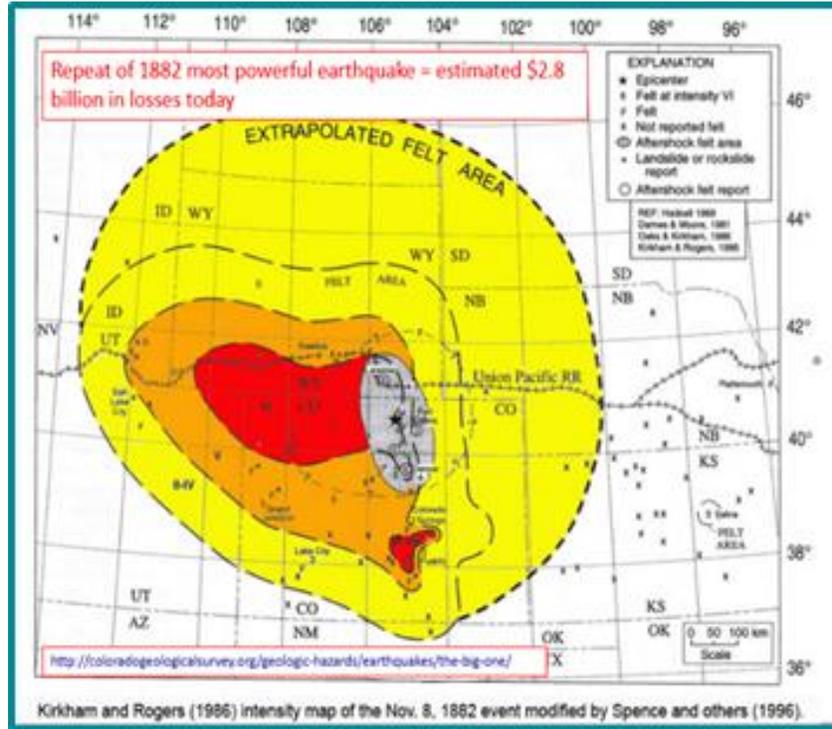


Figure 4.27 Fault Lines in Proximity of City of Westminster



Source: City of Westminster

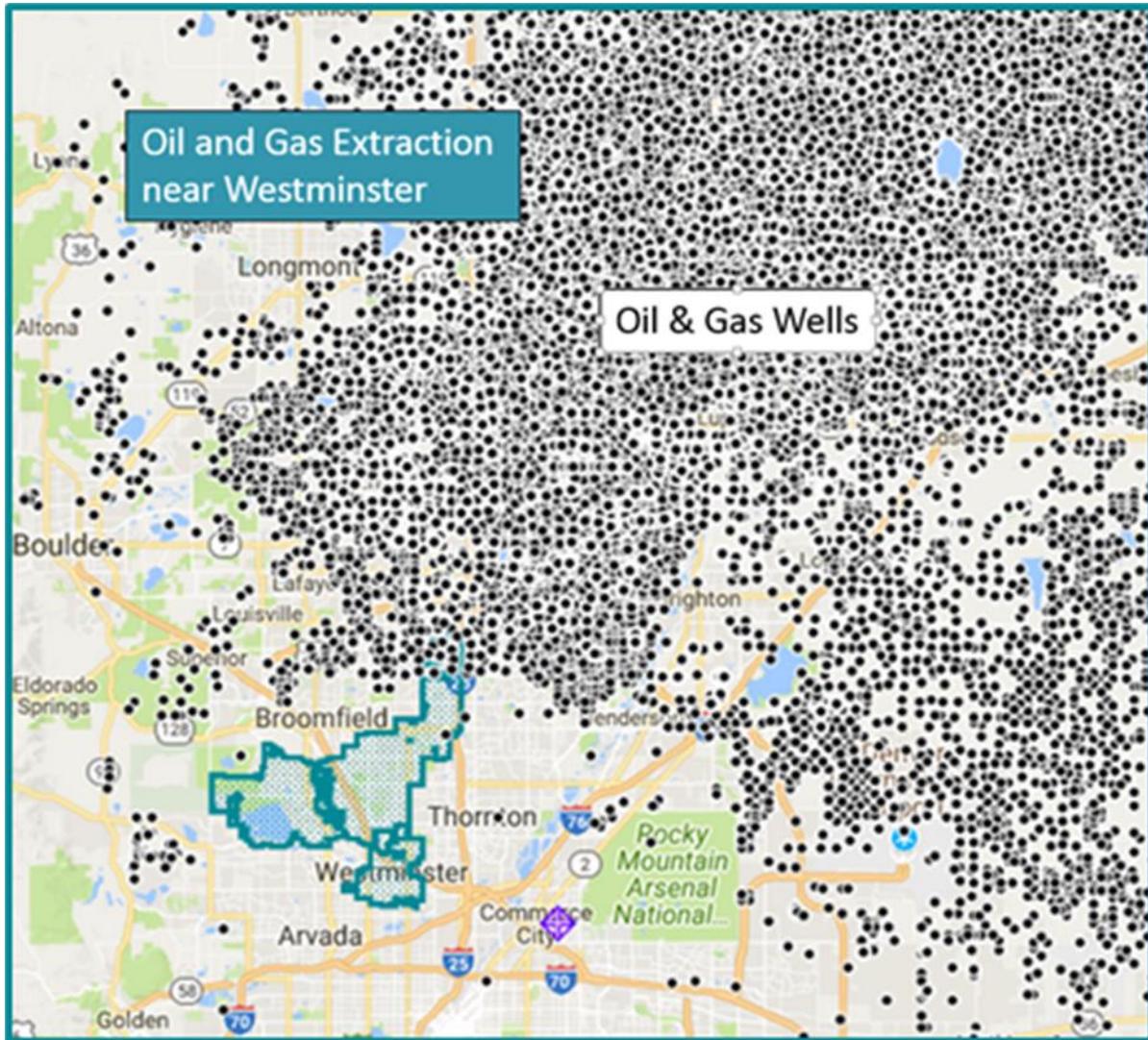
Figure 4.28 Fault Lines in Proximity of City of Westminster



Although there are no active oil or gas wells within Westminster, the areas north and east of the city are very active and induced or triggered earthquakes are a continued topic of study. Due to Colorado's long history of induced earthquakes including a 5.3 event that struck the Trinidad area in August 2011, the Colorado Oil and Gas Conservation Commission (COGCC) asked the Colorado Geologic Survey (CGS) to review all new drilling permits for water disposal wells. The CGS has been reviewing applications since

2011 and continues to work with the COGCC to understand this potential hazard. (Survey, Triggered (Induced) Earthquakes 2018)

**Figure 4.29 Proximity of Oil and Gas Wells to City of Westminster**



Source: City of Westminster

### **PROBABILISTIC SCENARIO**

A 2,500-year probabilistic HAZUS earthquake scenario was performed as part of this mitigation plan's update to analyze the impacts to Westminster specifically. The results can be referenced in the following table. This scenario considers worst case ground shaking from a variety of seismic sources and analyzed data aggregated to census tracts for the city. According to this probabilistic scenario, there is the potential for roughly 2,433 buildings experiencing at least moderate damage and \$298 million in economic losses, mostly associated with residential occupancies. Due to the low probability of a damaging earthquake occurring, as discussed below, the planning significance of earthquakes is considered low by the planning committee.

**Table 4.13 Results of HAZUS Earthquake Scenario in City of Westminster**

Impact Category	Modeled Impacts	
Residential Buildings Damaged (Based upon 5,944 buildings)	Slight: 4,252 Moderate: 1,434 Extensive: 246 Complete: 12	
Building Related Loss	\$285M	
Total Economic Loss	\$298M	
Injuries	Without requiring hospitalization: 48 Requiring hospitalization: 7 Life Threatening: 1 Fatalities: 1	
Essential Facility Damage (Based upon 58 buildings)	None with at least moderate damage	
Transportation and Utility Lifeline Damage	None with at least moderate damage	
Households w/out Power & Water Service (Based upon 51,308 households)	Power loss @ Day 1: 0 Power loss @ Day 3: 0 Power loss @ Day 7: 0 Power loss @ Day 30: 0	Water loss @ Day 1: 0 Water loss @ Day 3: 0 Water loss @ Day 7: 0 Water loss @ Day 30: 0
Displaced Households	184	

Source: HAZUS 4.0; Wood plc.

### CRITICAL FACILITIES AND INFRASTRUCTURE

Based on the HAZUS run previously described there would be minimal impacts to critical facilities and infrastructure.

### ECONOMY

Based on the HAZUS run there could potentially be \$298 million in economic losses, mostly associated with residential occupancies.

### NATURAL CULTURAL AND HISTORIC RECOURSES

The older and more historic buildings located downtown may be more vulnerable to earthquake damage, particularly unreinforced masonry structures.

### FUTURE DEVELOPMENT

Any new construction built to modern codes and construction standards in Westminster should generally be able to withstand earthquakes. It will be important that buildings are securely attached to their foundations to avoid potential shifting.

### VULNERABILITY SUMMARY

The most powerful earthquake ever recorded in Colorado was a VII on the Modified Mercalli Intensity Scale. Earthquakes of this scale are described as, "Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken." The 1967 event was induced by practices which have been discontinued and are not likely to be renewed near Westminster, however "fracking" is a common practice in Adams and Weld counties and has raised the concerns about the potential for future induced events. FEMA and the Colorado Geological Survey indicate that a repeat of 1882 earthquake of record could result in \$2.8 billion in losses in Colorado. While a category VII earthquake results in relatively minor structural damage, the overall cost could be significant and damage to critical infrastructures (roads, bridges, pipelines etc.) could disrupt government operations and community activities. (FEMA 2005) (Colorado Geologic Survey n.d.)

Based on the HAZUS modeling, Westminster could withstand moderate damages from a large earthquake, but the probability of that occurring is small. Since Colorado does not experience many earthquakes, the public generally perceives that there is little risk, and therefore they are less likely to know what to do during an earthquake or how to prepare and protect themselves and their property from one. Scientists are unable to predict when the next major earthquake will happen in Colorado - only that one will occur. Due to the low probability the overall significance is considered low.

#### 4.3.4 EPIDEMIC/PANDEMIC

Hazard	Likelihood (A-E)	Impact			Overall Impact
		Scale (1-5)	Durations (1-5)	Consequences (1-5) X 2	Sum of Impact divided by 3
Epidemic/Pandemic	C	5	5	5	C5

**Definition:** An epidemic is an increase (often sudden) in the number of cases of a disease above what is normally expected in the population of an area. A pandemic is an epidemic that has spread over several countries or continents, usually affecting a large number of people. (Control 2012)

**Description:** Microorganisms (bacterial, viruses, parasites, fungi, etc.) are ubiquitous in the environment. These organisms are a vital part of the ecosystem and are generally harmless or helpful for society. Pathogenic microorganisms are microorganisms that can cause diseases that may become infectious and spread among the population. Over a quarter of deaths worldwide are the result of infectious disease. The spread of infectious diseases happens through direct contact with an infected individual and their bodily fluids, through indirect contact with objects or surfaces that have been contaminated by an infected individual, as well as through vector borne pathogens that transmit infections through an intermediary such as plants, fungi and various breeds of bloodsucking insects. Zoonotic diseases are diseases found in animals and may be transmitted to humans. Some, but not all, zoonotic diseases may also be transmitted from person to person.

Pandemic diseases are among the most dangerous hazards facing human civilization. If a pandemic disease like the 1918 Spanish Flu were to afflict the City of Westminster today, it can be estimated that there would be about 70 cases with 4-5 fatalities a day for 18 months for a total of 37,950 people affected and 2,300 fatalities.

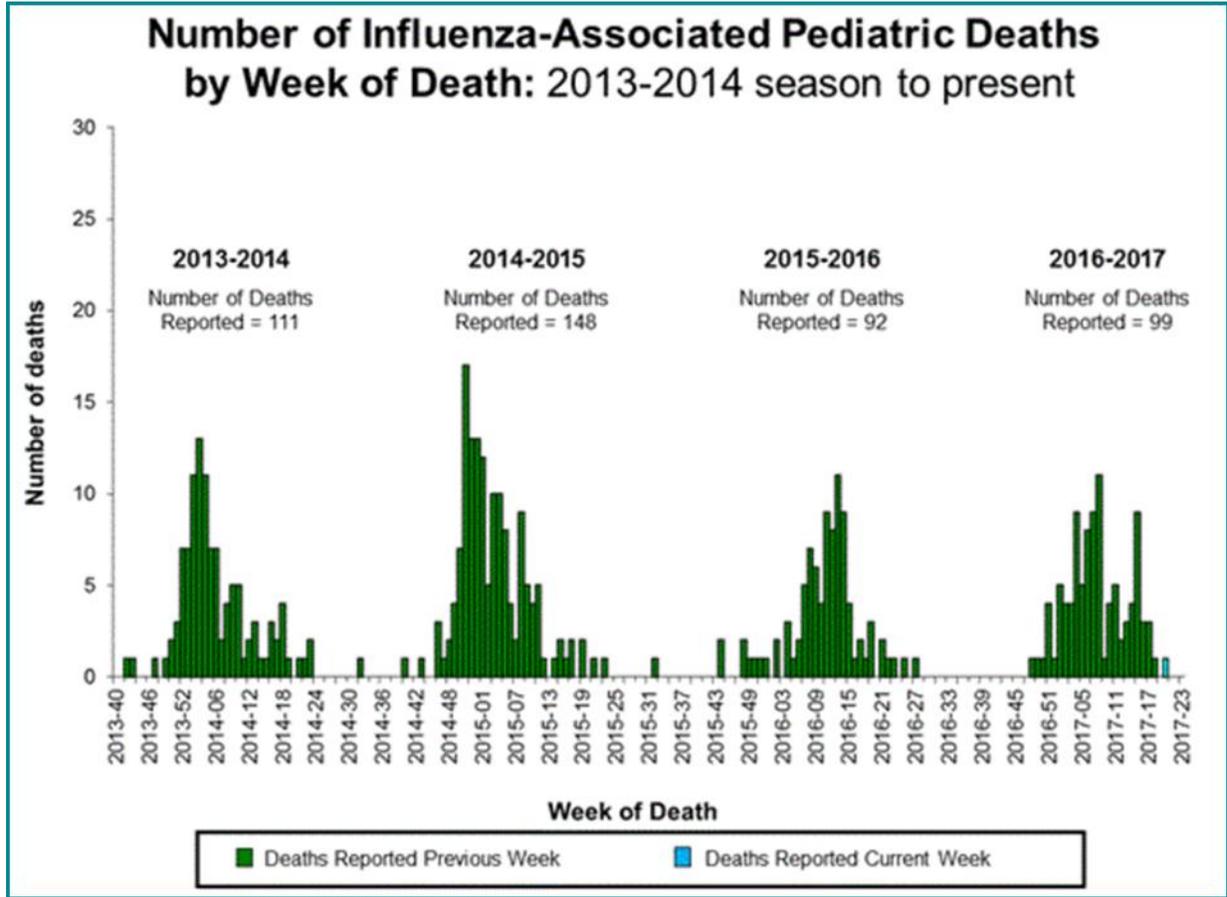
The danger posed by diseases varies depending on the means and rate of transmission, the associated mortality/morbidity rates, the availability of prophylaxis and the availability of effective treatment. The most dangerous infectious diseases are airborne diseases that spread quickly with person to person contact. These are more common in colder months with populations clustered together indoors. Sanitation and hygiene are also major factors in the transmission and risk posed by these diseases.

Influenza – Influenza occurs yearly in seasonal form and periodically in epidemic or pandemic form. Seasonal influenza is a common occurrence and there is a good degree of immunity from previous outbreaks in communities to mitigate damages, generally 70-90% of seasonal influenza fatalities are in populations age 65 and older. The actual number of cases and fatalities in the adult population from flu on a yearly basis is difficult to gauge as states are not required to report individual flu cases and influenza is infrequently listed on death certificates of those who die from flu-related complications.

Epidemic or pandemic influenza varies in severity, but populations may not have any immunity to these strains. Novel strains can easily create shortages in vaccines and antivirals and overwhelm public health resources. Additionally, lost productivity caused by the virus, as well as mitigation efforts, can have major repercussions on transportation, critical infrastructure, economic activity and social activities of all kinds.

Flu strains mutate and transition between animals and humans. Dogs, cats and bats can carry flu, but the greatest risk comes from poultry and swine involved in industrial farming. These industries can also serve as an incubator for diseases to become immune to antivirals and virtually impossible to combat.

Figure 4.30 Influenza-Associated Pediatric Deaths 2013-1014



Source: Centers for Disease Control

### Modern Influenza Pandemics:

**1918 – H1N1:** This was the most severe pandemic in recent history. There were three waves between 1918-19. Mortality was high in populations under 5, 20-40 years old, and 65 years and older. The high mortality among healthy people in the 20-40 years age range was a unique characteristic of this pandemic. Control efforts were limited to non-pharmaceutical interventions such as isolation, quarantine, personal hygiene, the use of disinfectants and limitations of public gatherings. The worldwide death rate was between 1-3% of the global population.

**1957 – H2N2:** The strain emerged out of East Asia and moved to the coastal cities of the United States within six months. The CDC estimates the number of deaths worldwide was 1.1 million with 116,000 in the United States.

**1968 – H3N2:** “Swine Flu” arrived in the United States in 1968 and the majority of the 100,000 U.S. fatalities were in the 65-years and older age range. The 1968 strain has transitioned to a seasonal flu and still circulates the globe. CDC estimates the 1968 flu pandemic had a global mortality of .03%.

**2009 – H1N1:** This novel flu was first detected in the United States and contains a unique combination of influenza genes not previously identified in animals or people. Nearly one-third of people over the age of 60 had antibodies against this virus, likely from an exposure to an older H1N1 virus. According to CDC estimates, 80% of fatalities for the 2009 flu were people younger than 65. This strain continues to

circulate globally as a seasonal flu. The worldwide death rate for the 2009 outbreak was estimated to be between 151,700 and 575,400 for the year.

**Escherichia coli (E. coli):** E. coli is a diverse group of bacteria. While most strains are harmless, many disease-carrying strains produce toxins called Shiga toxins. The primary source of these diseases are livestock and poor sanitation. Approximately, 8% of those infected, and up to 20% of children, will develop potentially life-threatening complications from E. coli.

**Pertussis:** Bordetella pertussis or whooping cough is found in humans and normally spreads through person to person contact with sneezing or coughing. This disease causes violent fits of coughing, but normally only children will develop fatal complications. This disease is largely managed through vaccinations. Fully vaccinated persons are still at risk of catching the disease, although usually in a less severe form. Pertussis is treated with antibiotics.

**Salmonellosis:** Salmonellosis is caused by bacteria named Salmonella and is dangerous to the elderly, infants and those with compromised immune systems. Salmonellosis is spread by eating raw or undercooked food that is contaminated with Salmonella. The disease is further spread by infected individuals who practice poor hygiene as well as animals, specifically lizards.

**Coronaviruses:** Coronaviruses were first discovered in the mid-1960s. There are many of these viruses that infect animals and there are, currently, six discovered strains that infect people. Transmission of coronaviruses generally occurs through coughing/sneezing and personal contact person-to-person. Coronaviruses are common worldwide, with the exceptions of the beta coronaviruses SARS-CoV (the virus that causes Severe Acute Respiratory Syndrome – SARS) and MERS-CoV (the virus that causes Middle East Respiratory Syndrome – MERS). SARS-CoV first emerged in China in November of 2002 and caused a worldwide outbreak with 8,098 probable cases (27 in the U.S.) and 774 deaths from 2002-03. There have been no known cases of SARS since 2004. MERS-CoV first emerged in Saudi Arabia in 2012 and has spread throughout the Middle East, Southeast Asia and Europe. Most of cases and fatalities have occurred in Saudi Arabia and the United Arab Emirates. There have only been two known U.S. cases of MERS in May of 2014 and no known fatalities. There are no specific treatments for illnesses caused by human coronaviruses.

## **NOTABLE EMERGING INFECTIOUS DISEASES IN THE LAST CENTURY**

**1952 Polio Epidemic:** The United States had a major polio epidemic in 1916, but outbreaks in the 40s and 50s created chaos and quarantine conditions across the nation. The epidemic peaked in 1952 with over 58,000 infected and 3,145 deaths. Vaccination efforts lead to polio being eradicated in the United States in 1979.

**1993 Cryptosporidium Outbreak in Milwaukee:** One of two water treatment plants in Milwaukee became contaminated with cryptosporidium, resulting in the largest waterborne outbreak in U.S. history, with 403,000 becoming ill and 100 deaths.

**2010 Whooping Cough Outbreak in California:** Outbreaks of pertussis, particularly among teens and children have increased since the 1980s. The 2010 outbreak in California lead to 9,477 cases with 10 infant deaths.

**1980s to Present AIDS Epidemic:** Acquired Immune Deficiency (AIDS) is the final stage of an illness caused by a Human Immunodeficiency Virus (HIV). This disease is spread through fluids, such as through blood transfusions, the sharing of needles, sexual contact or from an infected pregnant woman to her child. AIDS has spread in the United States for almost 40 years and, while treatments have improved the chances for survival, is a leading cause of death worldwide and the sixth leading cause of death in the United States.

## EMERGING DISEASES

Emerging diseases are those whose incidence in humans has increased in the past two decades or threaten to increase in the near future. Two-thirds of new diseases are zoonotic and mutation along with poor practices in agriculture can lead to antimicrobial-resistant disease that can only be combated with non-pharmaceutical methods. A re-emergence of old diseases with genetic variations or as a result of a decreased compliance with vaccination policy has become common in recent decades and the global economy has created new avenues for infectious diseases to spread. For example, international travel or trade in exotic and esoteric plants and animals create novel situations of transmission. Effective surveillance and reporting along with the speed of notification is essential when combating outbreaks.

**Table 4.14 Human Cases of Zoonotic Disease by Year**

Report Year	2010	2011	2012	2013	2014	5-Year Average (2010-2014)	2015
Anthrax	0	0	0	0	0	0	0
Brucellosis	1	0	2	1	3	1.4	0
Chikungunya	-	-	-	-	14	-	8
Dengue	-	-	-	-	10	-	13
Hantavirus	5	4	3	2	6	4.4	6
Malaria	31	27	30	31	30	29.8	21
Plague	0	0	1	0	8	1.8	4
Psittacosis	0	0	0	0	0	0	0
Q-Fever, Acute	4	2	9	5	4	4.8	7
Q-Fever, Chronic	0	2	1	3	2	1.4	1
Rabies, Human	0	0	0	0	0	0	0
Rabies, Animal	136	104	183	187	130	148	119
Rocky Mountain Spotted Fever	2	3	7	5	5	4.4	7
Tick-borne Relapsing Fever	1	7	7	6	2	4.6	3
Tularemia	3	3	0	2	16	4.8	52
West Nile Virus	79	7	134	321	118	131.8	101

Source: Colorado Department of Public Health and Environment

Bubonic Plague and West Nile Encephalitis are examples of zoonotic diseases that have become endemic in Colorado after their introduction. Plague is believed to have entered the US via west coast ports in 1911 and been transmitted to our rodent population (especially prairie dogs in our area) where outbreaks can pose a threat to pets and people who visit open spaces. West Nile Virus was first noted in New York in 1999 and became endemic in Colorado in 2002.

## VULNERABILITY SUMMARY

Historically, epidemics/pandemics have been the single greatest natural cause of death. While improvements in public health and medicine have greatly reduced this hazard, we have the potential to become victims of our own success. Emerging and re-emerging and newly resistant diseases that can be rapidly spread through a high speed global transportation and supply chains pose a persistent challenge to our public health and medical response communities. Climate is a major factor in affecting diseases and their transmission. A warmer climate may expand the geographic ranges of insects, snails and cold-blooded animals that spread diseases. Transmission seasons may also be extended. (Organization 2018)

#### 4.3.5 EROSION, DEPOSITION AND TURBIDITY

Hazard	Likelihood (A-E)	Impact			Overall Impact
		Scale (1-5)	Durations (1-5)	Consequences (1-5) X 2	Sum of Impact divided by 3
Erosion, Deposition and Turbidity	B	1	2	3	B3

**Definition:** Erosion is the removal of weathered sediment or rocks by the forces of wind, water and ice. Deposition is the laying down of sediment transported by wind, water or ice. Turbidity is the suspension of solids in a liquid/our water supply (PhysicalGeography.net 2012)

**Description:** Erosion, deposition and turbidity is a complex hazard that is closely related to the quality of our watersheds and the forests that are the basis of our water supply. Recent wildfires in Colorado have demonstrated the negative effect deforestation can have on a natural watershed’s ability to prevent erosion. Intense events such as the 2002 Hayman Fire can damage soil and greatly slowing the recovery of the vegetation or permanently degrading the biome. Invasive species (primarily the pine bark beetle) are also endangering the health of our forests and the water sheds that supply the Front Range. A healthy forest provides natural filtration and slows the run-off of snow melt and rain. (Lukas 2014) A significant forest fire in the watersheds that supply Westminster and the Front Range communities could lead to deposition in our streams, ditches and reservoirs as well as a general degradation of raw water quality. Colorado’s largest wildfire to date (Hayman Fire in 2002) burned 229 square miles and came within 30 miles of Westminster’s primary water source, the Clear Creek watershed. The 2011 Indian Gulch fire (10.9 square miles) has been the largest fire in the Clear Creek watershed to date, but wildfire is a persistent danger that is exacerbated by drought and invasive species. Although the Clear Creek watershed is outside the boundaries of the city, any event effecting the environmental quality and sustainability of this critical natural resource is of great concern to Westminster.

Water quality of the Clear Creek watershed is closely monitored and procedures are in place to close the intakes to the ditches used to supply Standley Lake. However, a severe precipitation event over the Big Dry Creek watershed could result in erosion and deposition affecting ditches, streambeds, reservoirs, open space and storm water management structures. Heavy sediments can settle out in the water infrastructure limiting its capacity or clogging it. Lighter sediments can remain suspended in the water supply for an extended period of time degrading water quality and resulting in increased treatment costs.

#### VULNERABILITY SUMMARY

Major rain events in 2013 and 2015 damaged the ditches supplying our raw water, deposited sediments in our water supply and increased turbidity in area water supplies. Drought, wildfire and invasive/noxious species pose a persistent threat to the overall quality of the watershed that the city depends upon for its water supply. Observed trends related to climate change (e.g. shorter winter, less snow pack, earlier thaw/run-off, and more extreme weather event) are changing the dynamics of our water supply, its quality, quantity and our uses. The cumulative effects of water shed degradation and climate change have the potential to significantly affect our water supply and related critical infrastructures.

#### 4.3.6 SWELLIN SOILS

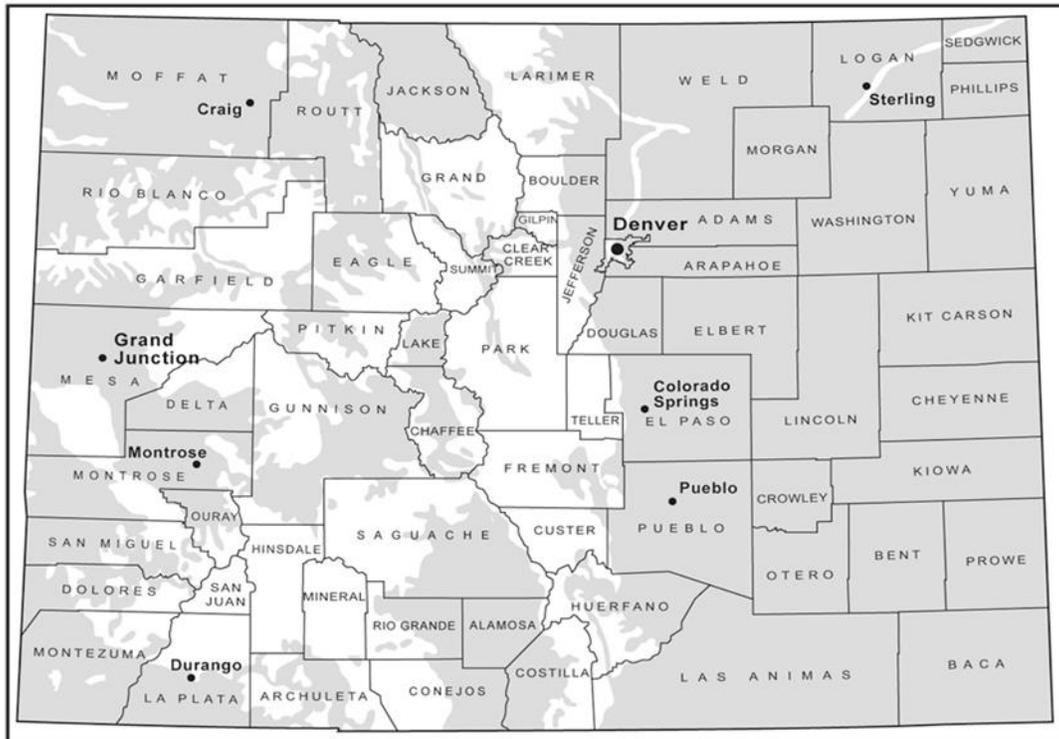
Hazard	Likelihood (A-E)	Impact			Overall Impact
		Scale (1-5)	Durations (1-5)	Consequences (1-5) X 2	Sum of Impact divided by 3
Expansive Soils	E	1	3	2	E3

**Definition:** Soils or soft bedrock that increase in volume as they get wet and shrink as they dry out. They are also commonly known as bentonite, expansive, or montmorillonite soils.(Survey, Colorado Geologic Survey-Swelling Soils n.d.).

**Description:** Swelling soils cause more property damage than any other geological hazard in Colorado. Swelling soils are found throughout Colorado (including much of Westminster). Swelling soils may expand

up to 20% and exert up to 30,000 pounds of force per square foot when wet. They damage foundations, drive ways, walkways, roads, pipelines and sewers. (Colorado Geological Survey-Swelling Soils 2017)

**Figure 4.31 Swelling Soils and Bedrock in Colorado**



*Distribution of swelling soils and bedrock (shaded areas) in Colorado*

Source: Colorado Geological Survey

**VULNERABILITY SUMMARY**

It has been estimated that 1 out of 3 houses in the Front Range is built on swelling soil. Repairs to damaged foundations typically cost \$30,000 to \$70,000. There is no special insurance of federal emergency funds to address damages caused by swelling soil. (David C. Noe 2014) The nature of these soils in conjunction with our cycles of drought and moisture (possibly exacerbated by climate change) poses an ongoing probability of significant property damage/loss. Residents who are new to Colorado may not be familiar with this hazard, their rights under Colorado Senate Bill 13 (1984), C.R.S. 6-65-101 and their role as responsible property owners in mitigating this hazard.

**4.3.7 EXTREME COLD**

Hazard	Likelihood (A-E)	Impact			Overall Impact Sum of Impact divided by 3
		Scale (1-5)	Durations (1-5)	Consequences (1-5) X 2	
Extreme Cold	D	5	3	3	D4

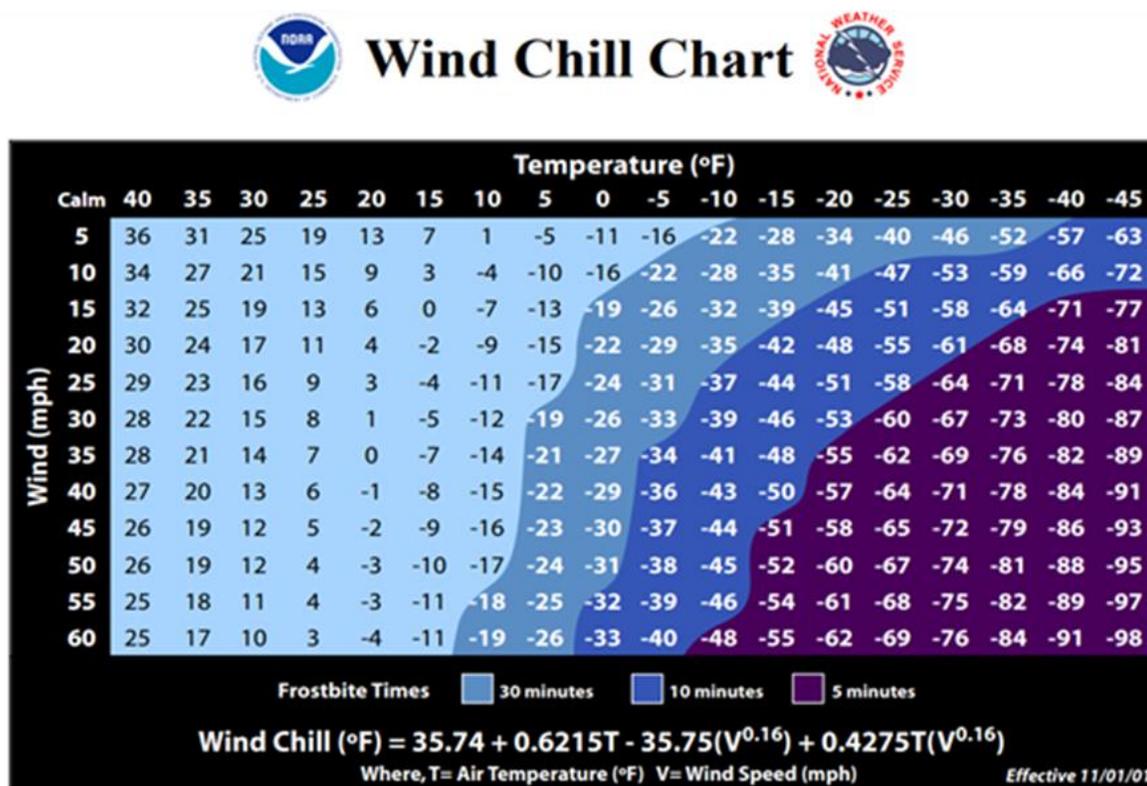
**Definition:** A prolonged period of excessively cold weather and the sudden invasion of very cold air over a large area. It can cause damage to agriculture, infrastructure and property. (Societies 2015)

**Description:** As is the case of other hazards that are not specific to geography, the entire building inventory and population in the city is potentially exposed. The coldest temperature recorded for Westminster is -29F (January 9, 1875). The area has recorded 29 days of -20 degrees or below weather

since 1872. The last time the Denver area experienced -20 or below temperatures was December 21-22, 1990. (National Weather Service 2017)

While the seasonal cold temperatures routinely experienced in our area have little impact on our built environment and critical infrastructure, they can pose a significant danger to the homeless and other vulnerable populations. Hypothermia and/or frostbite can occur at moderately cold temperature especially when compounded by wind. While the effects of cold temperatures the built environment are largely mitigated by appropriate building codes and resilient infrastructure, prolonged extreme cold can over-stress or damage power and water infrastructures.

**Figure 4.32 National Weather Service’s Wind Chill Chart**

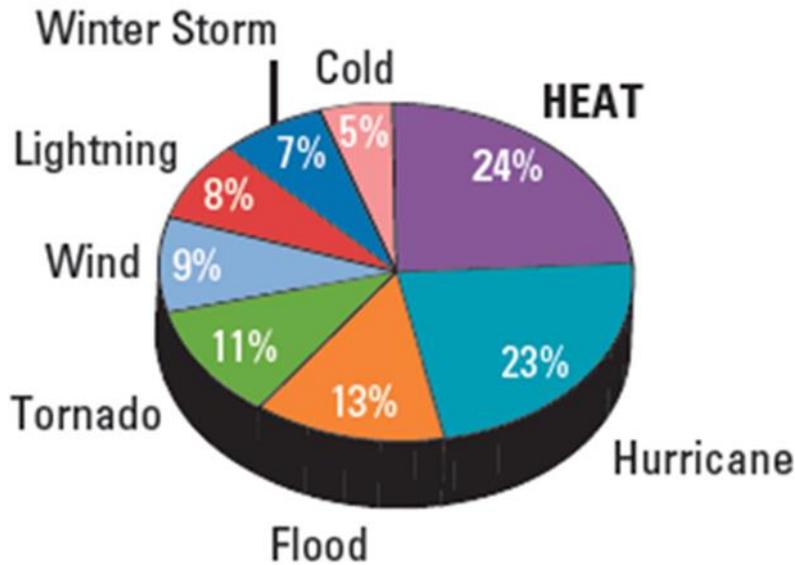


Source: National Weather Service

Sudden and unseasonable cold snaps can also damage or kill large numbers of trees. In a 1991 event, our area experienced a 64 degrees Fahrenheit change (from 71F to 7F degrees) between October 27 and October 29. During the 2014 event, temperatures dropped from 64F degrees on November 10 to -13 degrees on November 12; a 77F degree change in temperature. Both events severely damaged or killed many of our trees and planted landscape. The 2014 event involved one of the warmest falls on record and one of the most intense extratropical cyclones ever recorded in the North Pacific. The cyclone, a remnant of Typhoon Nuri, moved into the Bering Sea causing the jet stream to move northward and allowing the polar vortex to fall into the United States. (Geist n.d.) The 2014 event is an example of how a warming global climate can result in sudden extreme cold weather events. (Walsh 2014)

Figure 4. 33 US Deaths Attributed to Weather Conditions

### DEATHS IN THE UNITED STATES ATTRIBUTED TO WEATHER CONDITIONS, 2000–2009 <sup>6</sup>



Source: Centers for Disease Control

### VULNERABILITY SUMMARY

Extreme cold poses a danger to vulnerable populations (AFN, homeless and low income) as well as property (broken pipes) and vegetation. In 2016, there were 31 deaths attributed to extreme cold nationwide. The majority of these deaths (27), occurred outside (National Weather Service-Office of Climate, Water, and Weather Services 2017). Although none of these deaths occurred in Colorado, we should remain mindful of this hazard and the dangers it can pose. The conjunction of extreme cold and a prolonged loss of power or gas service would pose a significant hazard.

#### 4.3.8 EXTREME HEAT

Hazard	Likelihood (A-E)	Impact			Overall Impact
		Scale (1-5)	Durations (1-5)	Consequences (1-5) X 2	Sum of Impact divided by 3
Extreme Heat	C	5	3	4	C5

**Definition:** A prolonged period of excessively hot and sometimes humid weather relative to normal climate patterns. (Societies 2015) NOAA issues heat advisories when a heat index of 105F for at least 3 hours per day, or nighttime lows above 80F for two consecutive days are expected. (N.-N. W. Service 2009)

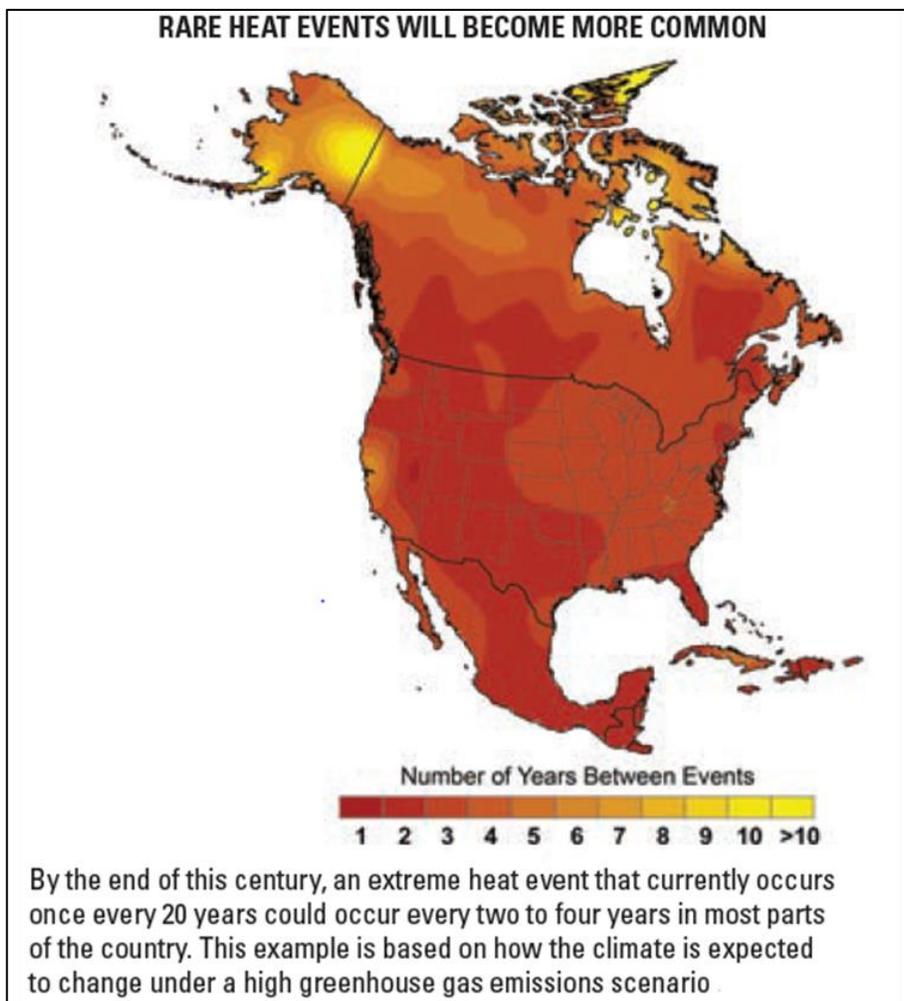
**Description:** As is the case of other hazards that are not specific to geography, the entire building inventory and population in the city is potentially exposed. The hottest temperature recorded for Westminster is 105F (August 8, 1978, June 25 & 26, 2012). The Denver metro area has recorded 86 days of 100F since 1872. During this period, the area has experienced thirty 90F degree streaks (10 days or more). Two of these heat streaks lasted for 24 days (during July and August in 2008 and 2012). Thirteen of our thirty >90F degree heat streaks have occurred since 2000. (National Weather Service

2017) Temperatures in the high 90s and low 100s are not unusual in Westminster. The lower humidity, altitude and weather patterns help to mitigate extreme heat, but many homes in Colorado do not have air conditioning. As with extreme cold, extreme heat poses the greatest hazard to vulnerable populations, especially the young and elderly. Extreme heat can also over-stress and potentially disrupt the power grid.

### VULNERABILITY SUMMARY

Extreme heat was the number one cause of weather related deaths (94) nationwide in 2016. The majority of these deaths took place in permanent homes with little or no air conditioning. (National Weather Service-Office of Climate, Water, and Weather Services 2017) Fortunately, none of these deaths were in Colorado, but we should be mindful of this hazard during extreme heat events that may occur here. Prolonged power outages that may be occur concurrently would significantly increase the likelihood of heat related injuries and deaths among more vulnerable populations.

**Figure 4.34** Number of Years Between Extreme Heat Events in the U.S.



Source: Centers for Disease Control

### 4.3.9 FLOODING

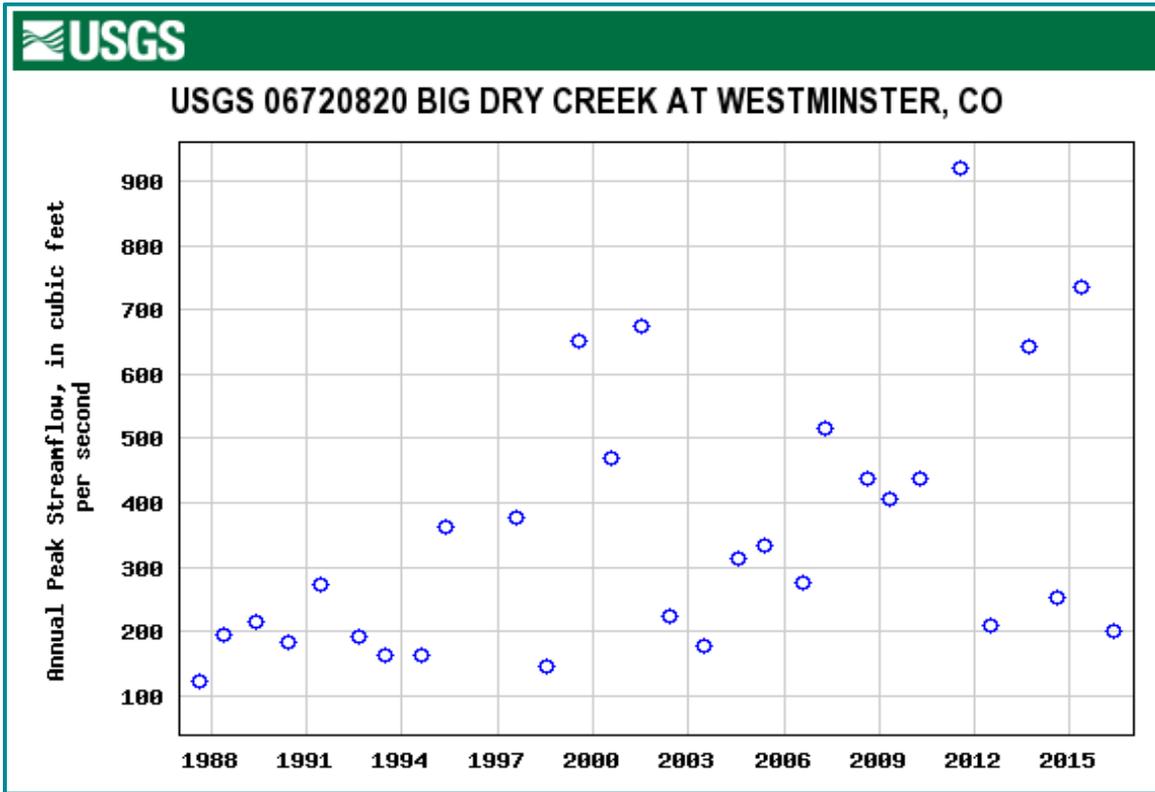
Hazard	Likelihood (A-E)	Impact			Overall Impact
		Scale (1-5)	Durations (1-5)	Consequences (1-5) X 2	Sum of Impact divided by 3
Flooding	D	3	3	3	D4

**Definition:** An event where water levels rise over the tops of river/creek banks due to excessive rain, snowmelt or ice dams. They can occur rapidly (flash flooding) and may be due to upstream events such as heavy rain, dam failure or the sudden release of water by debris or ice jam. (N. S. Laboratory, Severe Weather 101-Floods n.d.)

**Description:** Most of the city sits within the catchment of the headwaters of Big Dry Creek. Standley Lake is fed primarily through the Farmer’s Highline, Church Ditch that bringing water from Clear Creek near the City of Golden. Although this topographic factor limits our flooding hazard, intense rain events (2-3 inches in one hour), or rain events that result in 5 or more inches of rain can produce rapidly flowing water and have the potential to result in 100-year or greater flood events. These short duration 1-hour rainfall events have a one-percent annual chance of occurring. A 2013 storm over neighboring Boulder, Denver and Aurora exceeded 13 inches over multiple days and caused many dams to spill. During the past 50 years, Colorado has experienced several events that exceeded 8 inches per 24-hours. (UDFCD-Stewart, Mar. 23, 2017) For a more detailed examination of major precipitation events, see “Severe Summer Storms,” below.

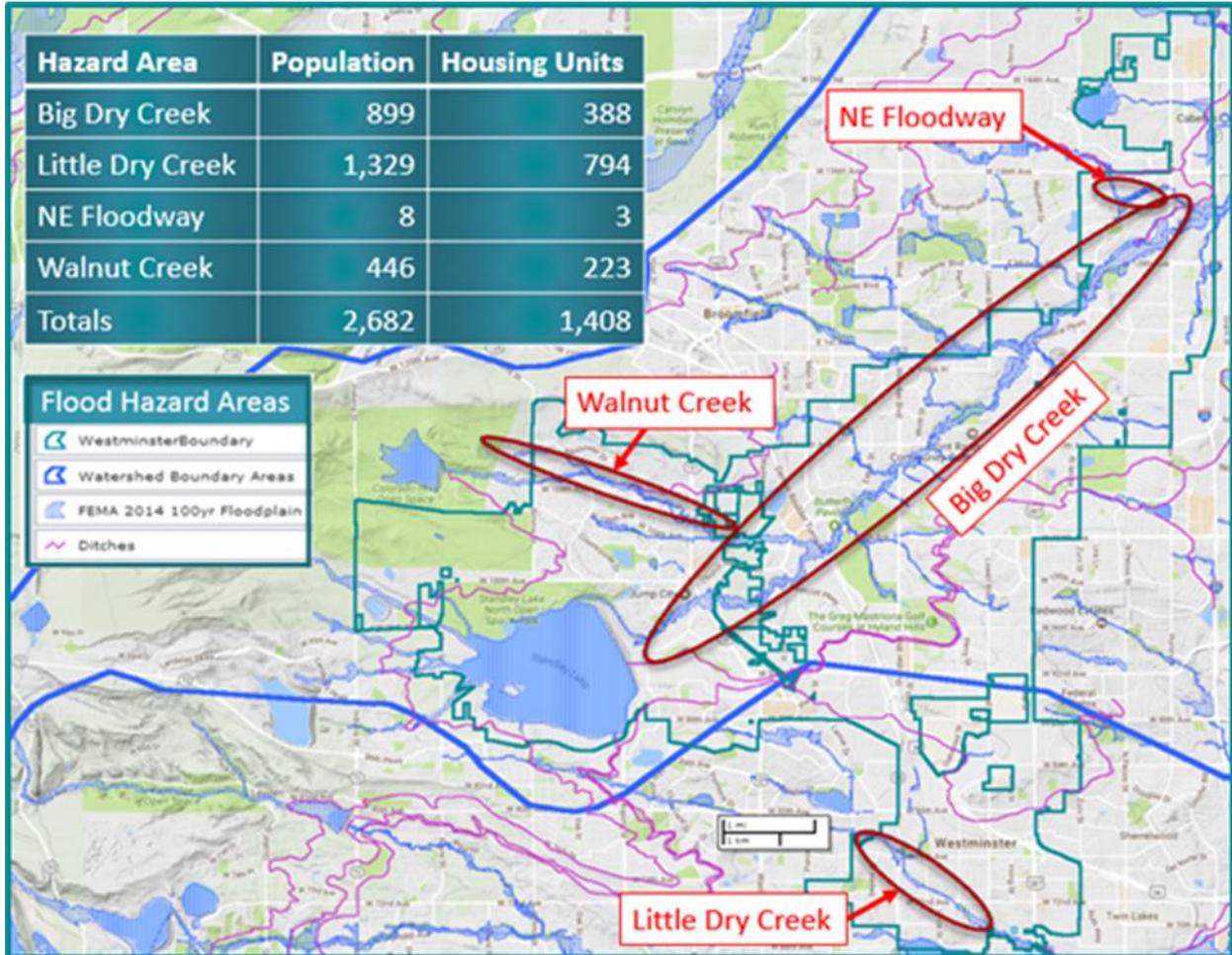
A local rain event exceeding 1.5 inches per hour will result in localized street flooding and fast running water. Although the Standley Lake has a small natural catchment area, an intense local rain event could result in flooding in the area between the dam and the BNSF railroad embankment approximately 1 mile downstream. The flooding could be exacerbated by any impedance of stream flows under Wadsworth Boulevard or the BNSF embankment. Roughly 1,400 properties encroach the floodplain. While not considered part of the regulatory floodplain, these properties are still considered high risk for flooding. (MARPLOT estimate) Neighborhoods along our four primary drainages (Big Dry Creek, Little Dry Creek, and Walnut Creek and Quail Creek/North East Floodway) are susceptible to high water due to severe winter storm snow melt or heavy localized rain. Our flood damage potential is low to moderate due to flood mitigation efforts and infrastructure. High numbers of visitors and recreational enthusiasts at Standley Lake and along Big Dry Creek increase the number of people that may be affected and in need of warning and evacuation.

Table 4.15 Annual Peak Streamflow of Big Dry Creek



Source: USGS

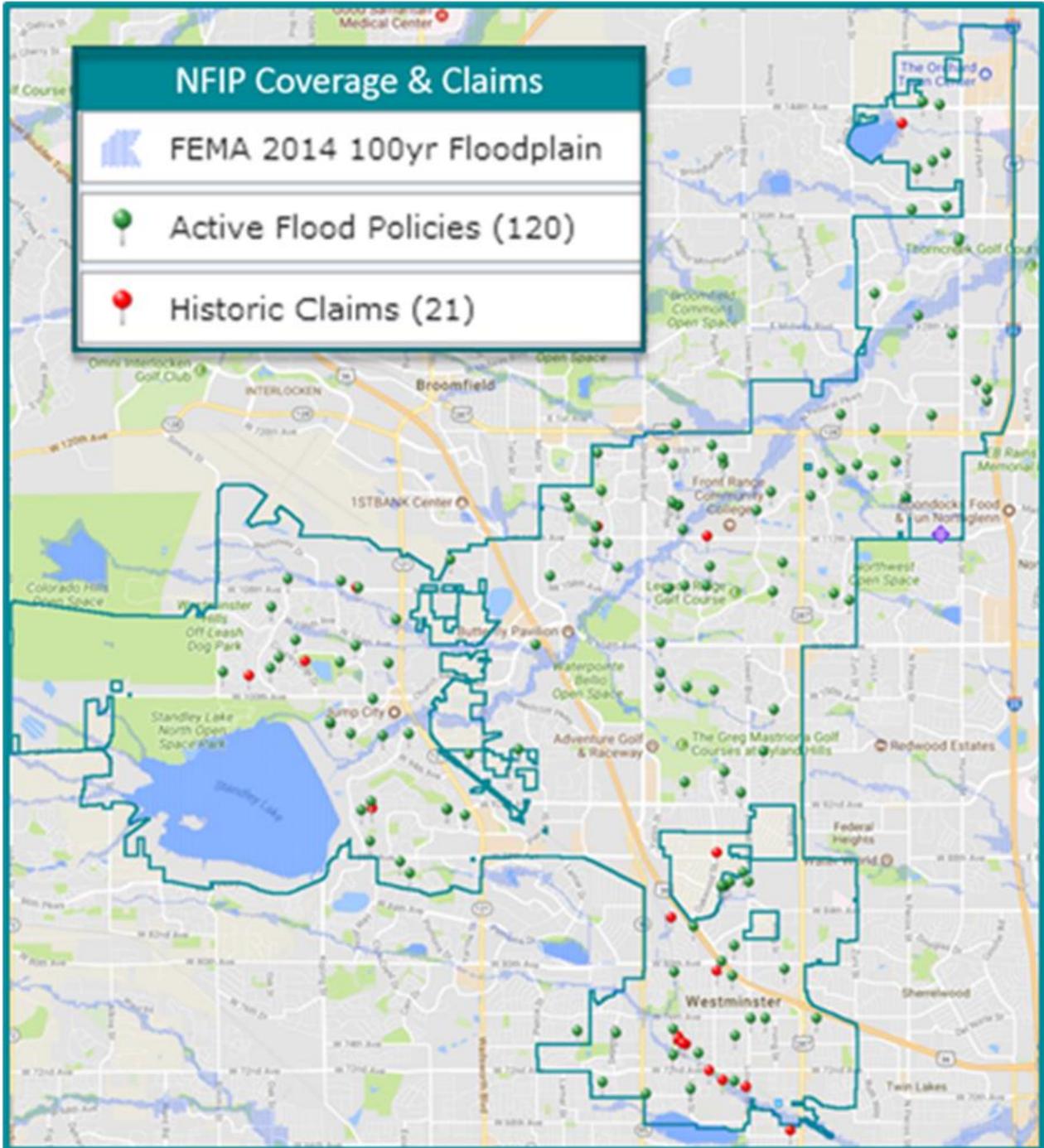
**Figure 4.35 Proximity of Housing Units to Flood Hazard Areas**



Source: City of Westminister

There are currently 120 active National Flood Insurance Program (NFIP) policies in Westminister that provide \$23,254,000 in coverage for building and \$8,799,500 for contents. Since 1981, 21 NFIP claims have been filed for a total of \$260,099 in losses.

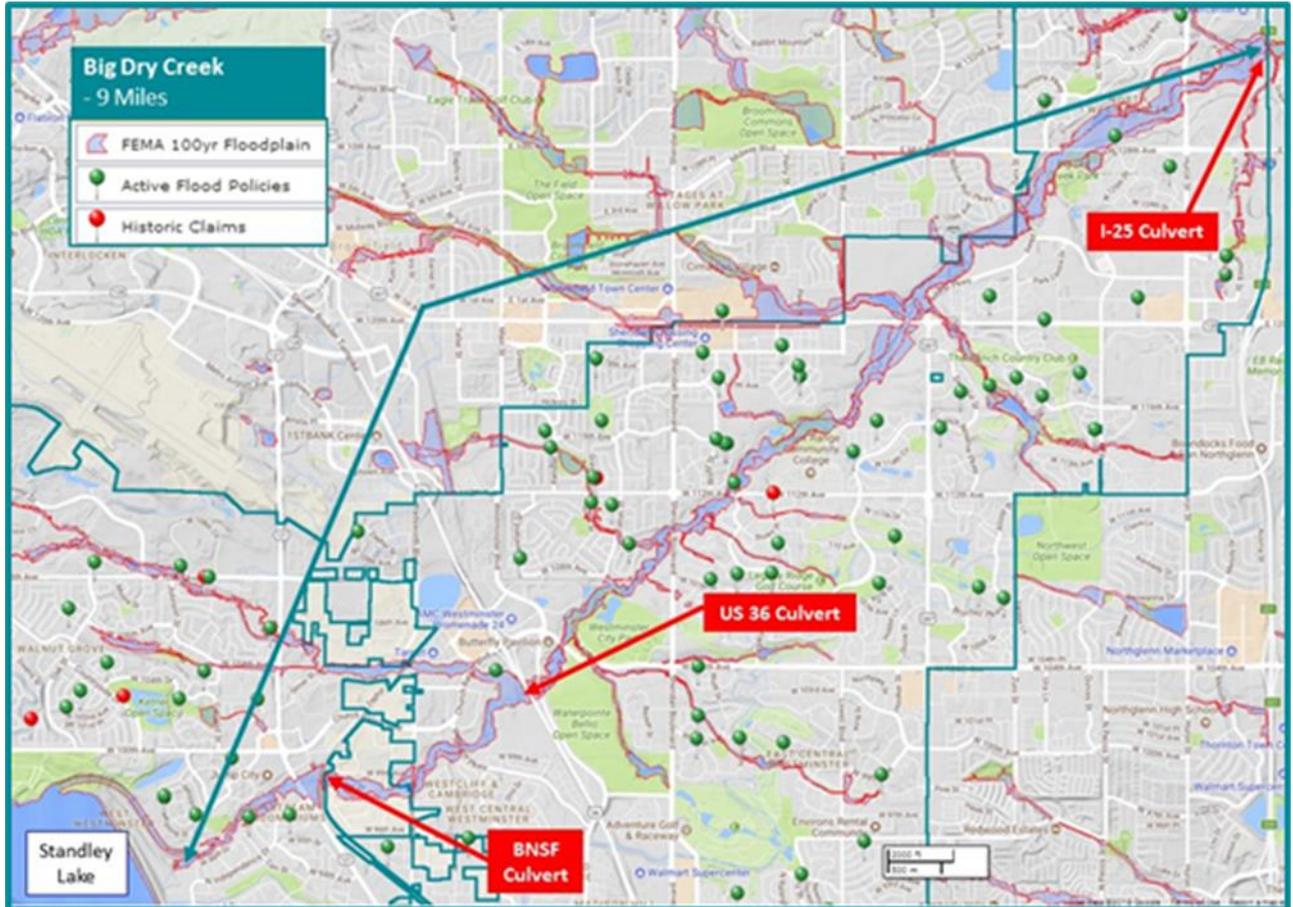
Figure 4.36 NFIP Coverage and Claims on City of Westminster



Source: City of Westminster

**Big Dry Creek** is a perennial stream that originates in the open spaces west of Standley Lake. This waterway flows from southwest to northeast across approximately 9 miles of Westminster. Three culverts (BNSF Railroad embankment, US 36 and I-25) are undersized for major storm flows on this waterway. The flood hazard posed by this waterway has been largely mitigated by improvements to the Standley Lake dam and spillway, culvert improvements and the use of open space to limit development.

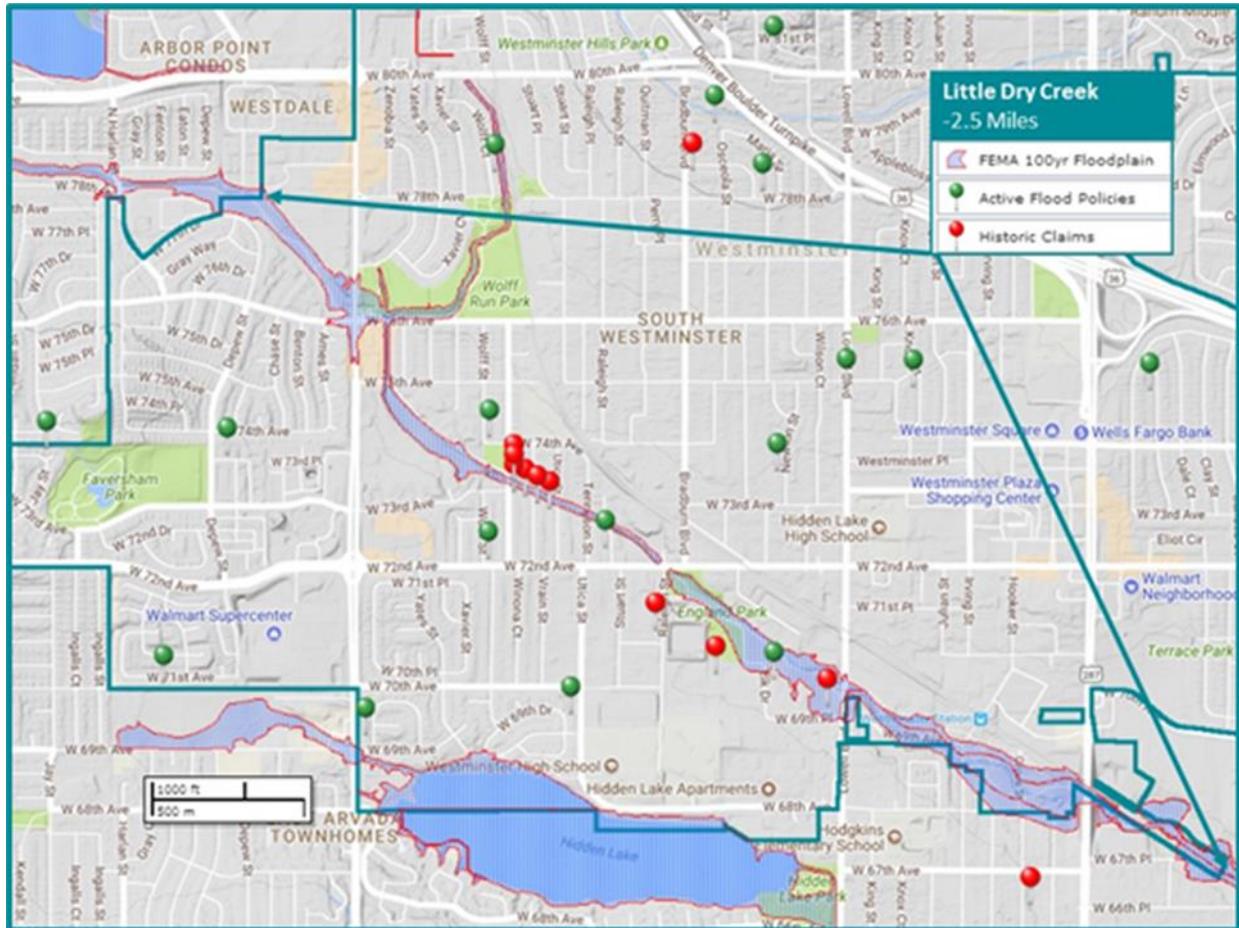
**Figure 4.37 Big Dry Creek 100yr Floodplain**



Source: City of Westminster

**Little Dry Creek** is an intermittent stream that runs for approximately 8 miles from 84th and Alkire to its terminus in Clear Creek. Approximately 3 miles of this waterway runs through southern Westminster. There are approximately 9 historic flood claims and 7 active flood insurance policies associated with this waterway. There are approximately 1,329 properties associated with its floodplain. However, there are no residential or commercial structures located in the regulatory floodplain. The flooding hazard posed by Little Dry Creek has been significantly mitigated through channel improvement projects and the use of open space. There are numerous culverts that could create a backwater condition, if obstructed.

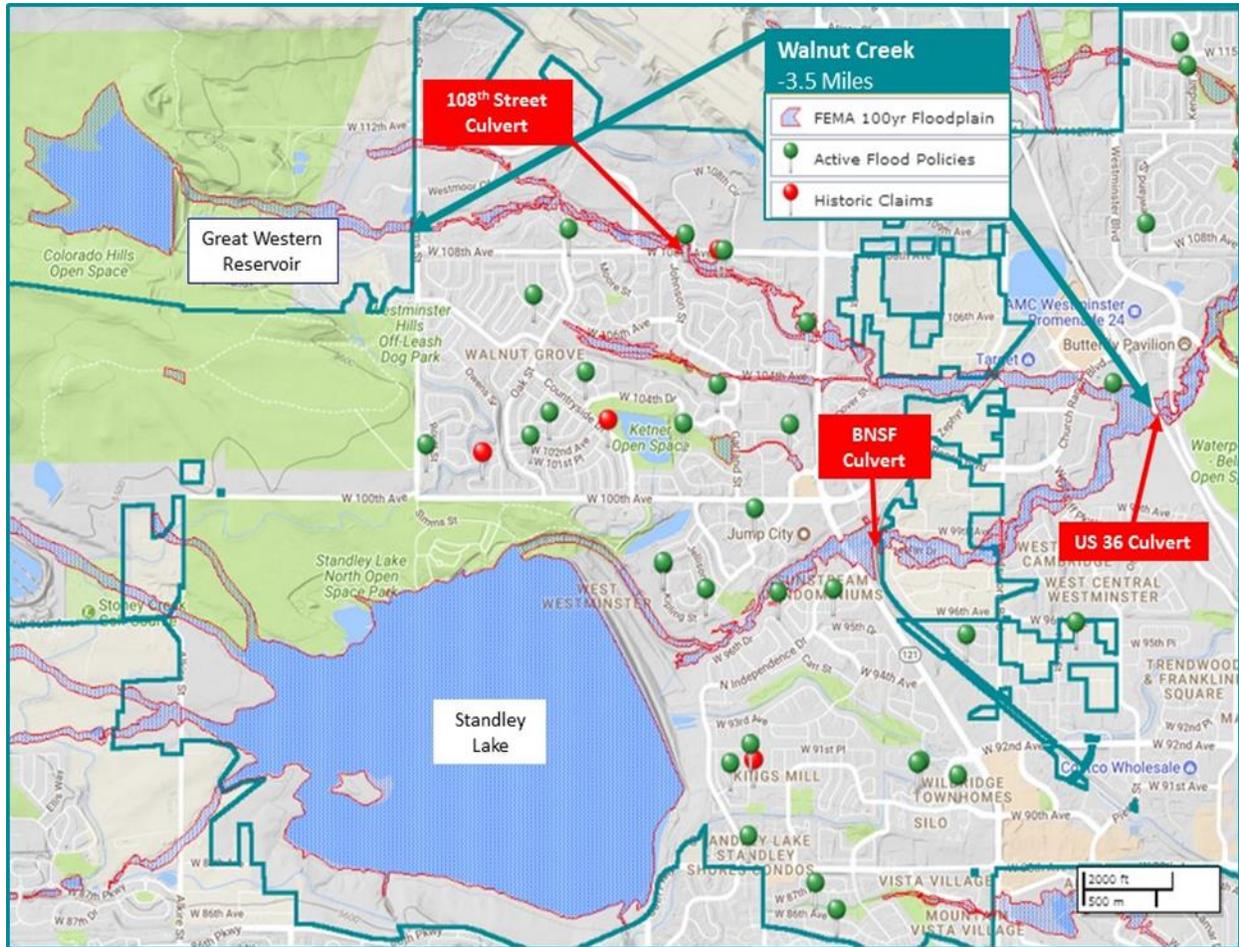
**Figure 4. 38 Little Dry Creek 100yr Floodplain**



Source: City of Westminster

**Walnut Creek** is an intermittent stream that originates in the foothills approximately 4 miles west of the city. Several small tributaries flow into the Great Western Reservoir which is approximately 1 mile upstream of the western edge of the city. Walnut Creek flows eastward for approximately 3.5 miles through central Westminster and enters Big Dry Creek near 103rd and US 36. Three culverts (108th Street, Union Pacific Railroad embankment, and US-36) are potential chokepoints for this waterway. Culvert improvement and the use of open space have been used to mitigate the flood hazard associated with this waterway

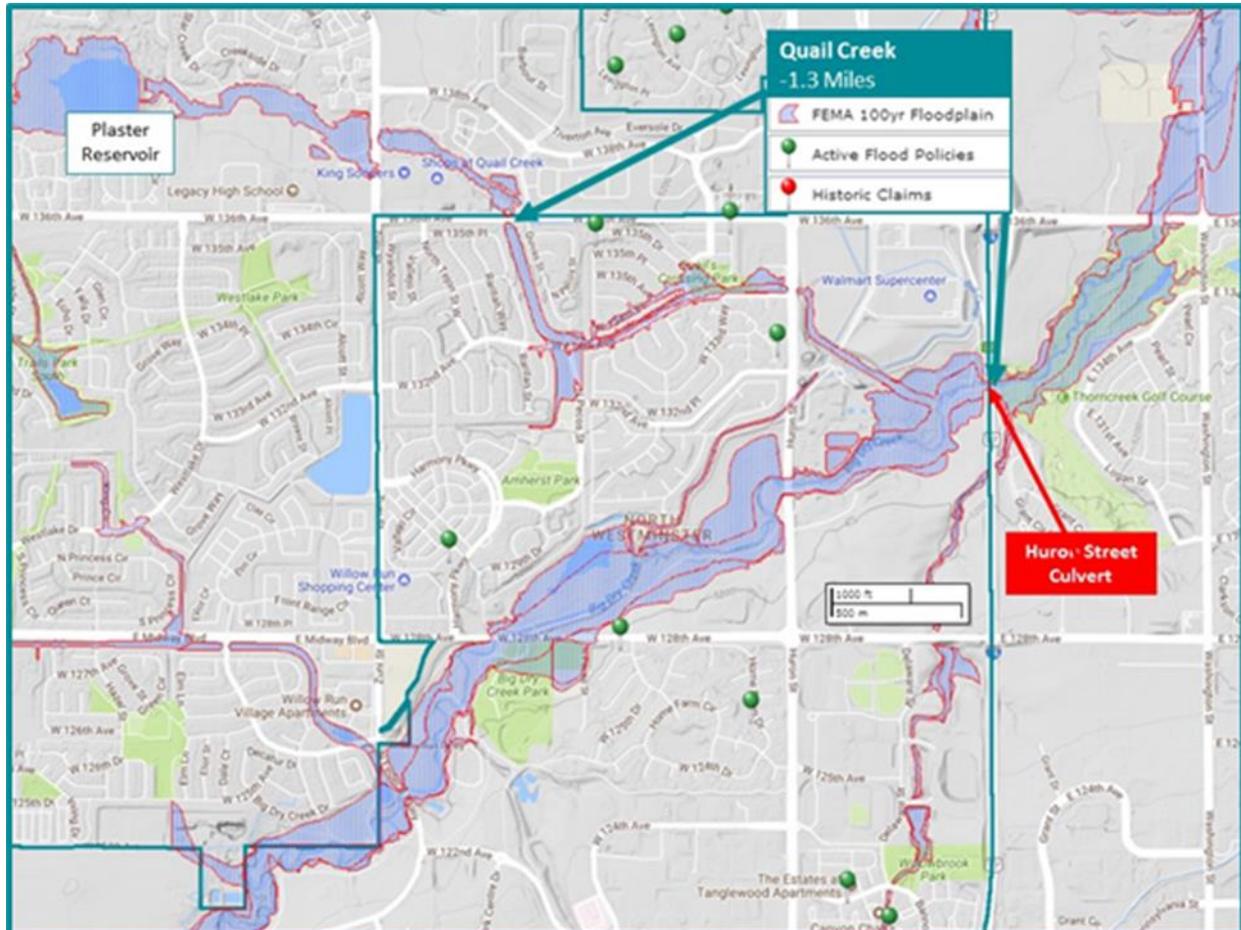
**Figure 4. 39 Walnut Creek 100yr Floodplain**



Source: City of Westminster

**Quail Creek** is a perennial stream that originates approximately 3 miles northwest of Westminster in the City and County of Broomfield. Approximately 0.9 miles of Quail Creek flows through northern Westminster before it enters Big Dry Creek near I-25.

**Figure 4. 40 Quail Creek 100yr Floodplain**



Source: City of Westminster

## FLOOD ANALYSIS AND METHODOLOGY

A flood vulnerability assessment was performed for the City of Westminster within Adams and Jefferson County using GIS. The city's building footprint and parcel data as well as the County's associated assessor's building improvement valuation data were used as the basis for the inventory. Westminster's effective National Flood Hazard Layer was used as the hazard layer. NFHL is FEMA's flood risk data that depicts the 1% annual chance (100-year) and the 0.2% annual chance (500-year) flood events. NFHL data for Adams, Boulder, Broomfield, and Jefferson counties were downloaded from the FEMA Flood Map Service Center on April 03, 2018 and determined to be the best available floodplain data.

Only parcels with improvement values greater than zero were used in the analysis, which assumes that improved parcels have a structure of some type. The FEMA NFHL flood zones were overlaid in GIS on the building footprint data to identify structures that would likely be inundated during a 1% annual chance and 0.2% annual chance flood event. Building improvement values and counts for those points were then extracted from the parcel/assessor's data and summed by land use type.

Based on this analysis Westminster has 72 buildings with a total value of \$113 million exposed to the 1% annual chance flood and 155 vulnerable buildings with a value of almost \$214 million to the 0.2% annual chance flood zones. This analysis does not account for buildings that may be mitigated to the 1% annual chance flood in accordance with local floodplain regulations. Content values are also not accounted for in this analysis. Damage from flooding is typically proportional to the depth of flooding in the structure. According to FEMA depth-damage relationships a two-foot-deep flood can result in damage equivalent to 25% of a structure's value. As a proxy for flood loss, 25% of the \$133M in the 1% annual chance flood hazard area equates to approximately \$33.25M in potential damage to structures, not including content losses.

**Table 4.16 Westminster Flood Risk: Building Exposure by Property Type**

Flood Risk Land Use Type	Improved Valuation			
	100-yr Count	100-yr Flood	500-yr Count	500-yr Flood
Commercial	2	\$33,232,510	14	\$115,224,622
Exempt	7	\$38,298,787	11	\$66,293,012
Residential	63	\$41,809,687	130	\$32,410,715
<b>Total</b>	<b>72</b>	<b>\$113,340,984</b>	<b>155</b>	<b>\$213,928,349</b>

Source: City of Westminster

The Westminster flood analysis was also split out by portions of the city that overlap Adams and Jefferson Counties. The Adams County portion of Westminster has the most exposure to the 1% annual chance flood with 55 properties and \$76 million. The Jefferson County portion has more exposure to the 0.2% annual chance flood hazard with 144 buildings totaling \$170.4 million.

**Table 4.17 Westminster 100-yr Flood Risk: Building Exposure by County**

Flood Risk Land Use Type	100-yr Improved Valuation			
	Adams County	Adams Valuation	Jefferson County	Jefferson Valuation
Commercial	n.a.	n.a.	2	\$33,232,510
Exempt	7	\$38,298,787	N/A	N/A
Residential	48	\$37,900,878	15	\$3,908,809
<b>Total</b>	<b>55</b>	<b>\$76,199,665</b>	<b>17</b>	<b>\$37,141,319</b>

Source: City of Westminster

**Table 4.18 Westminster 500-yr Flood Risk: Building Exposure by County**

Flood Risk Land Use Type	500-yr Improved Valuation			
	Adams County	Adams Valuation	Jefferson Count	Jefferson Valuation
Commercial	n.a.	n.a.	14	\$115,224,622
Exempt	3	\$41,717,386	8	\$24,575,626
Residential	8	\$1,794,041	122	\$30,616,674
<b>Total</b>	<b>11</b>	<b>\$43,511,427</b>	<b>144</b>	<b>\$170,416,922</b>

Source: City of Westminster

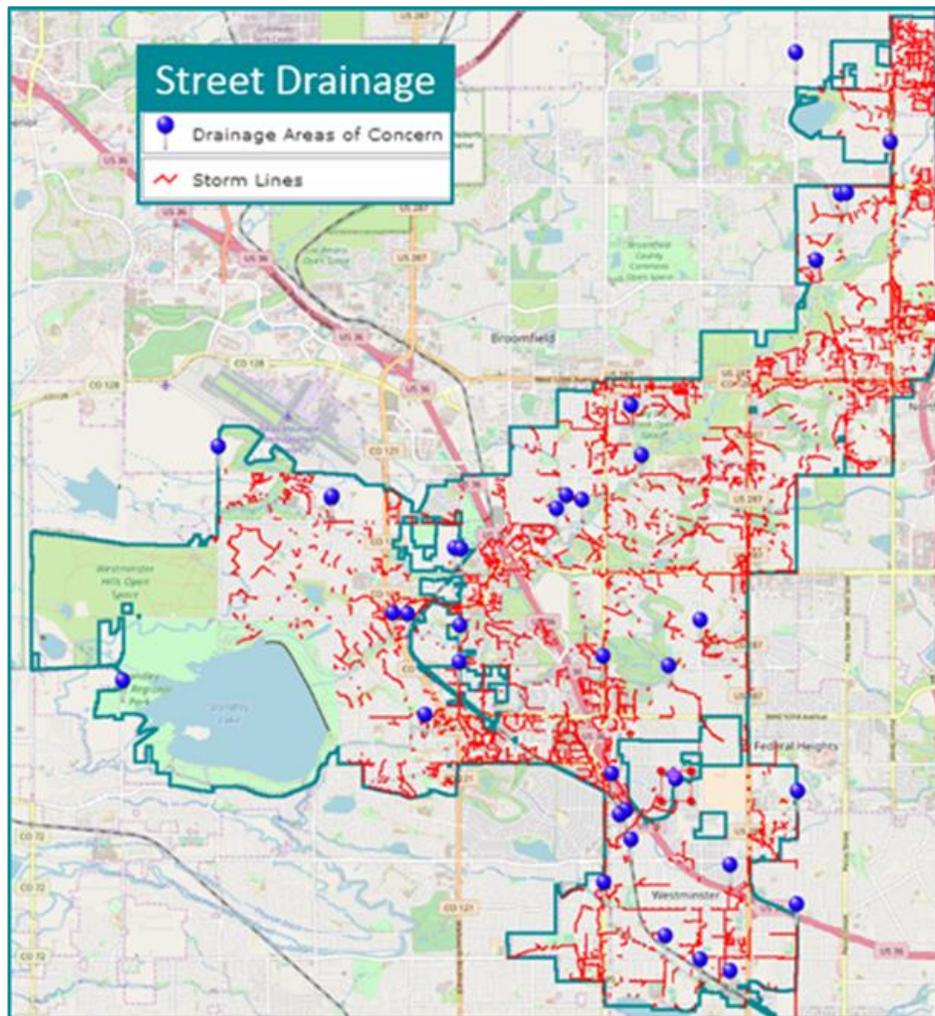
## REPETITIVE LOSS AND SEVERE REPETITIVE LOSS SUMMARY

The city has one Repetitive Loss property. A Repetitive Loss (RL) property is any insurable building for which two or more claims of more than \$1,000 were paid by the National Flood Insurance Program (NFIP) within any rolling ten-year period, since 1978. The property is not located in a FEMA flood hazard area and is likely flooded due to localized drainage problems. The property is a commercial building but due to privacy act limitations additional details are not provided in this plan. The city does not have any Severe Repetitive Loss properties.

### **Street Flooding**

Street flooding related to significant rainfall, hail or rapid snow melt is possible in Westminster. The city's storm water system includes over 9,000 storm inlets, manholes and associated storm water lines that convey storm water runoff to our natural drainages. The city has also identified 36 drainage sites of concern for inspection and maintenance.

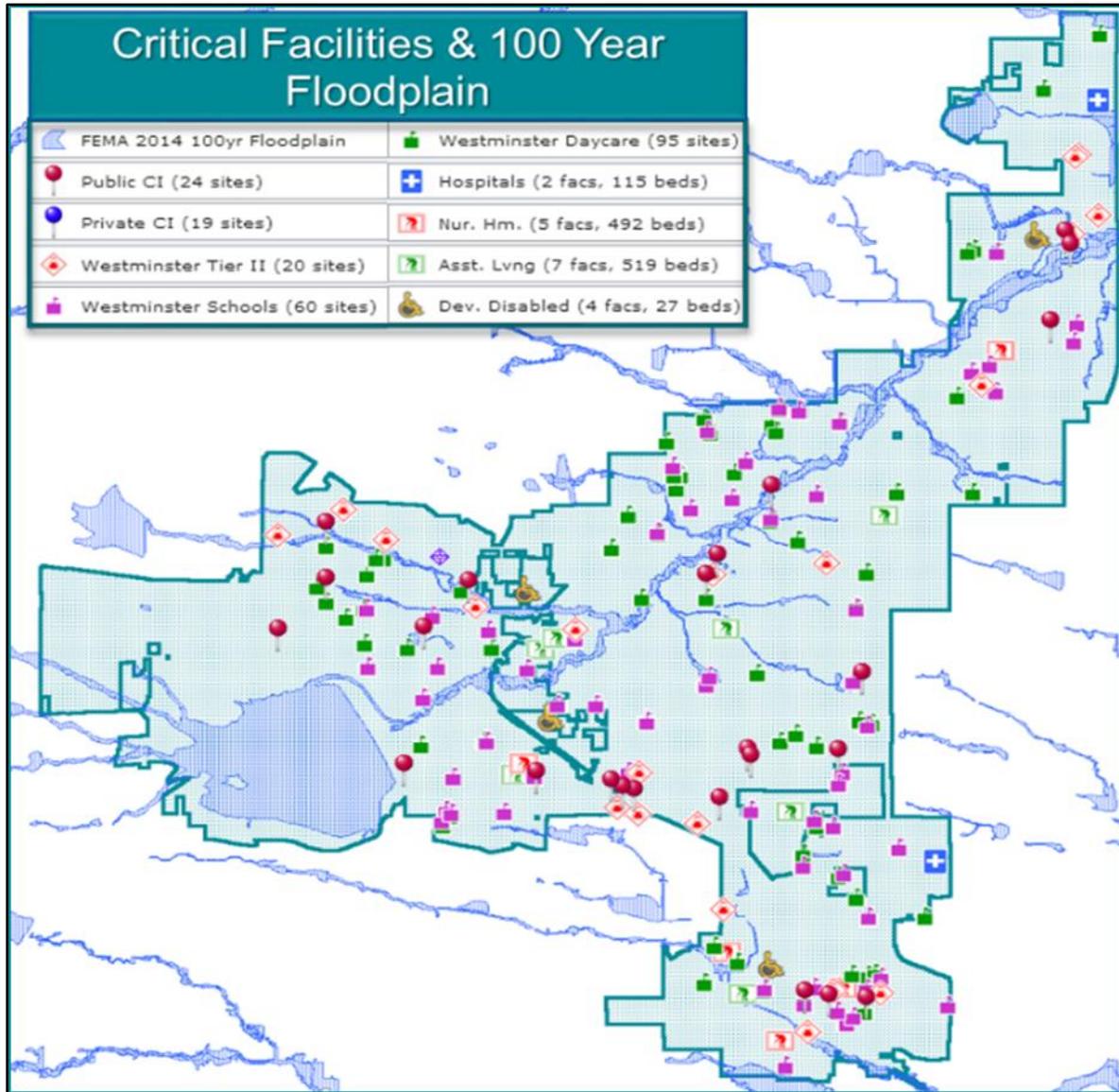
**Figure 4.41 Street Drainage Infrastructure and Areas of Concern**



## CRITICAL INFRASTRUCTURE RELATIVE TO THE FLOODPLAIN

No public or private critical infrastructure is in the floodplain. The Big Dry Creek Wastewater Treatment Plant borders the floodplain and one reclaimed influent storage tank is within the floodplain. Fire Station 3 is within 100 ft. of the floodplain. A communications facility (that is also a Tier II reporting site) is within 40 ft. of the Little Dry Creek floodplain.

Figure 4.42 Critical Facilities Proximity to 100-Year Floodplain



Source: City of Westminister

## VULNERABILITY SUMMARY

The size and isolation of the Big Dry Creek watershed greatly limits the probability of riverine flooding in Westminister. The capacity and variable quantities of water storage in the city's reservoirs, the rate of rainfall, and the amount of rainfall are dynamic factors that influence the probability of fast water or flooding.

As previously noted, a rain event >2-3 inches per hour will produce a fast water hazard, street flooding and possible spillway activity. The City of Westminister's Storm Drainage and Technical Criteria Manual specifies that 2.71 inches in one-hour is considered a 100-year rainfall event. These rain events have an occurrence interval of one-percent annually.

Rainfall events that exceed 3.14 inches in three-hours will probably result in reservoir spillage and possible flooding in the 100-year floodplain. This type of event also has an occurrence interval of one-percent annually.

Significant rain rates and amounts can produce fast water hazards and street flooding that can endanger lives and disrupt normal operations.

Rain events >5 inches during wet years or when our reservoirs are full may require the evacuation of significant numbers of residents and endanger many homes, businesses and critical infrastructures.

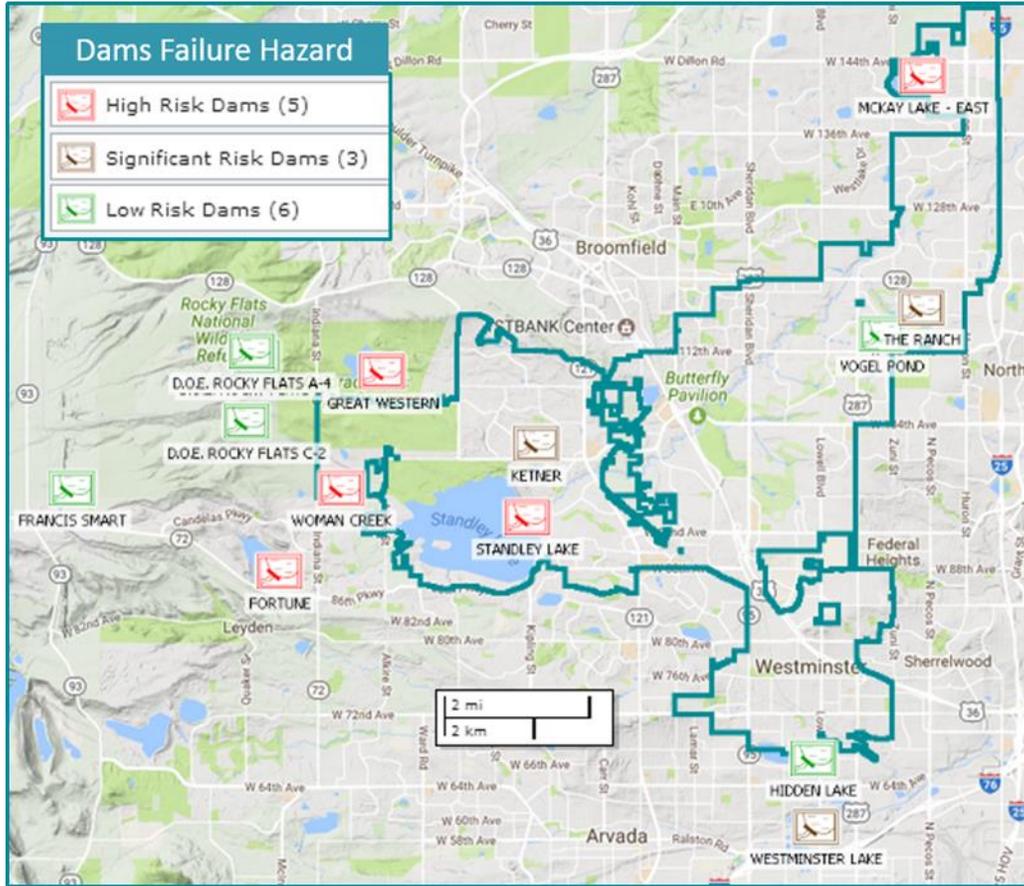
#### 4.3.10 DAM FAILURE

Hazard	Likelihood (A-E)	Impact			Overall Impact
		Scale (1-5)	Durations (1-5)	Consequences (1-5) X 2	Sum of Impact divided by 3
Dam Failure	A	3	4	5	A5

**Definition:** The failure of a dam and/or associated drainage control structures to adequately contain or divert water and prevent the endangerment/loss of life, property or environmental damage.

**Description:** Westminster sits at the headwaters of Big Dry Creek which transects the city southwest to northeast. Walnut Creek and Little Dry Creek are smaller drainage basins. Walnut Creek flows into Big Dry Creek while Little Dry Creek drains to the southeast into Clear Creek. Several man-made reservoirs are associated with these drainage basins. In addition to the limited local catchments, water is supplied to our primary water reservoir (Standley Lake) by a ditch running from Clear Creek near Golden. Several other ditches, legacies of the area’s agricultural past continue to flow through the city.

**Figure 4.43 Dams Failure Risk in City of Westminster**

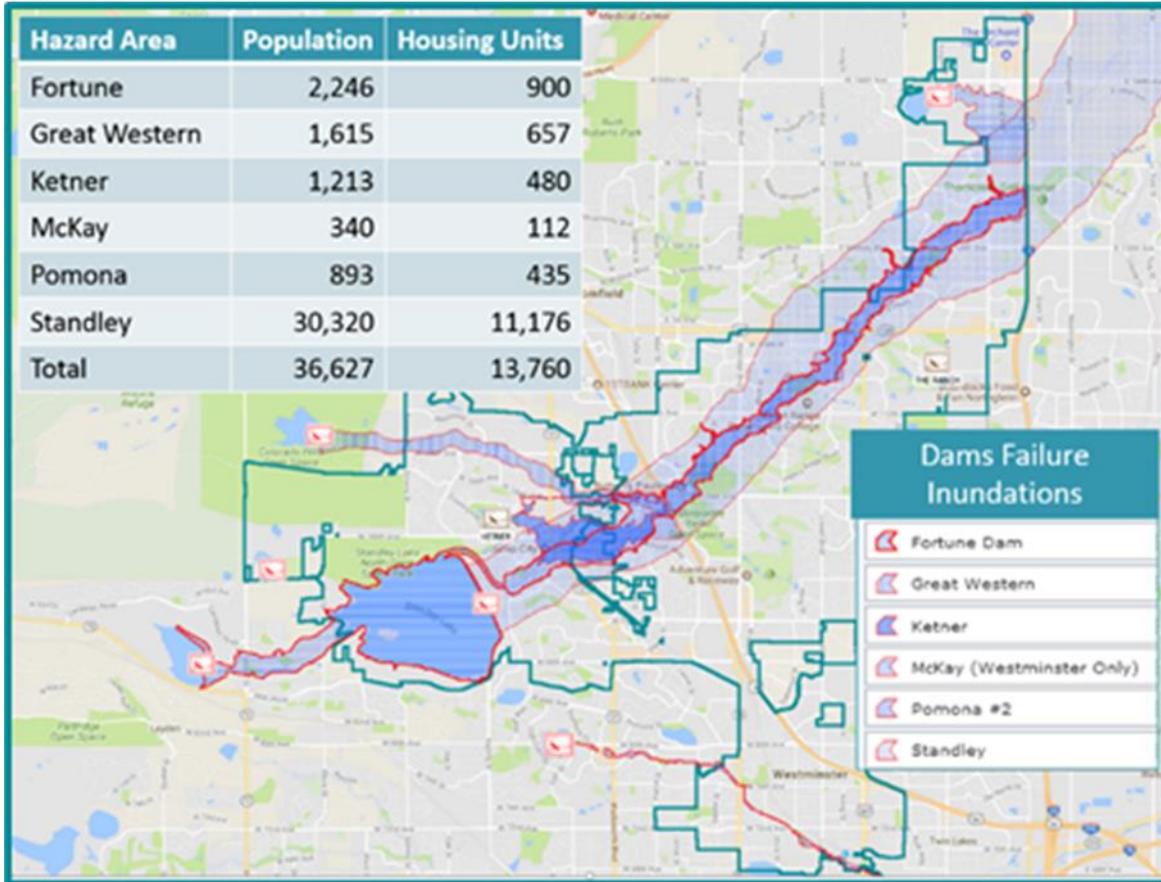


Source: City of Westminster

Eight of the dams in or upstream of Westminster are assessed by the State of Colorado to pose a high or significant hazard to the city. It is predicted that the failure of any of the Class 1 and/or Class 2 dams would cause significant property damage and possible injury or death. The Fortune and Standley dams pose the greatest potential danger of flooding the Big Dry Creek drainage basin and adjacent areas. Depending on the type of failure, it could result in an inundation 18 to 25 feet deep for approximately 9 miles downstream within 45 minutes to 7 hours. Approximately 4,585 people and 1,817 residential units are within this Big Dry Creek inundation zone. There are three other dams/drainages (Great Western, Ketner, and McKay) which pose a potential hazard to an additional 2,490 people and 1,015 residential units. Critical infrastructure within this zone includes a railroad, several major roads, and a waste water treatment facility.

Dams, reservoirs and associated ditches and drainages are critical infrastructures that are essential for the city's water supply and flood control efforts. Of the dams associated with Westminster's waterways by the Colorado Division of Water Resources, five are rated as high risk, three are significant risk and six are low risk.

**Figure 4.44 Areas of Dam Failure Inundation in City of Westminster**



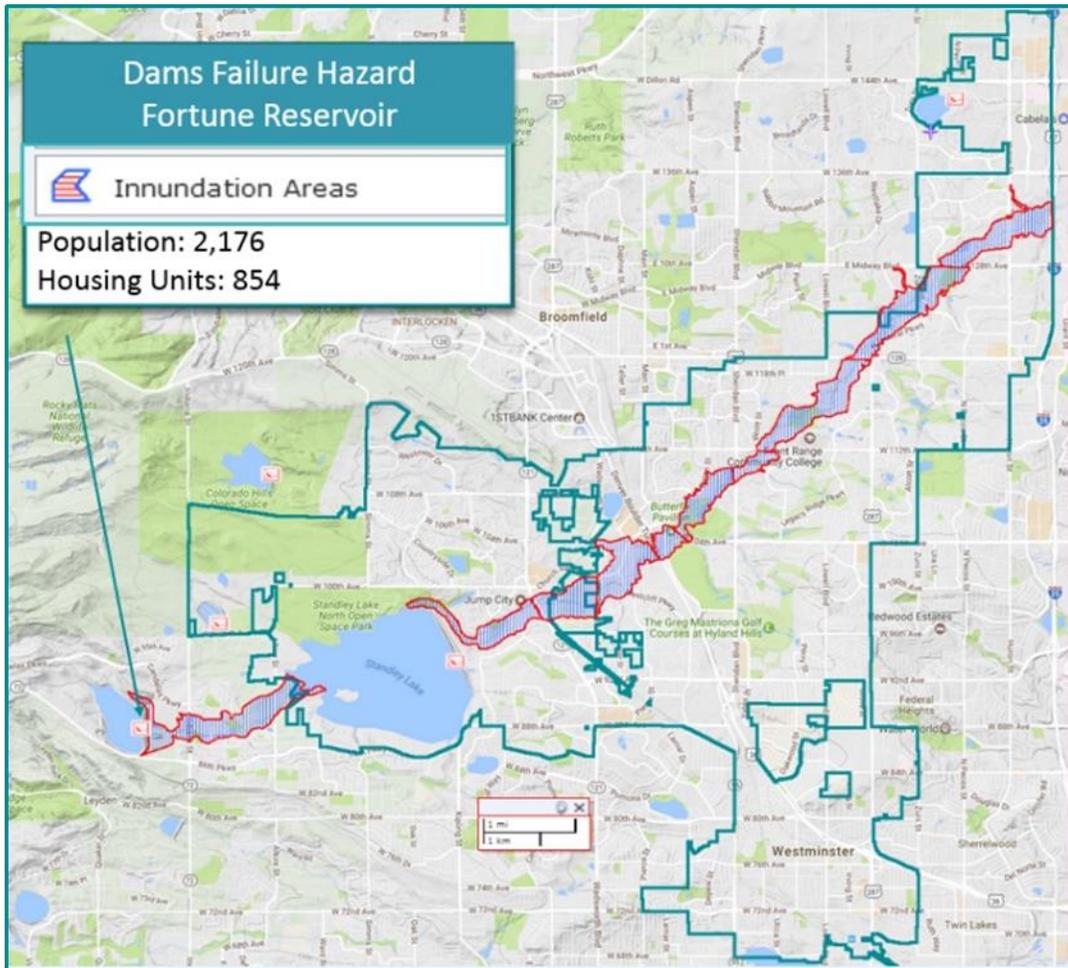
Source: City of Westminster

**Table 4.19 Dam Failure Risk Summary**

City of Westminster Dam Failure Risk Summary					
High Risk		Significant Risk		Low Risk	
Dam Name	Normal Storage (acre ft.)	Dam Name	Normal Storage (acre ft.)	Dam Name	Normal Storage (acre ft.)
Fortune	9,800	Ketner	166	Francis Smart	921
Great Western	2,200	The Ranch	18	Hidden Lake	270
McKay-East & South	375	Jim Baker Reservoir	955	Rocky Flats A-4	99
Standley Lake	42,734	Pomona #2	114	Rocky Flats B-5	74
Woman Creek	4,470			Rocky Flats C-2	70
				Vogel Pond	15

**Fortune Dam/Welton Reservoir** is approximately 2 miles upstream from Standley Lake and the city. The dam is 113 feet high and retains a reservoir that normally holds 10,623 acre feet (AF). Failure would result in downstream flooding east of Standley Lake within one hour. Within 2 hours, this flooding would peak at 16.5 feet. Flooding would continue along the Big Dry Creek to the eastern edge of the city where the flood would arrive in 4.5 hours. The flow would peak at 16.2 feet 7.5 hours after the failure. (Fortune Dam EAP 2017)

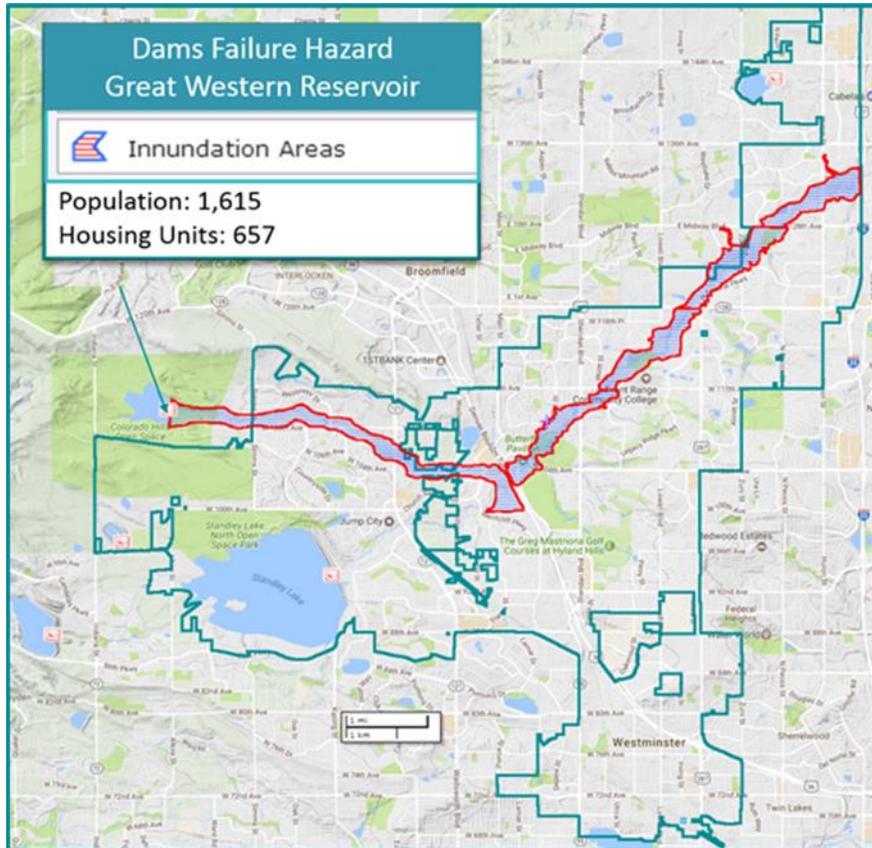
**Figure 4.45 Fortune Reservoir Dams Failure Hazard**



Source: City of Westminster

The crest of the **Great Western Reservoir** is 1,870 feet long and the reservoir capacity is 2,488 AF. Failure would cause extensive property damage and/or probably loss of life including overtopping several area roads. The reservoir drains into Walnut Creek for four miles before entering Big Dry Creek which could see flooding along an additional 5.75 miles to the eastern edge of the city. The EAP lists several housing units and business developments in the potential inundation zone of this reservoir. Flooding along Big Dry Creek would reach the eastern edge of the city in about 2.5 hours (17,680 cfs). (Great Western Reservoir EAP 2006)

**Figure 4. 46 Great Western Reservoir Dams Failure Hazard**

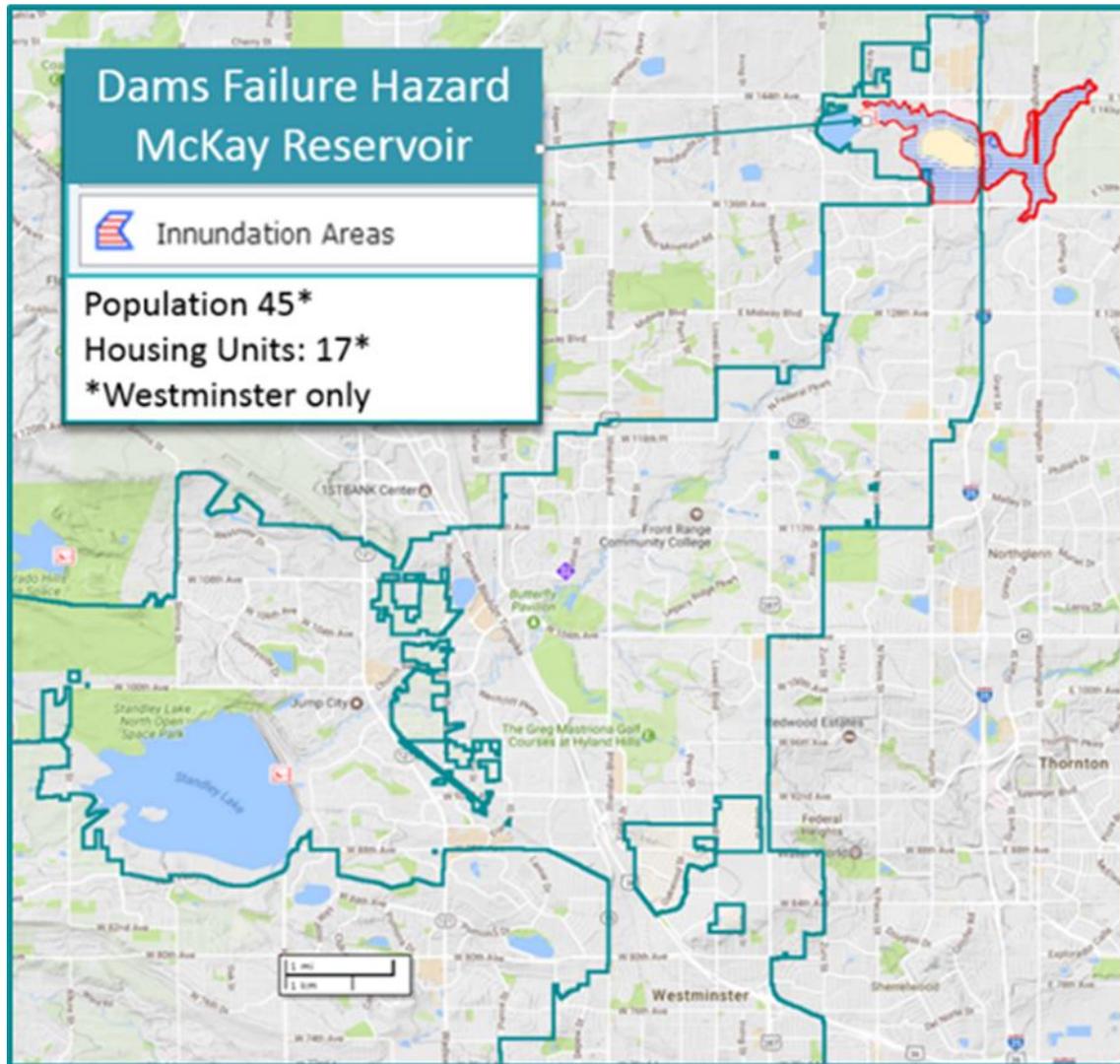


Source: City of Westminister



The **McKay** east dam is 20 feet high and 1,410 feet long. The south dam is 13 feet high and 850 long. They retain up to 375 AF. A breach of either dam would result in approximately 3.3 feet of water in parts of the Lexington Estates subdivision within 1 hour and shallow flooding (.9 feet) in the field between Huron and I-25 and I-25 and 136th and 144th. The 2017 EAP for this dam indicates water levels at I-25 would crest at 4 feet one hour and 19 minutes after the failure. Flooding would continue east of I-25 where the drainage channels run into Big Dry Creek. (McKay Lake EAP 2017)

**Figure 4.48 McKay Reservoir Dams Failure Hazard**

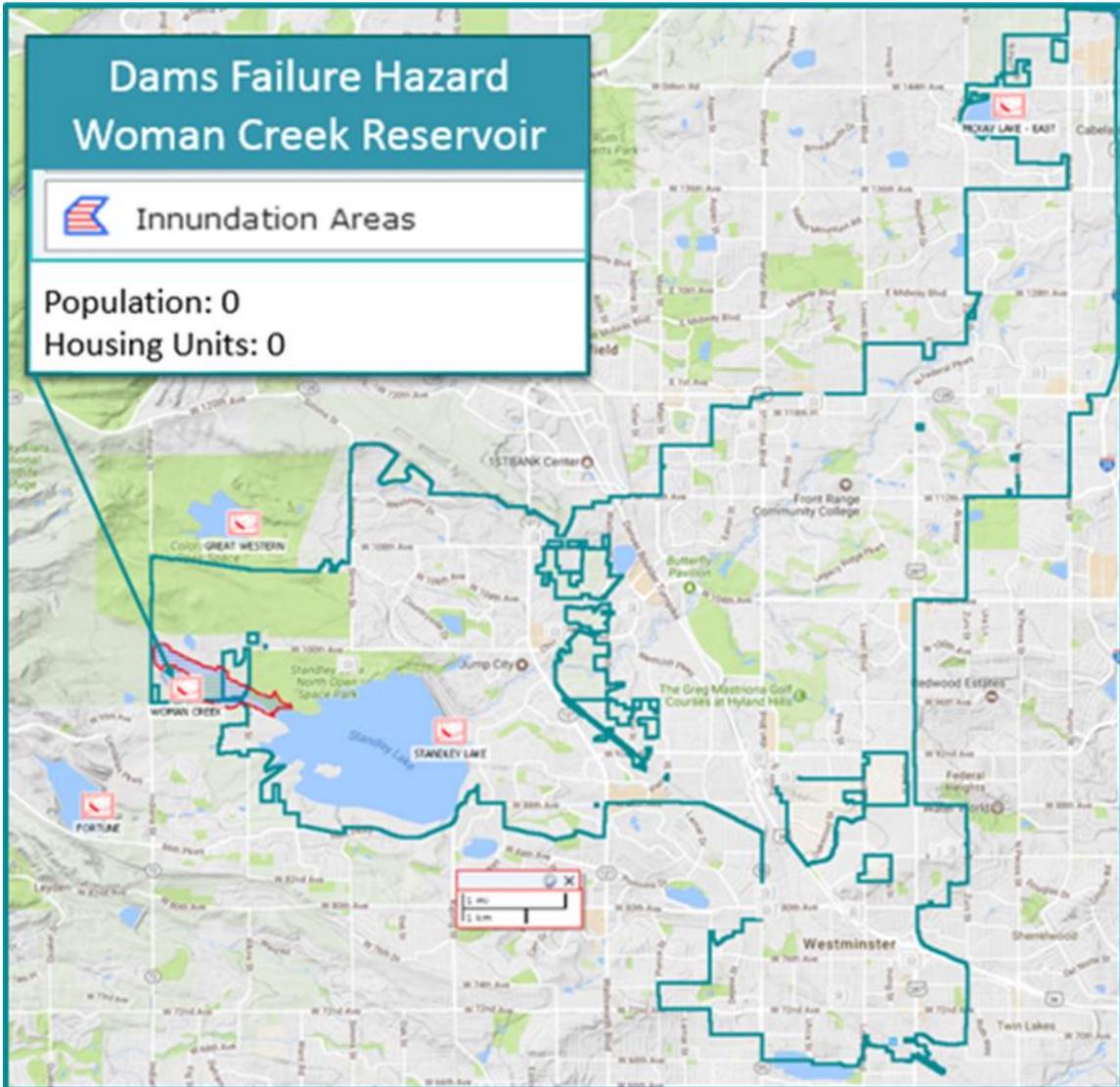


Source: City of Westminster

As our largest reservoir and our primary water storage site, Standley Lake is our dam of greatest concern. The dam is 115 feet high and retains up to 42,734 AF. According to the 2013 EAP, "Water released during a breach of Standley Lake dam would follow the Big Dry Creek corridor, but the potentially impacted areas include many housing areas and subdivisions, as well as several roads, a section of the railroad and parts of some shopping centers." Per the EAP inundation mapping, flooding would reach I-25 (the eastern edge of the city) 70 minutes after the failure with a flow rate of 112,610 cfs. (Standley Lake EAP 2013)

**Woman Creek Reservoir** was built to capture run-off from the Department of Energy's Rocky Flats nuclear weapons site. The dam is 49.8 feet high and 4,470 feet long. It is designed to retain up to 1,150 AF, but is usually dry. This site is approximately 1 mile upstream from Westminster's primary raw water storage facility, Standley Lake. Although there are few structures in the inundation area of this reservoir, a breach and release would restore the continuity water from the Rocky Flats site and raise public concerns about potential drinking water contamination. (Woman Creek EAP 2012)

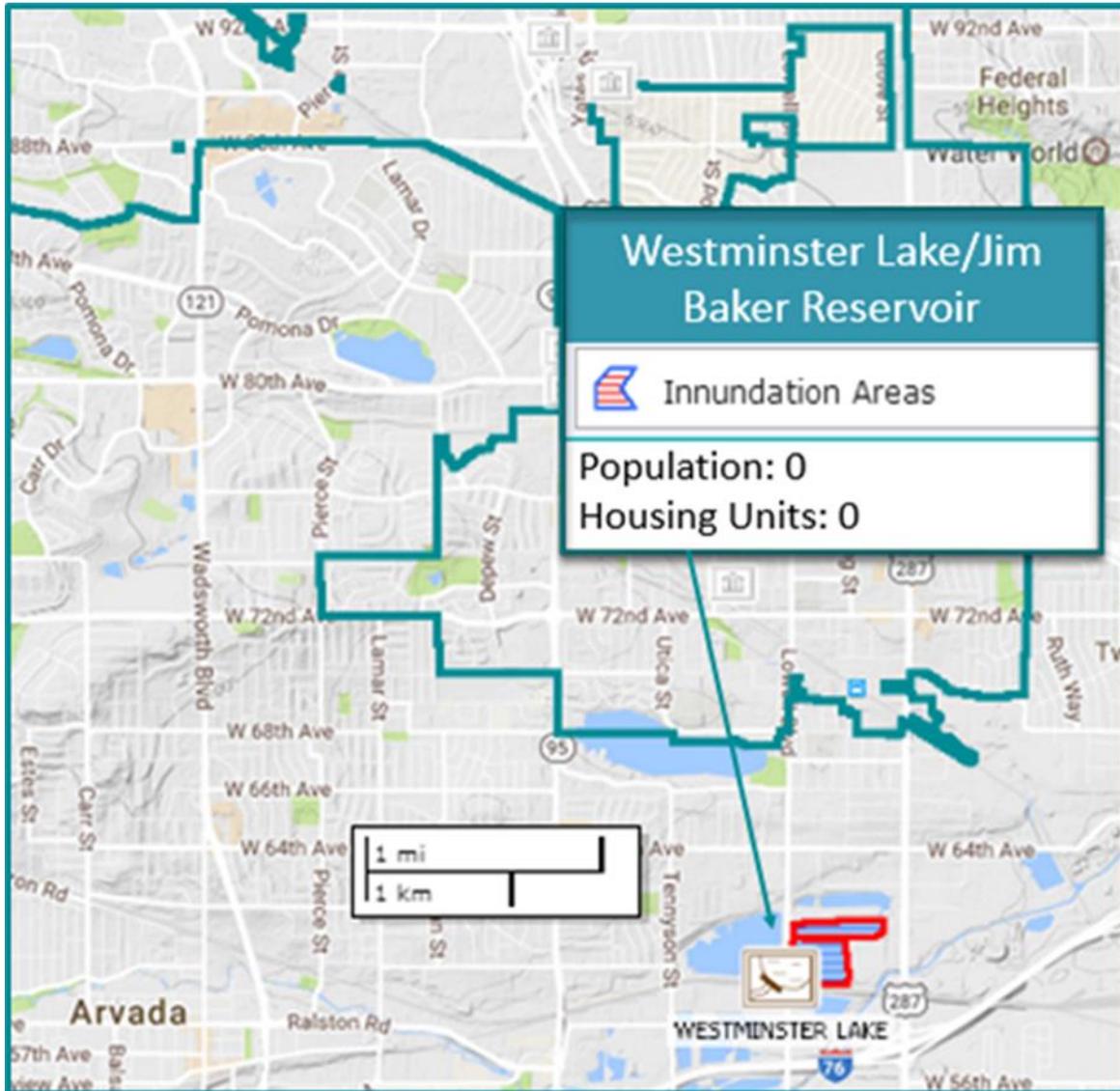
**Figure 4.49 Woman Creek Reservoir Dam Failure Hazard**



Source: City of Westminster

**Westminster Lake/Jim Baker Reservoir** is approximately 1 mile south of the city limits in unincorporated Adams County). The dam height 31 feet and its length is 3,290 feet. The maximum capacity of the reservoir is 955 AF. Per the 2015 EAP, Lake Sangraco will serve as the inundation area with discharge into Clear Creek. (Westminster Lake EAP 2015)

**Figure 4.50 Westminster Lake / Jim Baker Reservoir**

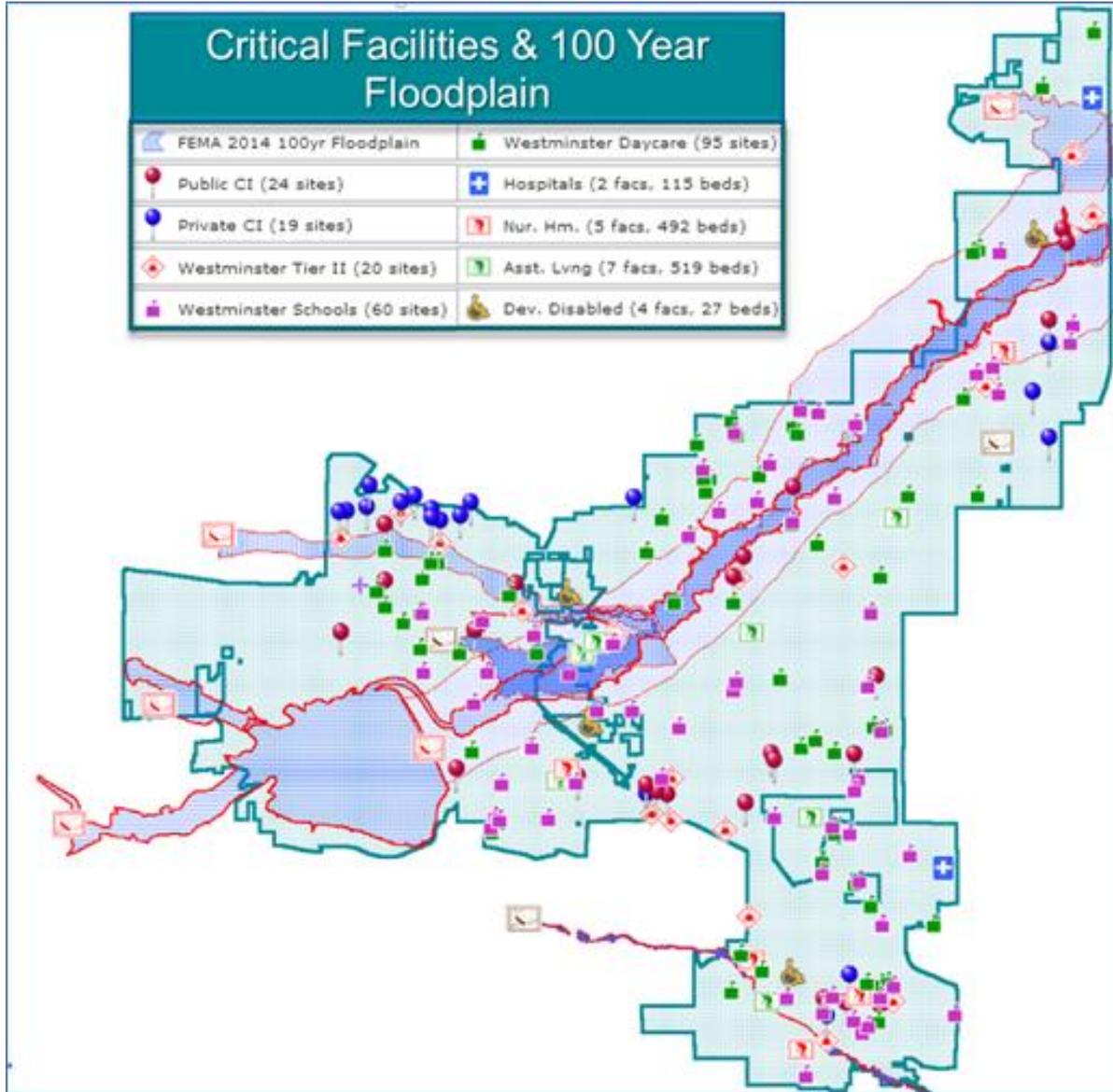


Source: City of Westminster

## **CRITICAL INFRASTRUCTURE AND THE INUNDATION AREAS**

No private sector critical infrastructure is within the dam failure inundation areas of the city.

**Figure 4.51 Critical Facilities & 100 Year Floodplain**



Source: City of Westminister

The following table lists which facilities would be potentially impacted by a dam failure.

**Table 4.20: Critical Infrastructure and Inundation Hazard**

Inundation Hazard	At Risk Facilities
Fortune Reservoir	<ul style="list-style-type: none"> <li>• Jefferson Charter Academy</li> <li>• Greenridge Place Assisted Living</li> <li>• Kindercare Learning Center</li> <li>• Motorola Solutions (Hazmat)</li> <li>• Butterfly Pavilion</li> <li>• Fire Station #4</li> <li>• Big Dry Creek Wastewater Plan</li> </ul>

Inundation Hazard	At Risk Facilities
Great Western Reservoir	<ul style="list-style-type: none"> <li>• Westview Recreation Center</li> <li>• The Learning Experience Day Care</li> <li>• Butterfly Pavillion</li> <li>• Fire Station #4</li> <li>• Big Dry Creek Wastewater Plant</li> </ul>
Ketner Reservoir	<ul style="list-style-type: none"> <li>• Primrose School</li> <li>• Jefferson Charter Academy</li> <li>• Greenridge Place Assisted Living</li> </ul>
McKay North	<ul style="list-style-type: none"> <li>• Foster 1-22 (well)</li> </ul>
Standley Lake	<ul style="list-style-type: none"> <li>• Lukas Elementary</li> <li>• Kids Kampus Preschool</li> <li>• Cleo Wallace Center</li> <li>• Primrose School</li> <li>• Jefferson Charter Academy</li> <li>• Greenridge Place Assisted Living</li> <li>• Retreat at Church Ranch Assisted Living</li> <li>• Kindercare Learning Center</li> <li>• Motorola Solutions (Hazmat)</li> <li>• Butterfly Pavillion</li> <li>• Westminster PR&amp;L Preschool</li> <li>• Park Operations Center</li> <li>• La Petite Academy (Eaton St)</li> <li>• Academy Child Development Center</li> <li>• Cotton Creek Elementary</li> <li>• Fire Station #4</li> <li>• A Child's Life Day Care</li> <li>• Life Christian Academy</li> <li>• Front Range Community College</li> <li>• Hope Montessori Academy</li> <li>• The Goddard School</li> <li>• Lisa's D's Homework Club</li> <li>• Academy of Charter Schools (Main)</li> <li>• Academy Charter North</li> <li>• DeVry University</li> <li>• Center of Northridge Nursing Home</li> <li>• Fire Station #6</li> <li>• Mountain Range Highschool</li> <li>• Arapahoe Ridge Elementary &amp; Child Care</li> <li>• Reclaimed Water Treatment Facility</li> <li>• Big Dry Creek Wastewater Plant</li> <li>• Unity Group Home</li> <li>• Lowe's (North Westminster)</li> <li>• Foster 1-22 (well)</li> </ul>

**VULNERABILITY SUMMARY**

The dams in and around Westminster are well monitored, maintained and designed for our anticipated extreme events. Renovations to the Standley Lake dam in 2004 and the newness of the Fortune dam (completed in 2001) greatly reduce the likelihood of a catastrophic failure of these dams and probability of an incident is negligible due to mitigation efforts. Fortune and Woman Creek are upstream of Standley Lake and would flow into Standley Lake in the event of a failure at either of these facilities and raise concerns regarding the water quality of the city's primary only source of raw water.

Although our area is not noted for seismic activity (see Earthquakes), there are several faults within a few miles west of our dams and reservoirs. Any earthquake in our area would be followed up by an inspection of dams to evaluate potential damages. A dam failure in Westminster would cause widespread damage in the region and take time to return full operations. Although a dam failure cannot be completely discounted, it is highly unlikely given current design, monitoring and maintenance practices.

## **COLORADO DIVISION OF WATER RESOURCES – DOWNSTREAM FLOODPLAIN IMPACT STUDY**

In 2017, Colorado DWR Dam Safety set out to systematically evaluate all high hazard dams related to operational and flood releases. The analysis produced the “Colorado High Hazard Dam Release-Downstream Floodplain Impacts Database and Ranking Tool”, containing information for both private and publicly owned high hazard dams across the state. The ranking of the dams identifies the dams with the highest threat of downstream flooding associated with releases of excess water during high runoff or heavy rain. DWR Dam Safety screened the state’s dam database using information from USGS (Streamstats), FEMA Flood Insurance Studies (FIS), and the National Flood Hazard Layer (NFHL). The data was used to compare natural flows versus natural flows in combination with dam release flows. The resulting ranks were developed based on the severity of the conditions, estimated safe channel capacity of the downstream channel, and maximum controlled discharge. The report assesses 415 dams in the State of Colorado and provides a ranking for 366 dams where there is either a high, moderate, or low likelihood of dangerous conditions created by dam and reservoir release operations simultaneously with naturally occurring flood conditions. The high, moderate, or low designations were assigned by DWR by dividing the total number of ranked dams into thirds. Westminster has six dams evaluated by the study, of which one dam went through the hydraulic analysis process. All of Westminster’s dams were ranked, and three were determined to be high hazard (listed in top 1/3rd of overall ranks), two were determined to be medium hazard (listed in the middle 1/3rd of overall ranks), and one was determined to be low hazard (listed in the bottom 1/3rd of overall ranks) based on release flow characteristics.

**Table 4.21 DWR Downstream Impact Analysis – Westminster Area Dams**

<b>Dam Name</b>	<b>Normal Storage (acre ft.)</b>	<b>DWR Floodplain Impact Overall Rank*</b>	<b>DWR Floodplain Impact Relative Rank</b>	<b>Outlet Capacity (cfs)</b>	<b>Downstream Safe Channel Capacity (cfs)</b>
Fortune	9,800	189	Medium	107	-
Great Western	2,200	196	Medium	40	-
McKay -East	375	56	High	175	-
McKay - South	375	367	Low	0	-
Standley Lake	42,734	7	High	700	380
Woman Creek	4,470	62	High	75	-

Source: Colorado Division of Water Resources \*Ranking out of 366 dams statewide.

Based on the DWR analysis Standley Lake ranks as #7 out of 366 dams statewide in potential for release flooding with detrimental impacts. The safe channel capacity of the reach downstream of Standley Dam is estimated to be 380 cfs. The maximum controlled discharge is 700 cfs. For comparison, the 10-year peak discharge estimated by StreamStats is 1,130 cfs; the 50-year peak discharge reported in the FEMA FIS is 730 cfs. The downstream impact area is urban with medium density. The first impacted road downstream of the dam is Wadsworth Boulevard. Wadsworth Boulevard may be overtopped at a peak discharge of approximately 1,600 cfs. The first impacted structures downstream of the dam are located near Zephyr Drive. The residential houses may be flooded at a peak discharge of approximately 380 cfs.

### 4.3.11 HAIL

Hazard	Likelihood (A-E)	Impact			Overall Impact
		Scale (1-5)	Durations (1-5)	Consequences (1-5) X 2	Sum of Impact divided by 3
Hail	E	5	1	3	E4

**Definition:** Hail is a form of solid precipitation consisting of balls or irregular lump of ice. The National Weather Service rates hail from .25 inches (pea-size) to 4.5 inches (softball-size). Severe hail >2" (NOAA 2013)

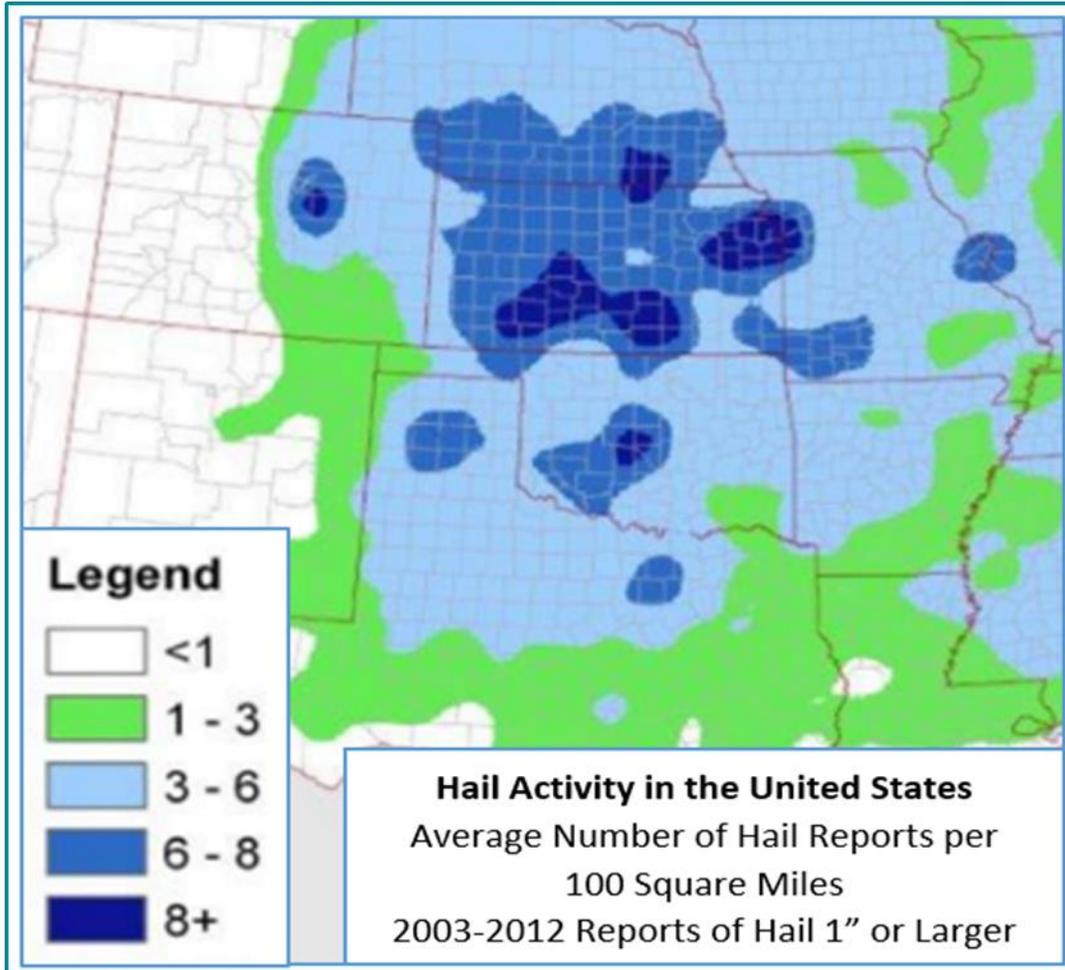
**Table 4.22 Past Hail Occurrences in Colorado**

Date	Location	Cost When Occurred (Millions)	2016 Dollars (Millions)*
<b>May 8, 2017</b>	Denver Metro	\$1.4 Billion	<b>\$2.3 Billion</b>
July 20, 2009	Denver Metro	\$767.3	\$845.5
July 11, 1990	Denver Metro	\$625.0	\$1.1 Billion
June 6-15, 2009	Denver Metro	\$353.3	\$389.2
July 28, 2016	Colorado Springs	\$352.8	\$352.8
June 6-7, 2012	CO Front Range	\$321.1	\$330.5
June 13-14, 1984	Denver Metro	\$276.7	\$629.3
July 29, 2009	Pueblo	\$232.8	\$256.5
October 1, 1994	Denver Metro	\$225.0	\$358.8
September 29, 2014	Denver Metro	\$213.3	\$213.4
May 22, 2008	Winsor	\$193.5	\$212.3
July 13, 2011	CO Front Range	\$164.8	\$173.1

Source: \*2015 estimated cost calculations based on the Consumer Price Index

**Description:** Our hail season is April 15 to September 15. Hailstones can be anywhere from 3/8 of an inch to grapefruit sized. One death and numerous injuries have been attributed to hail in Colorado. Hail can cause severe damage to homes, vehicles, utilities, vegetation and other property. The Front Range typically experiences three or four catastrophic (>\$25 million in insured damages) annually. Eight of ten of Colorado's most costly hailstorms have occurred in the Denver metro area. The May 2017 event near Golden is estimated to have caused over \$1.4 billion in damages.

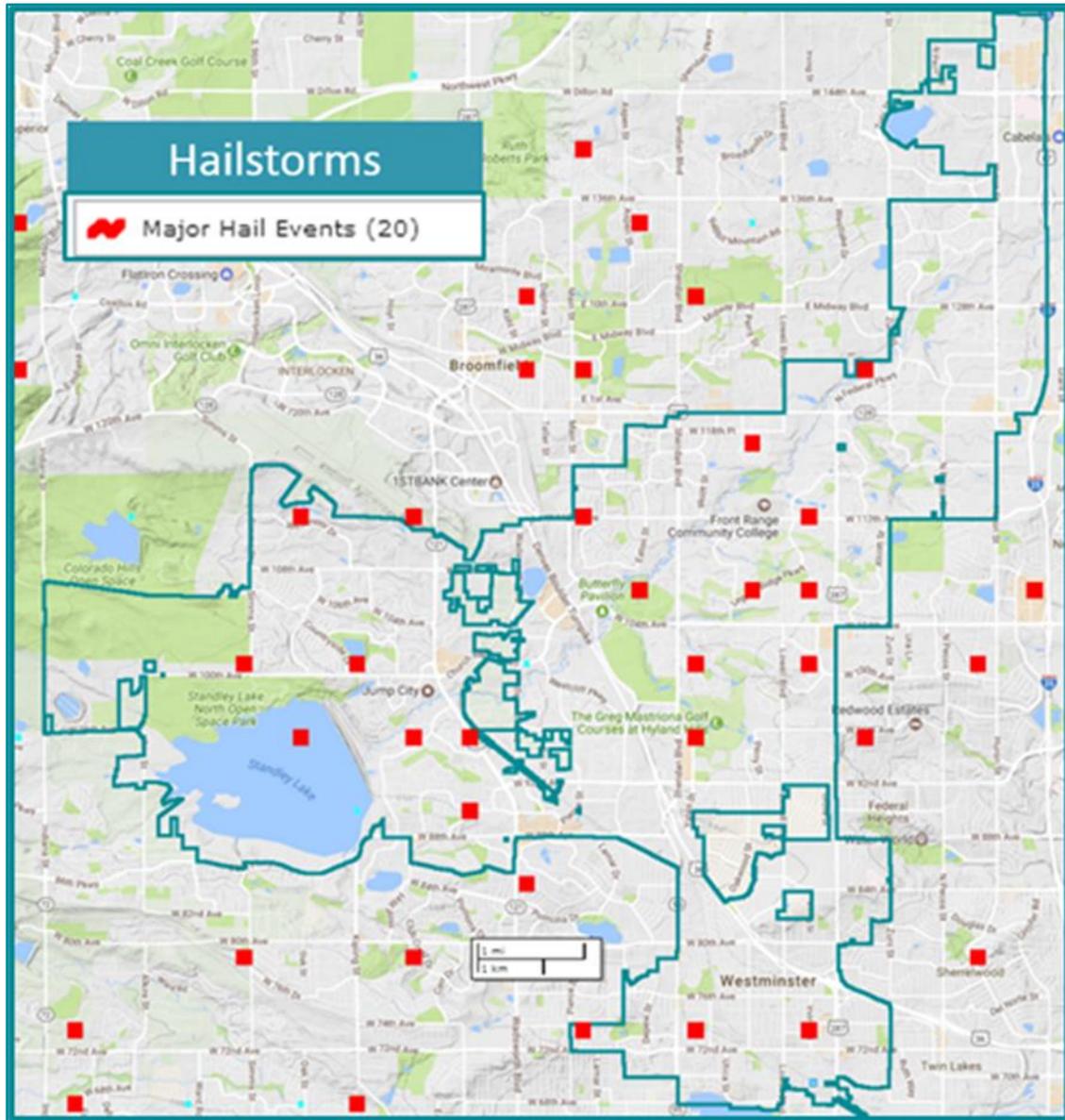
Figure 4.52 US Hail Activity



Source: Insurance Institute for Business & Home Safety

High winds and heavy rain may accompany hailstorms and result in greater damage. The most typical months for hailstorms are June and July and they are usually an afternoon/evening phenomena. Hail can pose a danger to populations that may be caught out of doors at open air events or in open spaces. (Rocky Mountain Insurance Information Association 2017) (Community Collaborative Rain, Hail & Snow Network-Hail Fact 2017) All of Westminster is susceptible to hail storms. Between 1955 and 2016, the National Weather Service documented 20 significant hail events in Westminster. (NOAA National Weather Service 2017)

Figure 4.53 Hailstorms Events in City of Westminster



Source: City of Westminster

### VULNERABILITY SUMMARY

Hailstorms are frequent annual events that endanger life and cause substantial property damage throughout Westminster.

#### 4.3.12 INVASIVE AND NOXIOUS SPECIES

Hazard	Likelihood (A-E)	Impact			Overall Impact Sum of Impact divided by 3
		Scale (1-5)	Durations (1-5)	Consequences (1-5) X 2	
Invasive Species	E	3	5	3	E4

**Definition:** Invasive species are plants, animals or pathogens that are non-native (or alien) to the ecosystem under consideration and whose introduction causes or is likely to cause harm (U. S. Agriculture 2018). Noxious species are undesirable native organisms that attack or compete with more desirable plant and animals.

**Description:** Westminster is home to a variety of local flora and fauna; however, changes in the ecosystem affect food chains and can determine the survival of these species (Wildlife, Threatened and Endangered List 2018). In Colorado, there are currently 7 amphibians, 19 birds, 23 fish, 13 mammals, 10 reptiles and 2 mollusks that are listed as threatened, endangered or a special concern by either the state or federal government. Issues involving keystone species also pose an indirect hazard for local plants and animals, such as in 2015 when a plague outbreak in the prairie dog population caused birds of prey to change nesting patterns and search for other food sources.

Invasive species are either plant, animal, microbial, or aquatic (both plant and animal). Species are transplanted to new ecosystems through intentional, or unintentional, transport through a vector or due to migratory changes brought on by climate change or loss of habitat. The Colorado Department of Parks and Wildlife lists several invasive species as either aquatic nuisance species (ANS), noxious weeds or forest pests.

**Table 4.23 Invasive and Noxious Species in Colorado**

Aquatic Nuisance Species (ANS) are plants and animals that invade lakes, reservoirs, rivers and streams. ANS that are top concerns for Colorado are:	Noxious weeds are terrestrial or aquatic plants that out-compete native plants for light, space and nutrients. By displacing native plants, noxious weeds eliminate necessary forage, shelter and habitat for wildlife. Top concerns for Colorado are:	Forest pests include beetles, fungi, and pathogens that threaten millions of trees. Most of these pests arrive in wood pallets or crates and are spread locally by firewood. These pests can destroy entire populations of trees. Primary concerns in Colorado are:
Zebra mussel	Meadow Knapweed	Emerald Ash Borer
Quagga mussel	Purple Loosestrife	Gypsy Moth
New Zealand mudsnail	Yellow Starthistle	Japanese Beetle
Asian carp		
Rusty crayfish		
Eurasian watermilfoil		
Viral hemorrhagic septicemia		

Source: CO Parks and Wildlife

This invasive species of greatest concern within Westminster are the Zebra Mussel and Emerald ash borer. The City of Westminster services 14,000 trees in parks, greenbelts, facilities and right of ways. This is in addition to thousands of trees located in the 3,090 acres of open space within city limits. These trees are made up of species of ash, pine, spruce, honey locus, cottonwood, oak, linden, cherry, cedar and crab apple trees. Species are interspersed throughout the city to create biodiversity and increase the resiliency of arboreal populations.

**Emerald Ash Borer:** The emerald ash borer originates in Asia and devastates ash trees. The emerald ash borer was confirmed in Boulder County, in 2013 and contributes to the decline of millions of North American ash trees. Although, the insect has yet to be verified in other counties, 15% of Colorado trees are ash trees and are involved in storm water mitigation, energy use and property values. The beetle is active annually from May through July and trees die within two to four years after an infestation begins, although signs of an infestation may take up to four years to manifest. The beetle typically travels up to a half-mile when infesting new trees, but distribution can expand drastically through industrial wood processing.

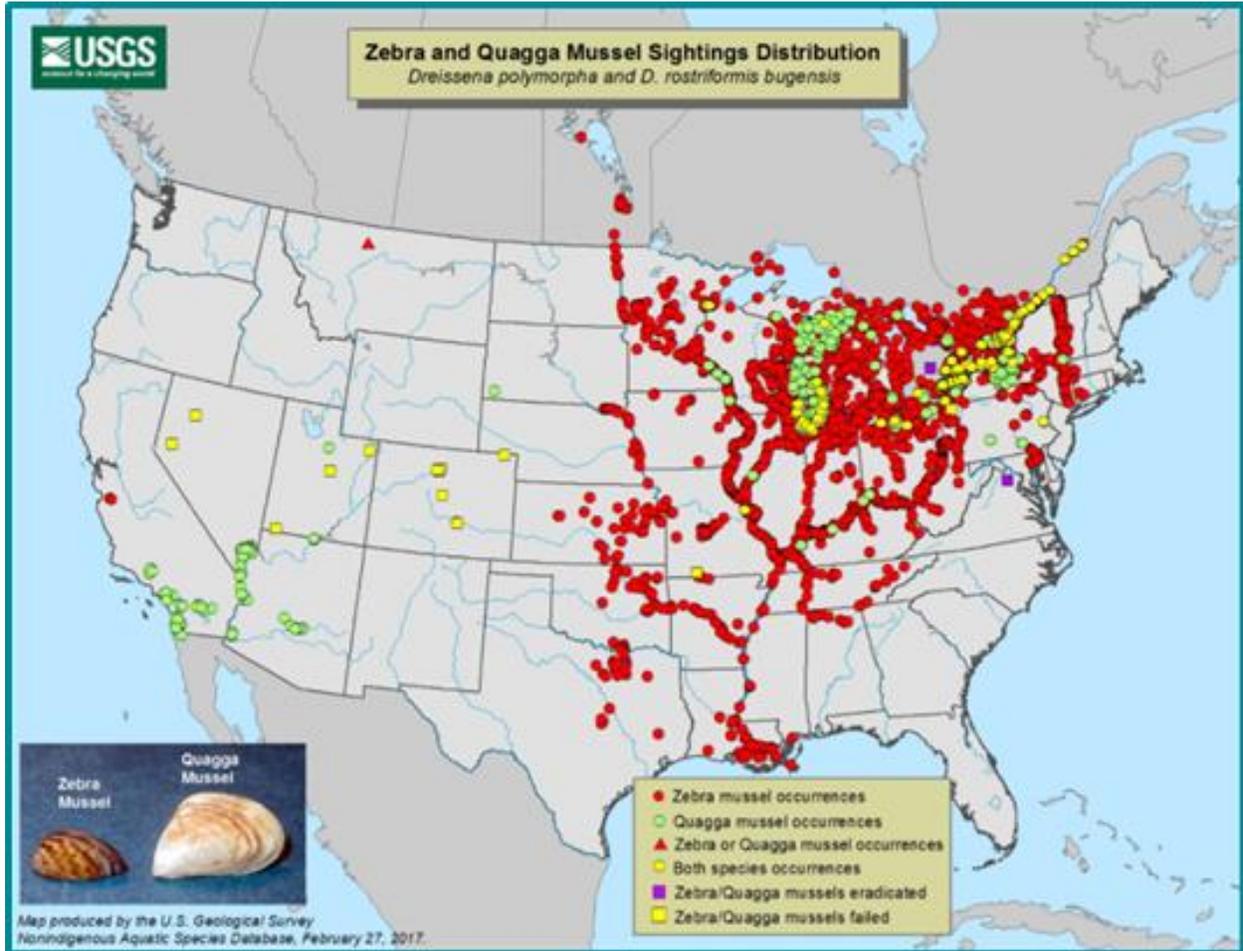
---

**Figure 4.54 Emerald Ash Borer**



**Zebra mussels** are native to Central Asia and Eastern Europe. They were discovered in the Great Lakes in 1988 and have spread to 33 states. Quagga mussels are native to the Ukraine. They were discovered in the Great Lakes in 1989 and have since spread to 27 states. Several Colorado reservoirs and waterways tested positive for zebra and quagga larvae between 2007 and 2014, but all Colorado waters have been de-listed following five years of no detections. Zebra and quagga mussels spread quickly, are difficult to eradicate and pose a serious clogging danger to water infrastructures.

Figure 4.55 Observed Zebra and Quagga Mussels in the United States



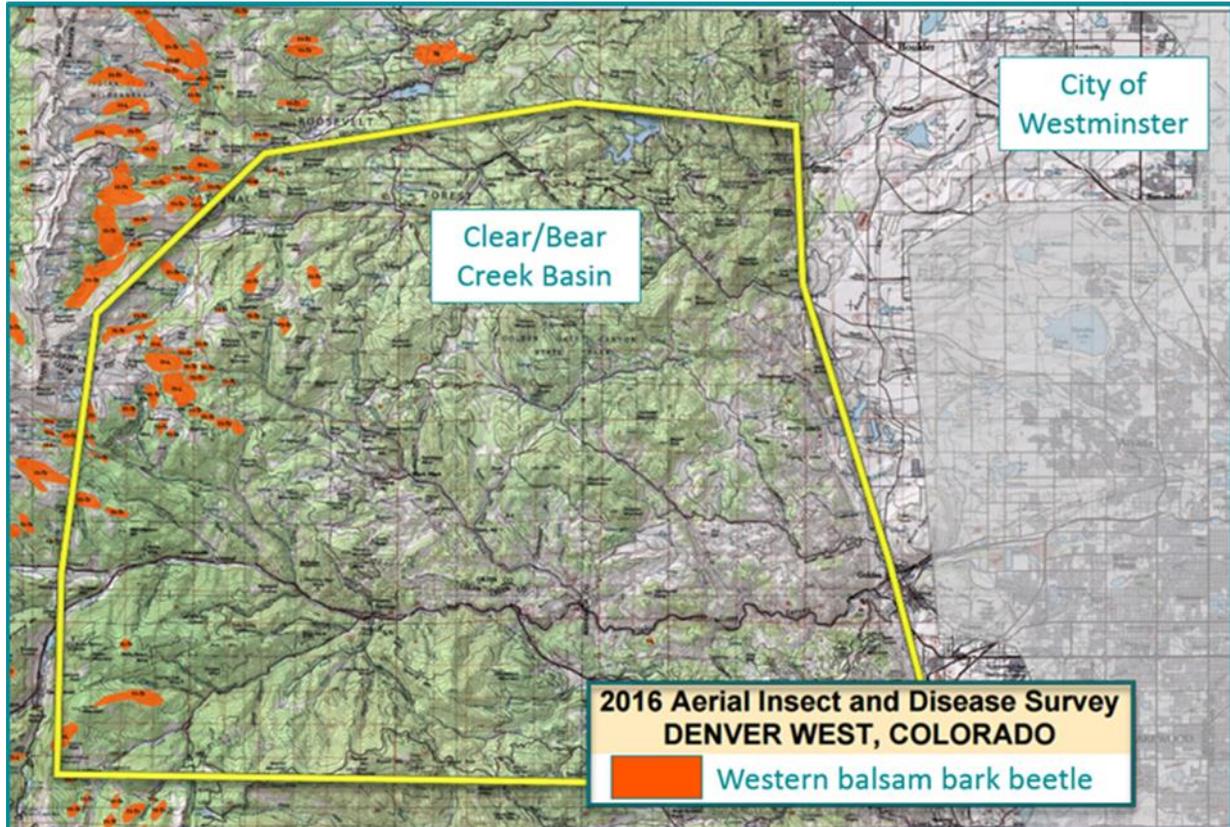
Source: USGS

Noxious species are organisms that are native that out-compete or attack other more desirable species. Our noxious species of greatest concern include the various beetles that are attacking our forests. Various pine and spruce beetles are native to Colorado and since the latest outbreak in 1996, beetle infestations have spread to approximately 6.6 million acres of Colorado. The beetles have reached epidemic levels and will continue to affect the ecology of Colorado for decades to come; however, the impacts of large, simultaneous infestations in multiple forest systems is currently being studied, has yet to be documented and is not fully understood. There is no effective means of controlling large beetle outbreaks.

The predominant tree species in the State of Colorado are bristlecone pine, Colorado blue spruce, Douglas fir, Engelmann spruce, limber pine, lodge pole pine, narrow leaf cottonwood, quaking aspen, piñon pine, plains cottonwood, ponderosa pine, Rocky Mountain juniper, subalpine fir and white fir. (Wildlife, Colorado Parks and Wildlife-Top Invasive Species Concerns 2018)

While beetle infestations are not a great concern within the city limits, the potential environmental degradation these insects pose to the water sheds that provide our water supply is a great concern for the city. Drought stressed trees are more susceptible to both wildfire and beetle infestation. Individually and in combination, drought, beetle infestation and wildfire pose a major threat to the water supply of Westminster and the other communities of the Front Range.

Figure 4.56 2016 Aerial Insect and Disease Survey



Source: USDA-Forest Service 2016

### VULNERABILITY SUMMARY

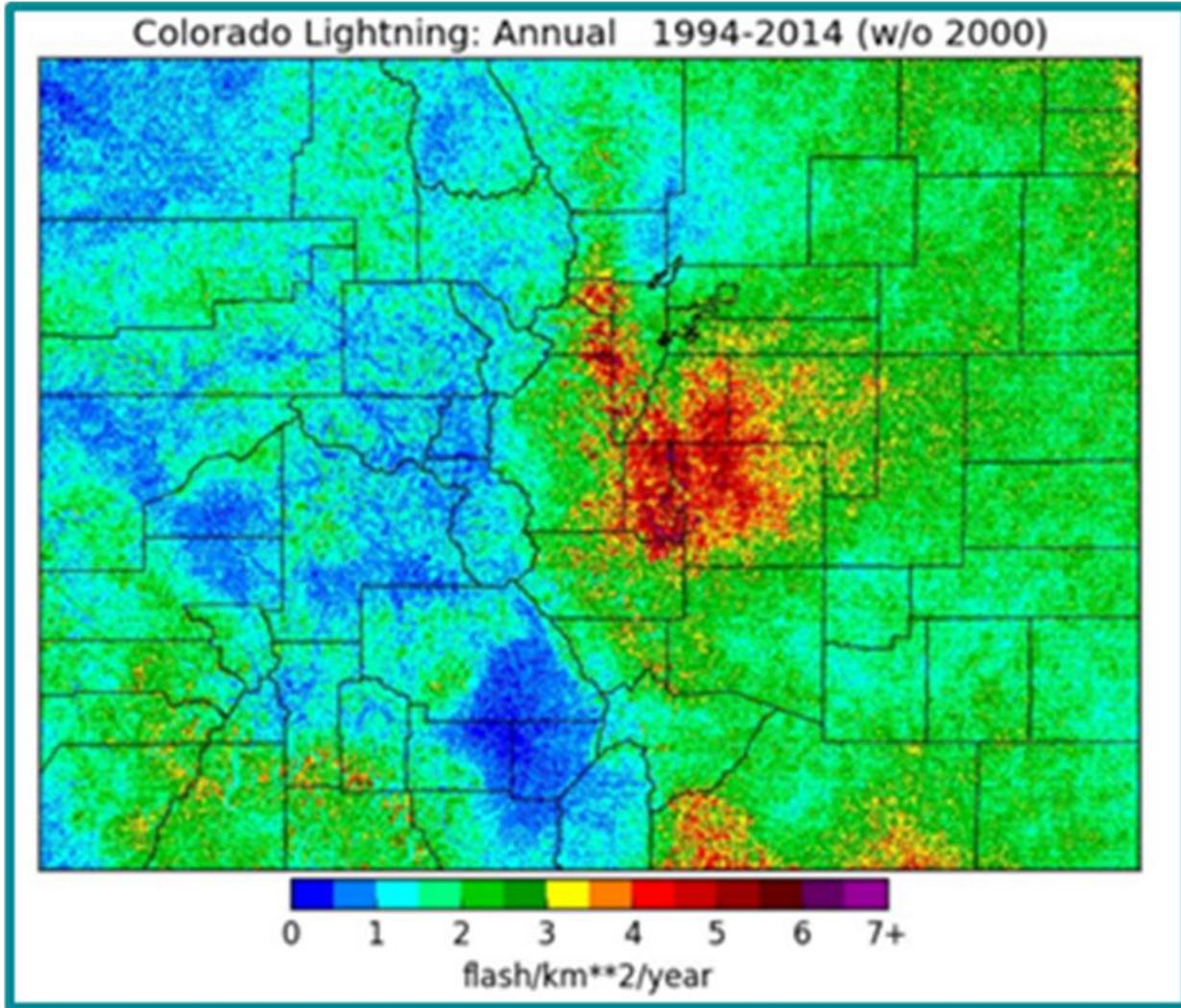
Invasive and noxious species are a persistent threat to our natural habitat, our designed landscapes and green spaces, our native species, our critical infrastructure and our water supply. There is no effective counter measure against the beetle infestations that are beginning to encroach on the watersheds that provide our water supply. The emerald ash borer has been confirmed in adjacent communities and could endanger the Ash tree population of the city. While zebra and quagga mussels are not currently known to be in any Colorado waters, preventing the spread of these species depends of effective biosecurity measures and rigorous inspections of all recreational craft using our local reservoirs. Climate change, environmental degradation and global trade/transportation individually and in combination raise the possibility that other invasive and noxious species may be introduced into our local environment. Invasive and noxious species are an ongoing and persistent natural hazard that has the potential to have profound long-term effects on our environment, critical infrastructure, economy and the community as a whole.

#### 4.3.13 LIGHTNING

Hazard	Likelihood (A-E)	Impact			Overall Impact Sum of Impact divided by 3
		Scale (1-5)	Durations (1-5)	Consequences (1-5) X 2	
Lightning	E	1	1	2	E2

**Definition:** A giant spark of electricity in the atmosphere between cloud, the air or the ground. (N. S. Laboratory, Severe Weather 101 - Lightning n.d.)

Figure 4.57 Colorado Annual Lightning, 1994 - 2014



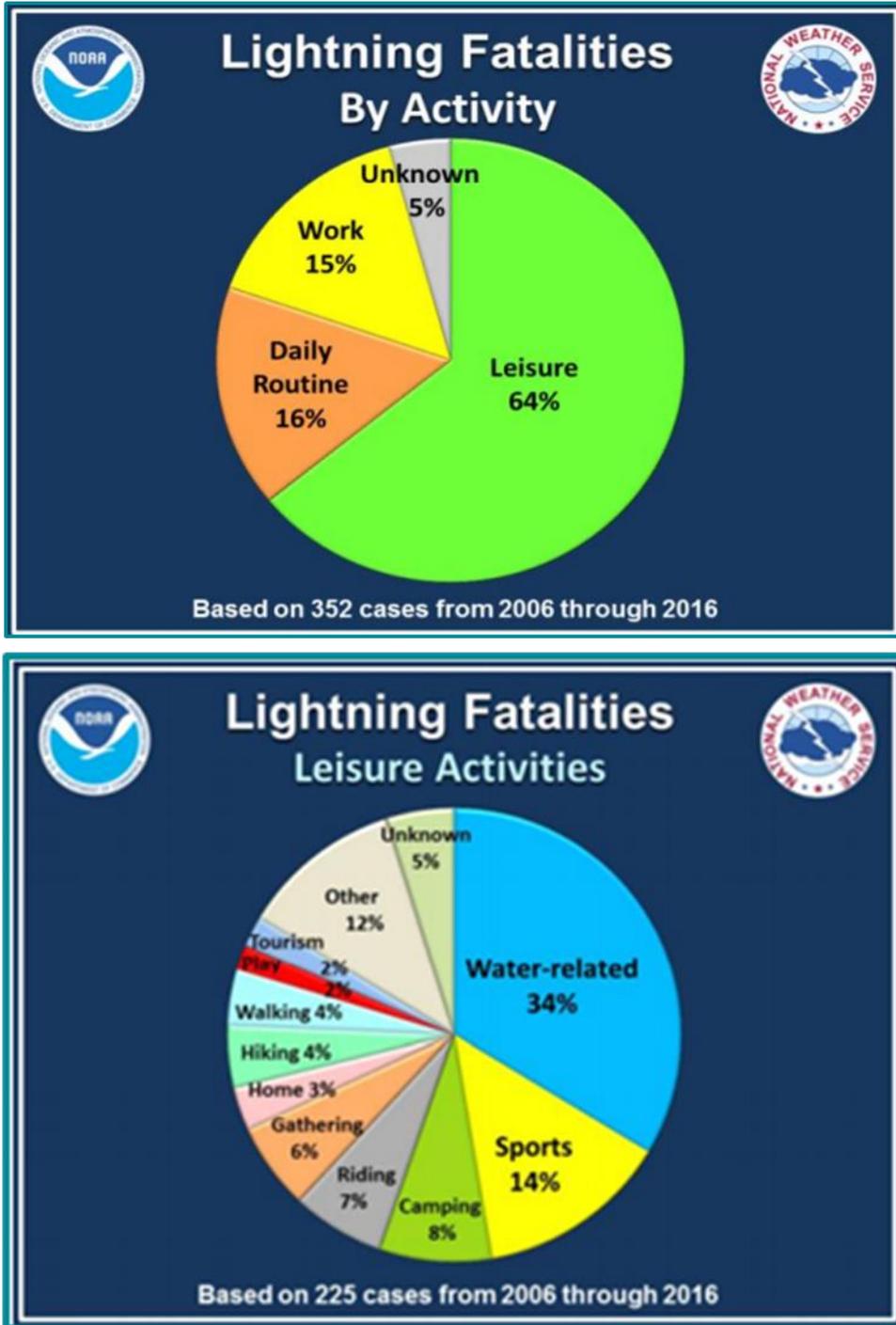
Source: NOAA

**Description:** Lightning poses a threat to life, property and the environment. According to the National Weather Service, lightning is the number one weather related killer in Colorado. Lightning can pose a danger to populations that may be caught out of doors at open air events or in open spaces. Lightning can also damage critical infrastructures or spark fires. Lightning typically occurs in the summer months, usually May- September. According to a March 2017 NOAA report, there were 352 people killed by lightning in the United States between 2006 through 2016. Notably, 64% of these fatalities occurred during leisure activities such as boating, fishing, golfing, sports events, hiking and gatherings. As a city that prides itself on outdoors activities and events that take advantage of our generally favorable weather lightning is of special concern. As is the case of other hazards that are not specific to geography, the entire building inventory and population in the city is potentially exposed. (Jensenius 2017)

### VULNERABILITY SUMMARY

Lightning is a common weather hazard throughout Westminster. It has the potential to produce mass casualty incidents, cause fire/property losses and damage critical infrastructures.

Figure 4.58 2006 – 2016 Lightning Fatalities



Source: NOAA

#### 4.3.14 SEVERE SUMMER STORMS

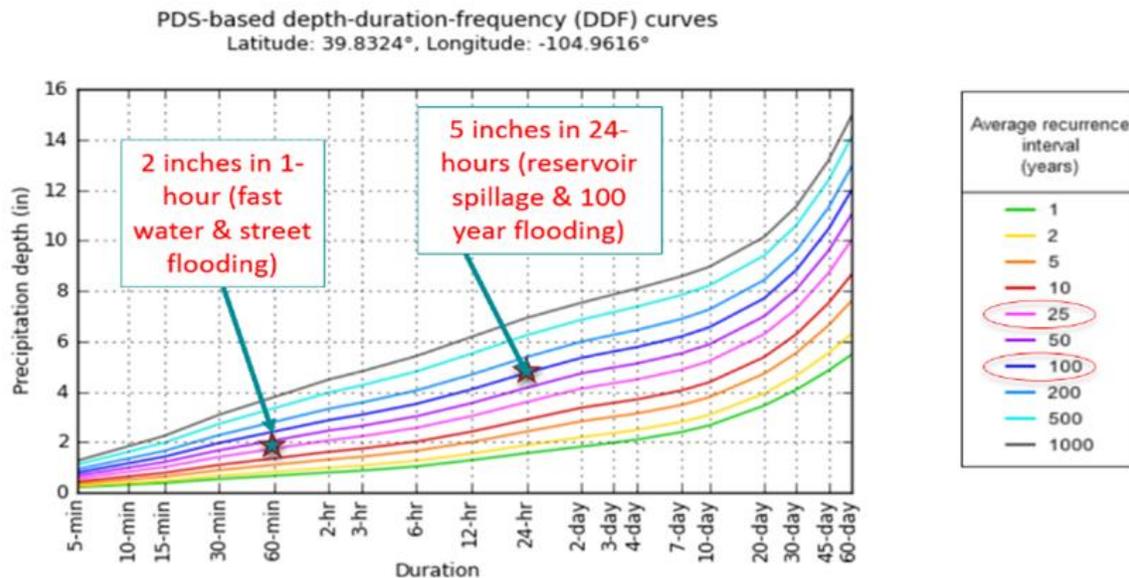
Hazard	Likelihood (A-E)	Impact			Overall Impact Sum of Impact divided by 3
		Scale (1-5)	Durations (1-5)	Consequences (1-5) X 2	
Severe Summer Storm	E	4	1	4	E4

**Definition:** A convective storm (thunderstorms) that usually covers a relatively small geographic area, or moves in a narrow path, and is sufficiently intense to threaten life and/or property. Examples include severe thunderstorms with large hail (> 1 inch), damaging wind (>58 mph), or tornadoes. Although cloud-to-ground lightning is not a criterion for severe local storms, it is acknowledged to be highly dangerous and a leading cause of deaths, injuries and damage from thunderstorms. Excessive localized convective rains are not classified as severe storms but often are the product of severe local storms. Such rainfall may result in related phenomena (flash floods) that threaten life and property. (N.-N. W. Service 2009)

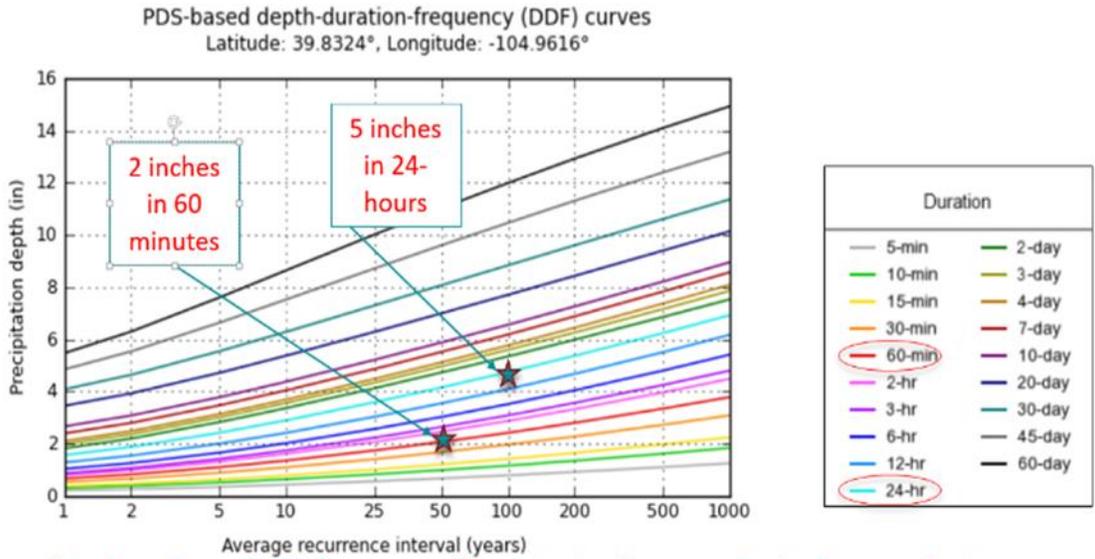
**Description:** Thunderstorms are a typical feature of the city's weather from late May through early September. The wettest month on record was September 2013 when 6.47 inches of rain fell in the local area and neighboring communities (Boulder and Aurora/Denver) received over 8 inches of rain which caused major flooding.

Local observations and experience have established anecdotal benchmarks for severe summer storms based on the intensity and total amounts of rainfall. An intense event is anything >2 inches in 1-hour. An event of this intensity produces fast water in drainage structures and waterways as well as street flooding. A major rainfall event is anything >5 inches in 24-hours. In addition to the impacts associated with intense rain events, this amount of rainfall can cause our reservoirs to spill and produce flooding in our 100-year flood plain.

**Figure 4.59 Precipitation Depth-Duration-Frequency Curves**



This chart shows the expected timeframe for high precipitation events. Receiving 2-3 inches of rain in an hour or 5 inches in a day are marked to show that these events can be expected to occur periodically 1-4 times a century.



This chart shows the likely amount of precipitation for storms lasting between 5 minutes to 60 days. A storm lasting one hour will drop two inches of precipitation about twice a century (2% chance per year) while a storm lasting one day will drop five inches of precipitation about once a century (1% chance per year).

Source: NOAA- Hydrometeorological Design Studies Center

National Oceanographic and Atmospheric Administration-National Weather Service (NOAA-NWS) data provides estimates of the frequency of severe summer storm events as a guideline, but these averages should not be interpreted too literally. Repeated events can occur more frequently than the average indicates and ongoing changes in global weather patterns seem to be creating precipitation and drought events that are more extreme than the historic norms.

**Table 4.24 Rainfall Frequency Estimates**

Rainfall (liquid precipitation only) frequency estimates are provided for durations between 1 and 24 hours in addition to precipitation frequency estimates. Please refer to NOAA Atlas 14 document for more information.

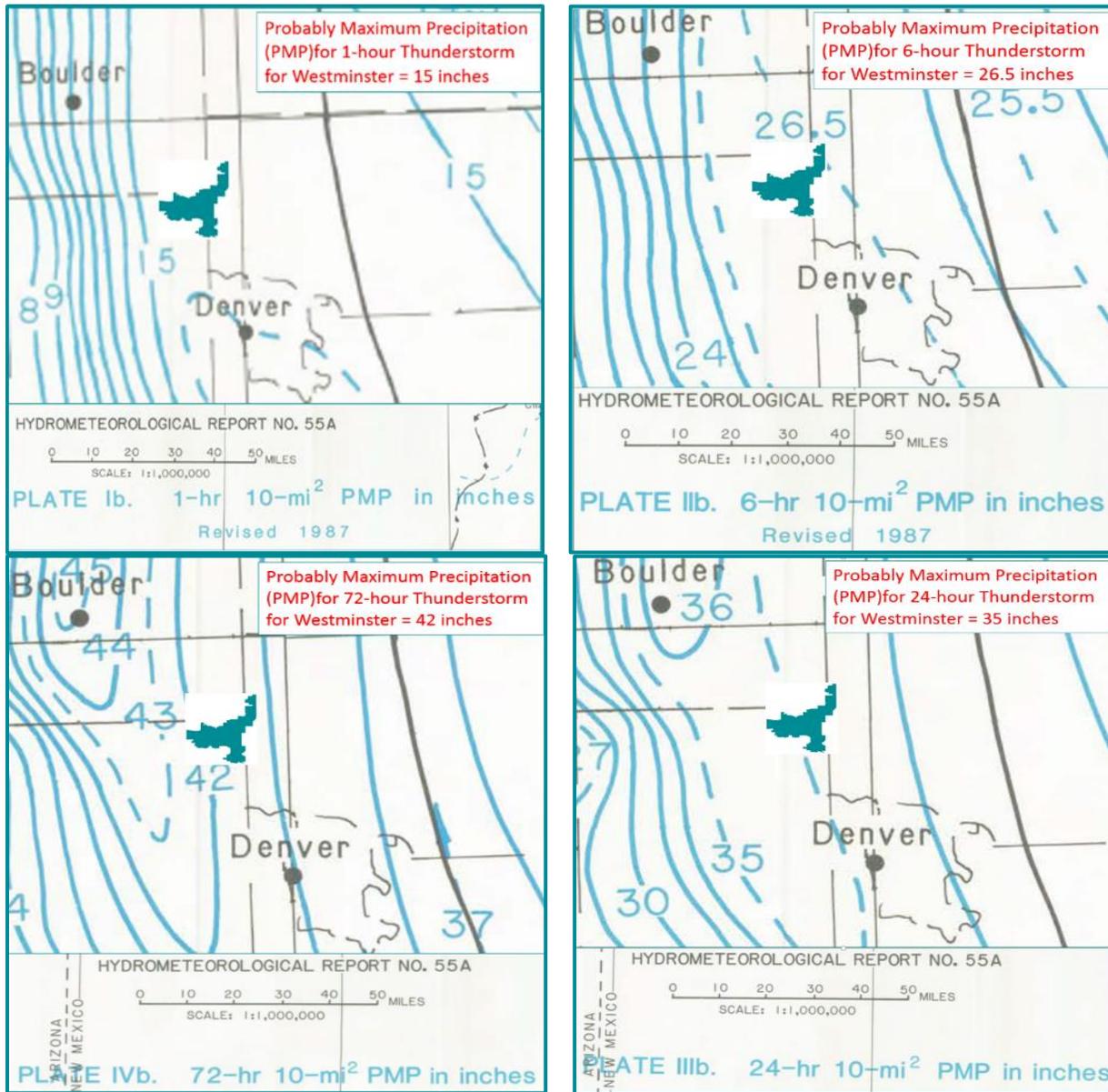
PDS-based rainfall frequency (RF) estimates with 90% confidence intervals (in inches) <sup>1</sup>										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
60-min	0.641 (0.499-0.825)	0.795 (0.618-1.02)	1.07 (0.831-1.39)	1.33 (1.02-1.72)	1.72 (1.29-2.33)	2.04 (1.50-2.80)	2.40 (1.70-3.36)	2.78 (1.89-3.98)	3.34 (2.18-4.89)	3.78 (2.39-5.57)
2-hr	0.756 (0.594-0.961)	0.939 (0.738-1.20)	1.27 (0.994-1.62)	1.57 (1.22-2.01)	2.03 (1.55-2.73)	2.42 (1.79-3.28)	2.84 (2.03-3.93)	3.29 (2.26-4.66)	3.95 (2.61-5.72)	4.46 (2.86-6.50)
3-hr	0.814 (0.644-1.03)	1.01 (0.800-1.28)	1.37 (1.08-1.73)	1.69 (1.33-2.15)	2.18 (1.67-2.91)	2.60 (1.93-3.49)	3.04 (2.19-4.17)	3.52 (2.43-4.94)	4.22 (2.80-6.07)	4.76 (3.07-6.88)
6-hr	0.964 (0.771-1.20)	1.19 (0.948-1.48)	1.58 (1.26-1.98)	1.95 (1.54-2.45)	2.50 (1.93-3.28)	2.96 (2.23-3.92)	3.46 (2.52-4.68)	3.99 (2.79-5.53)	4.78 (3.21-6.77)	5.38 (3.51-7.67)
12-hr	1.20 (0.968-1.48)	1.45 (1.17-1.79)	1.90 (1.53-2.35)	2.31 (1.85-2.87)	2.93 (2.29-3.81)	3.46 (2.63-4.52)	4.02 (2.96-5.38)	4.63 (3.27-6.33)	5.52 (3.75-7.72)	6.20 (4.09-8.73)
24-hr	1.45 (1.18-1.76)	1.75 (1.43-2.14)	2.29 (1.87-2.80)	2.77 (2.25-3.40)	3.48 (2.75-4.44)	4.07 (3.13-5.24)	4.70 (3.49-6.18)	5.35 (3.82-7.21)	6.32 (4.33-8.71)	7.03 (4.69-9.78)

<sup>1</sup> Rainfall frequency (RF) estimates in this table are based on frequency analysis of partial duration series (PDS). Numbers in parenthesis are RF estimates at lower and upper bounds of the 90% confidence interval. The probability that rainfall frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values. Please refer to NOAA Atlas 14 document for more information.

Source: NOAA- Hydrometeorological Design Studies Center

Severe summer storms endanger life and property from the resultant flooding and fast water situations these events can cause. Associated street flooding, high wind, wind-driven water can disrupt routine business and city operations and disrupt critical infrastructures resulting in economic losses. The hazards posed by lightning, hail and saturated/heaving soils will be examined separately.

**Figure 4.60 Probable Maximum Precipitation 1, 6, 24, and 72 hours**



Source: NOAA Hydrometeorological Report No. 55A

## VULNERABILITY SUMMARY

Severe summer storms are frequent annual occurrences for the city. The more extreme events routinely pose a threat to life and property. The rare, but most severe potential events could result in significant flooding that would endanger large numbers of residents, homes, critical infrastructures and businesses.

#### 4.3.15 SEVERE WINTER STORMS/BLIZZARDS

Hazard	Likelihood (A-E)	Impact			Overall Impact
		Scale (1-5)	Durations (1-5)	Consequences (1-5) X 2	Sum of Impact divided by 3
Severe Winter Storm	E	5	2	2	E3

**Definition:** A winter storm event that is 3 hours or longer with sustained winds or frequent gusts of 35 mph or greater, considerable falling/blowing snow that reduces visibility to less than ¼ mile. (N.-N. W. Service 2009)

**Description:** As is the case of other hazards that are not specific to geography, the entire building inventory and population in the city is potentially exposed. Since 1881, the metro area has recorded 24 snowstorms that deposited between 15.9 and 45.7 inches of snow. Although not an annual event, Westminster is extremely susceptible to heavy snowfalls. Major snow events typically occur between September and April. Severe winter storms disrupt transportation and routine community activities, damage or disrupt critical infrastructure, incur significant snow and debris removal cost and may cause structural collapses. Vulnerable populations are at special risk to the disruption of heating, the operation of life sustaining medical equipment and lack of ready access to medical care. According to the Rocky Mountain Insurance Information Association (RMIIA), the March 2003 blizzard was our most expensive winter storm on record with more than 28,000 claims and at least \$93.3 million in insured losses. Most of the damage was the result of wet, heavy snow that caused the collapse of roofs, porches, awnings, carports and outbuilding. Downed tree limbs, power outages, spoiled food and living expenses for people who were displaced by storm damage also contributed to the human, material and economic consequences of this event. (Association, RMII-Winter Storms 2017)

#### VULNERABILITY SUMMARY

Severe winter storms and blizzards are unpredictable annual events that impact the entire region. The primary concerns are travelers and commuters who may be stranded on our roads, snow removal, disruption of electrical service, collapsed roofs, downed power lines and poles and broken tree branches. Severe winter storms and blizzards have the potential to strand or displace residents and travelers, disrupt critical infrastructure, business and city operations.

#### 4.3.16 SOLAR/GEOMAGNETIC STORM

Hazard	Likelihood (A-E)	Impact			Overall Impact
		Scale (1-5)	Durations (1-5)	Consequences (1-5) X 2	Sum of Impact divided by 3
Solar/Geomagnetic Storm	A	5	1	4	A4

**Definition:** A major disturbance in the Earth's magnetosphere caused by intense solar winds associated with solar coronal mass ejections (CMEs). These storms can result in intense currents and global geomagnetic disturbances that can disrupt global satellite systems and create harmful geomagnetic induced currents in the power grid and pipelines. (Space Weather Prediction Center-NOAA 2017)

Figure 4.61 NOAA Space Weather Scales



# NOAA Space Weather Scales



Category		Effect	Physical measure	Average Frequency (1 cycle = 11 years)
Scale	Descriptor	Duration of event will influence severity of effects		
<b>Geomagnetic Storms</b>				
<b>G 5</b>	Extreme	<b>Power systems:</b> widespread voltage control problems and protective system problems can occur, some grid systems may experience complete collapse or blackouts. Transformers may experience damage.	Kp values* determined every 3 hours	Number of storm events when Kp level was met; (number of storm days)
		<b>Spacecraft operations:</b> may experience extensive surface charging, problems with orientation, uplink/downlink and tracking satellites.		
		<b>Other systems:</b> pipeline currents can reach hundreds of amps, HF (high frequency) radio propagation may be impossible in many areas for one to two days, satellite navigation may be degraded for days, low-frequency radio navigation can be out for hours, and aurora has been seen as low as Florida and southern Texas (typically 40° geomagnetic lat.).**		
		<b>Power systems:</b> possible widespread voltage control problems and some protective systems will mistakenly trip out key assets from the grid.		
		<b>Spacecraft operations:</b> may experience surface charging and tracking problems, corrections may be needed for orientation problems.		
<b>G 4</b>	Severe	<b>Other systems:</b> induced pipeline currents affect preventive measures, HF radio propagation sporadic, satellite navigation degraded for hours, low-frequency radio navigation disrupted, and aurora has been seen as low as Alabama and northern California (typically 45° geomagnetic lat.).**	Kp=8	100 per cycle (60 days per cycle)
		<b>Power systems:</b> voltage corrections may be required, false alarms triggered on some protection devices.		
		<b>Spacecraft operations:</b> surface charging may occur on satellite components, drag may increase on low-Earth-orbit satellites, and corrections may be needed for orientation problems.		
		<b>Other systems:</b> intermittent satellite navigation and low-frequency radio navigation problems may occur, HF radio may be intermittent, and aurora has been seen as low as Illinois and Oregon (typically 50° geomagnetic lat.).**		
		<b>Power systems:</b> high-latitude power systems may experience voltage alarms, long-duration storms may cause transformer damage.		
<b>G 3</b>	Strong	<b>Spacecraft operations:</b> corrective actions to orientation may be required by ground control; possible changes in drag affect orbit predictions.	Kp=7	200 per cycle (130 days per cycle)
		<b>Other systems:</b> HF radio propagation can fade at higher latitudes, and aurora has been seen as low as New York and Idaho (typically 55° geomagnetic lat.).**		
		<b>Power systems:</b> weak power grid fluctuations can occur.		
		<b>Spacecraft operations:</b> minor impact on satellite operations possible.		
		<b>Other systems:</b> migratory animals are affected at this and higher levels; aurora is commonly visible at high latitudes (northern Michigan and Maine).**		
<b>G 2</b>	Moderate	<b>Power systems:</b> minor impact on satellite operations possible.	Kp=6	600 per cycle (360 days per cycle)
		<b>Spacecraft operations:</b> minor impact on satellite operations possible.		
		<b>Other systems:</b> migratory animals are affected at this and higher levels; aurora is commonly visible at high latitudes (northern Michigan and Maine).**		
		<b>Power systems:</b> weak power grid fluctuations can occur.		
		<b>Spacecraft operations:</b> minor impact on satellite operations possible.		
<b>G 1</b>	Minor	<b>Other systems:</b> migratory animals are affected at this and higher levels; aurora is commonly visible at high latitudes (northern Michigan and Maine).**	Kp=5	1700 per cycle (900 days per cycle)
		<b>Power systems:</b> weak power grid fluctuations can occur.		
		<b>Spacecraft operations:</b> minor impact on satellite operations possible.		
		<b>Other systems:</b> migratory animals are affected at this and higher levels; aurora is commonly visible at high latitudes (northern Michigan and Maine).**		
		<b>Power systems:</b> weak power grid fluctuations can occur.		

\* Based on this measure, but other physical measures are also considered.  
 \*\* For specific locations around the globe, use geomagnetic latitude to determine likely sightings (see [www.swpc.noaa.gov/Aurora](http://www.swpc.noaa.gov/Aurora))

Source: NOAA

**Description:** The hazard of solar weather has recently gained greater recognition and research is ongoing to improve our understanding of this hazard, its probability, and options for warning and mitigation. The two largest solar events on record occurred in 1859 and 1921 when vulnerable technologies were much less a part of our critical infrastructures. In 2012, the earth missed being struck by a major solar event by 9 days. A 2009 National Science Academy study concluded that a major solar event on the scale of the 1921 geomagnetic storm could cause permanent damage to more than 350 large transformers causing loss of power to 130 million in the United States alone. This study concluded that 30% of the Extremely High Voltage (EHV) transformers in Colorado are at risk of multiple year outages resulting from a solar event on the scale of the 1921 storm. Power disruptions of this scale and duration would have a ripple effect on interdependent critical infrastructures. (Space Studies Board 2008) NOAA rates geomagnetic storms on G1-G5. G4 (severe) and G5 (extreme) geomagnetic storms have the potential to disrupt or damage the power grid, HF radio operations as far south as Texas and Florida.

**Figure 4.62 At-Risk Extremely High Voltage Transformer Capacity**

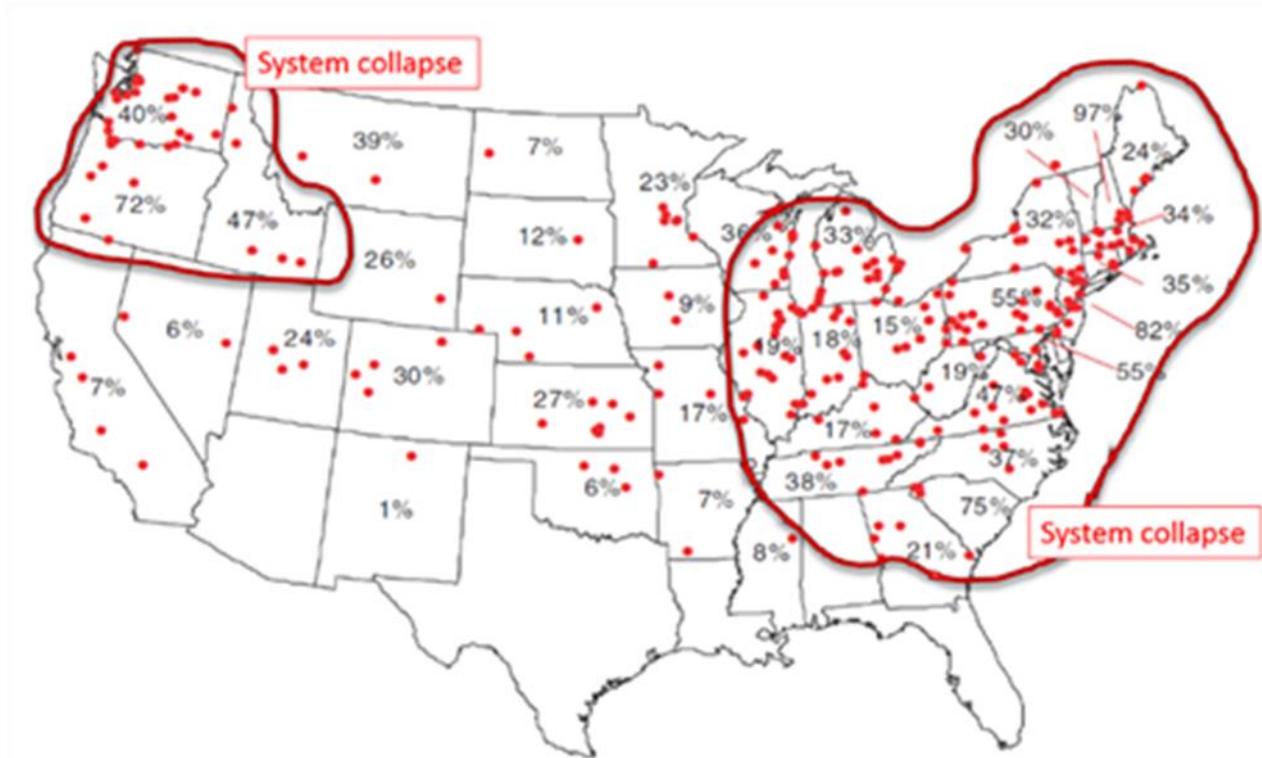


FIGURE 7.2 A map showing the at-risk EHV transformer capacity (estimated at ~365 large transformers) by state for a 4800 nT/min geomagnetic field disturbance at 50° geomagnetic latitude. Regions with high percentages of at-risk capacity could experience long-duration outages that could extend multiple years. SOURCE: J. Kappenman, Metatech Corp., “The Future: Solutions or Vulnerabilities?,” presentation to the space weather workshop, May 23, 2008.

Source: 2009 National Science Academy

NOAA’s Space Weather Prediction Center estimates there are about 60 days of G4-Severe and 4 days of G5-Extreme geomagnetic storm events during each 11-year solar cycle. CMEs begin as an explosion of magnetic field and plasma from the Sun’s corona and move outward to reach the Earth within approximately 18-96 hours (Space Weather Prediction Center 2016). Mitigation of this hazard must begin long before the solar storm occurs. Adequate protections require a holistic approach to the systems’ design. If the asset owner determines that the event may exceed the systems protective capabilities, the best mitigation option may be a controlled outage for the duration of the event. (Industrial Control Systems Cyber Emergency Response Teams n.d.)

**Table 4.25 Notable Geomagnetic Events**

Date	Impacts
Sept. 1-2, 1859 (Carrington Event)	Telegraph systems
November 17, 1882	Telegraph systems
May 13-15, 1921	Telegraph and undersea cables
March 24, 1940	Long line communications
1958	Power blackout
August 4, 1972	Equipment tripping, voltage stability issues; communications cable
March 13, 1989	9-hour blackout in Canada
July 14-15, 2000	Satellites short-circuited, radio black-outs
October 29-31, 2003	Satellite damage; Swedish power outage

Date	Impacts
December 5, 2006	Damaged satellites, disrupted communications and GPS
July 23, 2012	Carrington Class event (missed by 9 days)

## VULNERABILITY SUMMARY

As a low probability, high impact event, this hazard has the potential to significantly damage and disrupt power and communications critical infrastructures. These disruptions could be prolonged and would cascade into other critical infrastructures (water, emergency operations, government, business, transportation etc.) that are dependent on reliable power, satellite communications and GPS. These disruptions have the potential to endanger lives, cause significant economic losses and damage to the environment.

### 4.3.17 TORNADO

Hazard	Likelihood (A-E)	Impact			Overall Impact
		Scale (1-5)	Durations (1-5)	Consequences (1-5) X 2	Sum of Impact divided by 3
Tornado	A	2	1	3	A3

**Definition:** A violently rotating column of air, usually pendant to a cumulonimbus, with circulation reaching the ground. It nearly always starts as a funnel cloud and may be accompanied by a loud roaring noise. On a local scale, it is the most destructive of all atmospheric phenomena. Tornadoes are rated using the Fujita Scale. (N.-N. W. Service 2009)

**Table 4.26 Fujita Tornado Damage Scale**

Scale	Wind Estimate (MPH)	Typical Damage
F0	<73	Light damage. Some damage to chimneys, branches broken off trees; shallow-rooted trees pushed over, sign boards damaged.
F1	73-112	Moderate damage. Peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos blown off roads.
F2	113-157	Considerable damage. Roofs torn off frame houses; mobile homes demolished; boxcars overturned; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.
F3	158-206	Severe damage. Roofs and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted; heavy cars lifted of the ground and thrown.
F4	207-260	Devastating damage. Well-Constructed houses leveled; structures with weak foundations blown away some distance; cars thrown and large missiles generated.
F5	261-313	Incredible damage. Strong frame houses leveled of foundations and swept away; automobile-sized missiles fly through the air in excess of 100 yards; trees debarked; incredible phenomena will occur.

Source: NOAA

**Description:** There were 2,118 tornados in Colorado between 1950 and 2016. Of these, 123 were within 20 miles of Westminster. The National Weather Service reports the north metro area averages one confirmed tornado each year since 1950. The ongoing development of the area will increase the probability of property damage. Tornadoes typically occur April through June. However, tornadoes are possible during other months of the year as well. Tornadoes occur primarily East of I-25. Tornados can pose a danger to populations that may be caught out of doors at open air events or in open spaces.

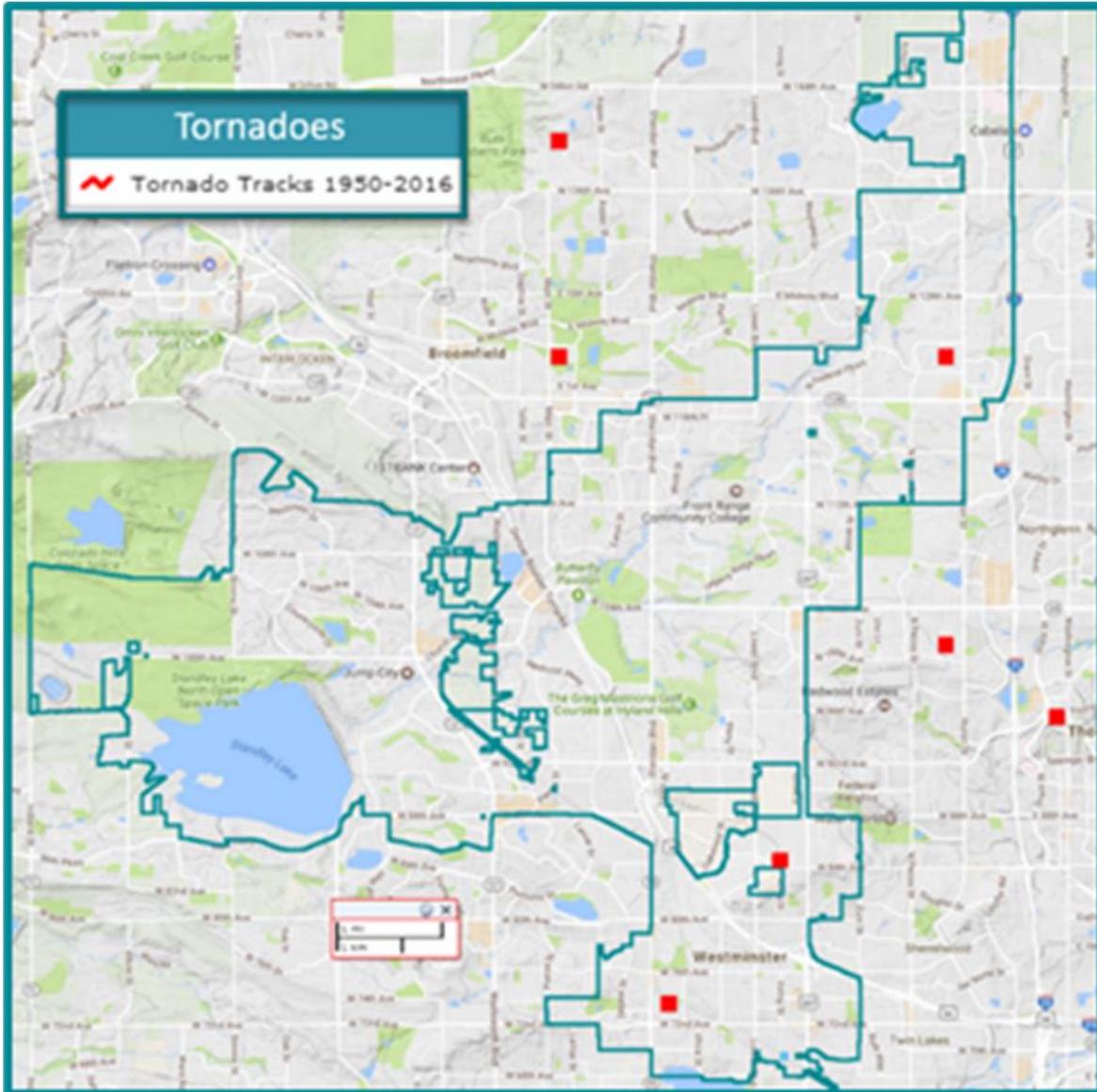
**Table 4.27 Westminster Tornadic Events**

Date	Scale	Length of Track (miles)
June 4, 1976	F-0	.009 miles
April 21, 1988	F-0	.009 miles
June 6, 1995	F-0	.009 miles

Source: NOAA NCEI

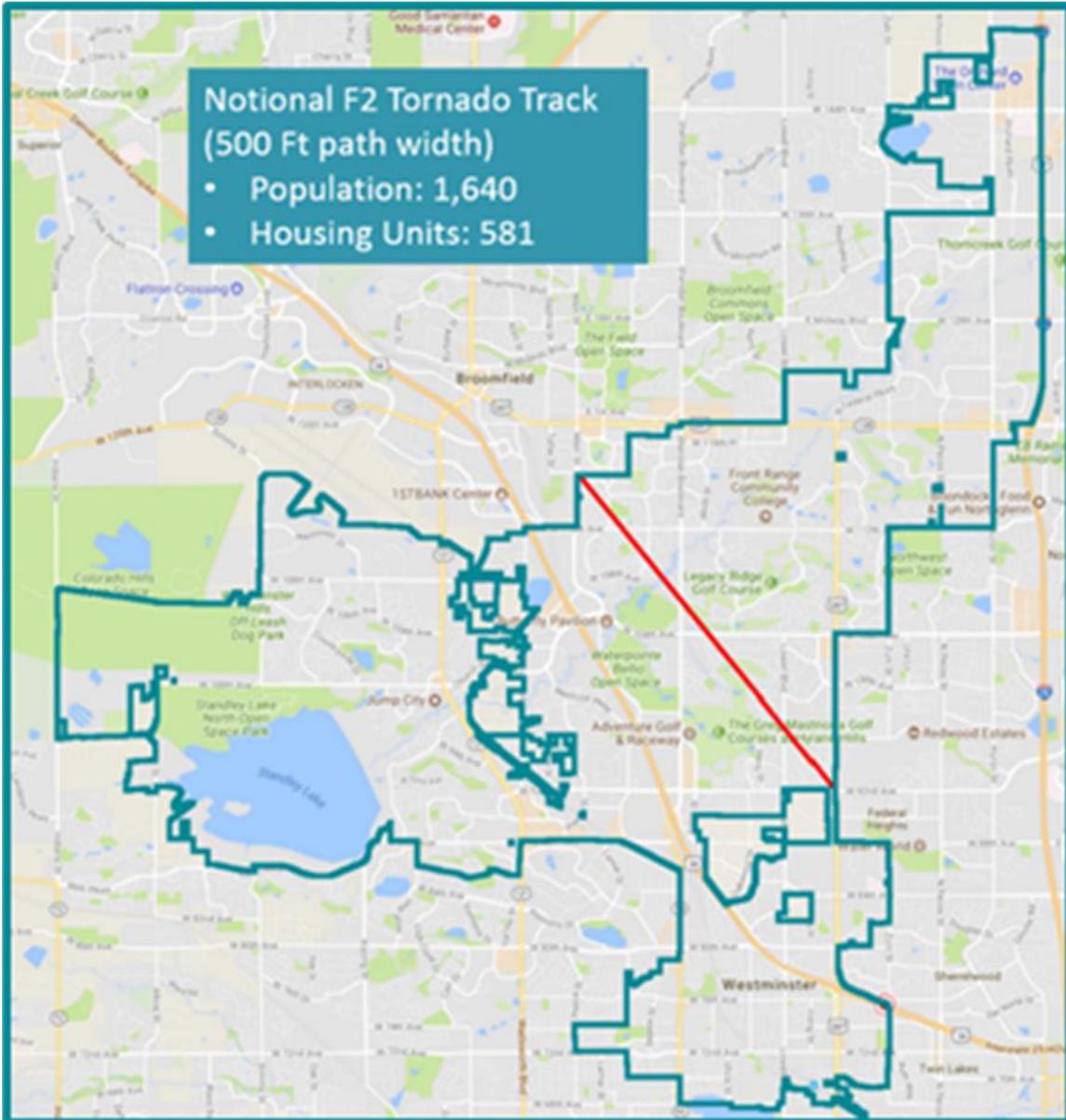
The National Weather Service has documented three tornadic events in Westminster between 1950 and 2016. These touchdown events were in the F0 scale (65-85 mph winds, minor or no damage) with no reported injuries or damage. In June 1981, an F-2 tornado touched down approximately three miles east of Westminster in Thornton. The tornado injured 42 people and did significant damage to several homes. F1 (86-110 mph) and F2 (111-135 mph) have occurred in the communities surrounding Westminster.

Figure 4.63 Tornado Events in City of Westminster 1950-2016



Source: NOAA Storm Events Database

Figure 4.64 Hypothetical Tornado Impacts



Source: City of Westminister

### VULNERABILITY SUMMARY

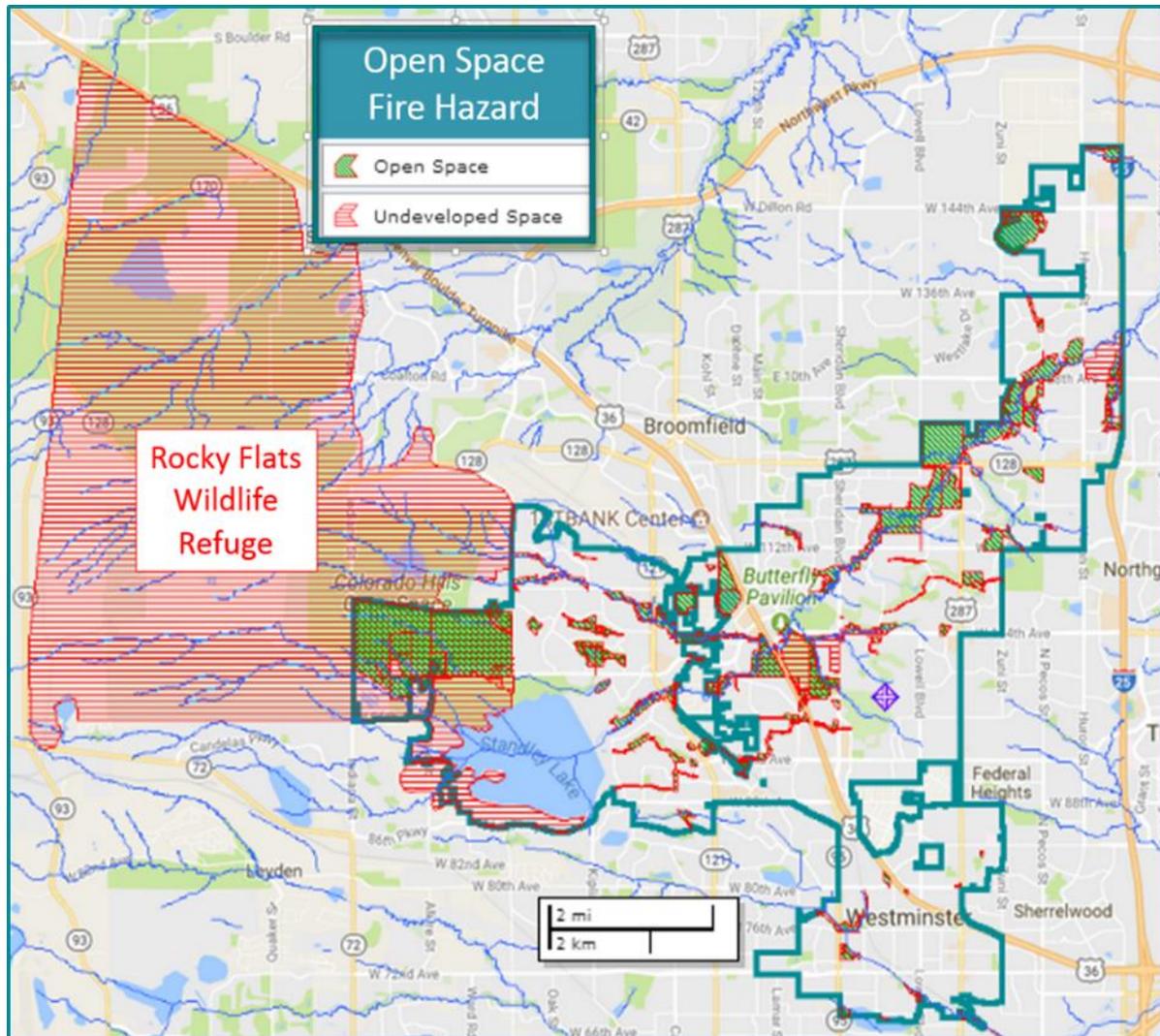
Eighteen tornadoes have occurred within 10 miles of Westminister since 1950. Of these, five were F1 (73-112 mph) and three were F2 (113-157 mph) tornadoes which are capable of moderate to severe damage such as tearing roofs off, destroying mobile homes and uprooting trees. Tornadoes are not unusual in the Denver metro area and pose a threat to our residents and property. A notional F2 tornado with an estimated path width of 500 feet would endanger an estimated 1,640 residents and 581 housing units.

#### 4.3.18 OPEN SPACE FIRE (WILDFIRE)

Hazard	Likelihood (A-E)	Impact			Overall Impact Sum of Impact divided by 3
		Scale (1-5)	Durations (1-5)	Consequences (1-5) X 2	
Open Space Fire	D	1	2	2	D2

**Definition:** Any free burning uncontained fire not prescribed for the area which consumes the natural fuels and spreads in response to its environment. (N.-N. W. Service 2009)

**Figure 4.65 Risk of Open Space Fire in Proximity to City of Westminster**



Source: City of Westminster

**Description:** The natural landscape of Westminster is dominated by rolling hills, short prairie grasses, seasonal streams and dry gulches which support native trees and brush. The city's policy of maintaining 15% of the city's total area as managed open space helps preserve the natural environment, provides a home to wildlife, and enhances the quality of living and outdoor recreation for our residents. The estimated annual cost of maintaining our open space was estimated to be \$1.5 million (\$500 per acre) in 2014. This significant investment reflects the importance of this community resource to our residents and leadership. The city owns 3,067.2 acres as managed open space and 109 miles of trails. Most of our

urban natural landscape is in corridors along the Big Dry Creek and Walnut Creek drainages and is characterized by native grasses and Cottonwood trees. Our open spaces often abut residential and commercial property. Open space and undeveloped property pose a threat of brush fires throughout the year. Periods of low humidity, lack of precipitation, and high winds provide ideal conditions for ignition. Drought conditions may significantly increase the potential for wildland fires. (StudioCPG and ERO Resource Corporation 2014)

In the late 1990's, a wind-driven (60-70 mph) open space fire destroyed several buildings on the historic Shoenberg farm site (McQuiston 2017). A wind driven grass fire on the Rocky Flats area to the west of the city rapidly burned several hundred acres, caused the evacuation of the Walnut Creek neighborhood and threatened several homes before it was brought under control by the Westminster Fire Department and several of its mutual aid partners.

### VULNERABILITY SUMMARY

Fire is a natural element of the native grasslands and streambed vegetation of our managed open space. Natural or human-caused fires in these areas during dry and windy weather could endanger adjacent built environments. Fires in our open space areas are commonly the result of lightning, powerline failures, arson and accidents. Most brush fires are contained immediately and do not escape initial affected areas, but the potential for deaths, injuries or property losses exists.

#### 4.3.19 WINDSTORM

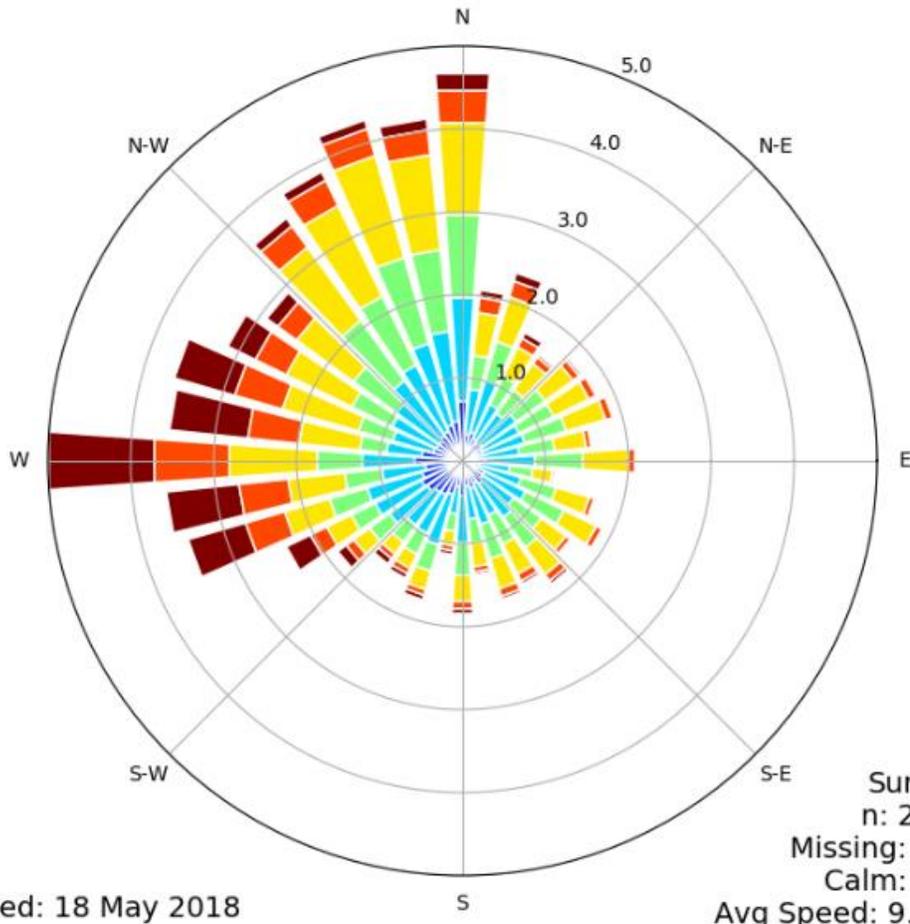
Hazard	Likelihood (A-E)	Impact			Overall Impact Sum of Impact divided by 3
		Scale (1-5)	Durations (1-5)	Consequences (1-5) X 2	
Windstorm	E	4	2	1	E2

**Definition:** Damaging “straight-line” winds are classified as those that exceed 50-60 mph. (N. S. Laboratory, Severe Weather 101-Damaging Winds 2016)

**Description:** Westminster’s proximity to the Rocky Mountains make it susceptible to chinook and bora winds. These downslope winds can exceed 90 miles per hour and produce damage to structures, vehicles and trees, as well as, cause erosion. A Chinook along the Front Range in January, 1982 had recorded gusts of up to 137 mph and destroyed mobile homes, downed power/telephone lines, blew out windows, damaged roofs and destroyed small planes on the ground in nearby communities. (National Center for Environmental Information n.d.) Since 1980, the National Weather Service has recorded 8 significant wind events in Westminster. An event on August 9, 1996 injured five. (NOAA National Weather Service 2017)

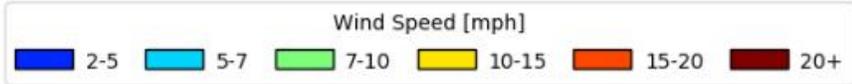


[BJC] BROOMFIELD/JEFFCO  
Windrose Plot [All Year]  
Period of Record: 01 Aug 1981 - 18 May 2018



Summary  
n: 291897  
Missing: 14929  
Calm: 12.1%  
Avg Speed: 9.2 mph

Generated: 18 May 2018



Source: Iowa State University

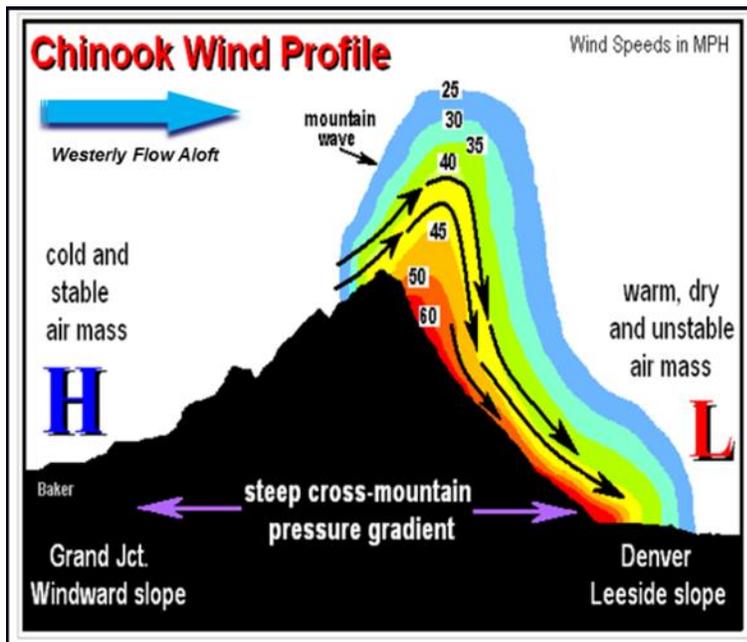


## VULNERABILITY SUMMARY

Straight-line wind events of more than 40 mph are not unusual for Westminster. They are predictable and provide an opportunity to take routine measures to mitigate their impacts. Airborne debris has the potential to cause injuries and damage property. Chinook winds can cause thousands of dollars in damages to property and trees. Wind events in conjunction with open space fire, hail or winter storms can greatly exacerbate the consequences of these hazards.

Steep pressure gradient (or large horizontal difference in air pressure) between a pressure maxima or high pressure (H) in western Colorado and a pressure minima or low pressure (L) in northeast Colorado is necessary for the formation of strong and gusty Chinook winds on and near the east face of the Front Range. Strong westerly flow aloft will further strengthen this downslope wind.

**Figure 4.67 Chinook Winds**

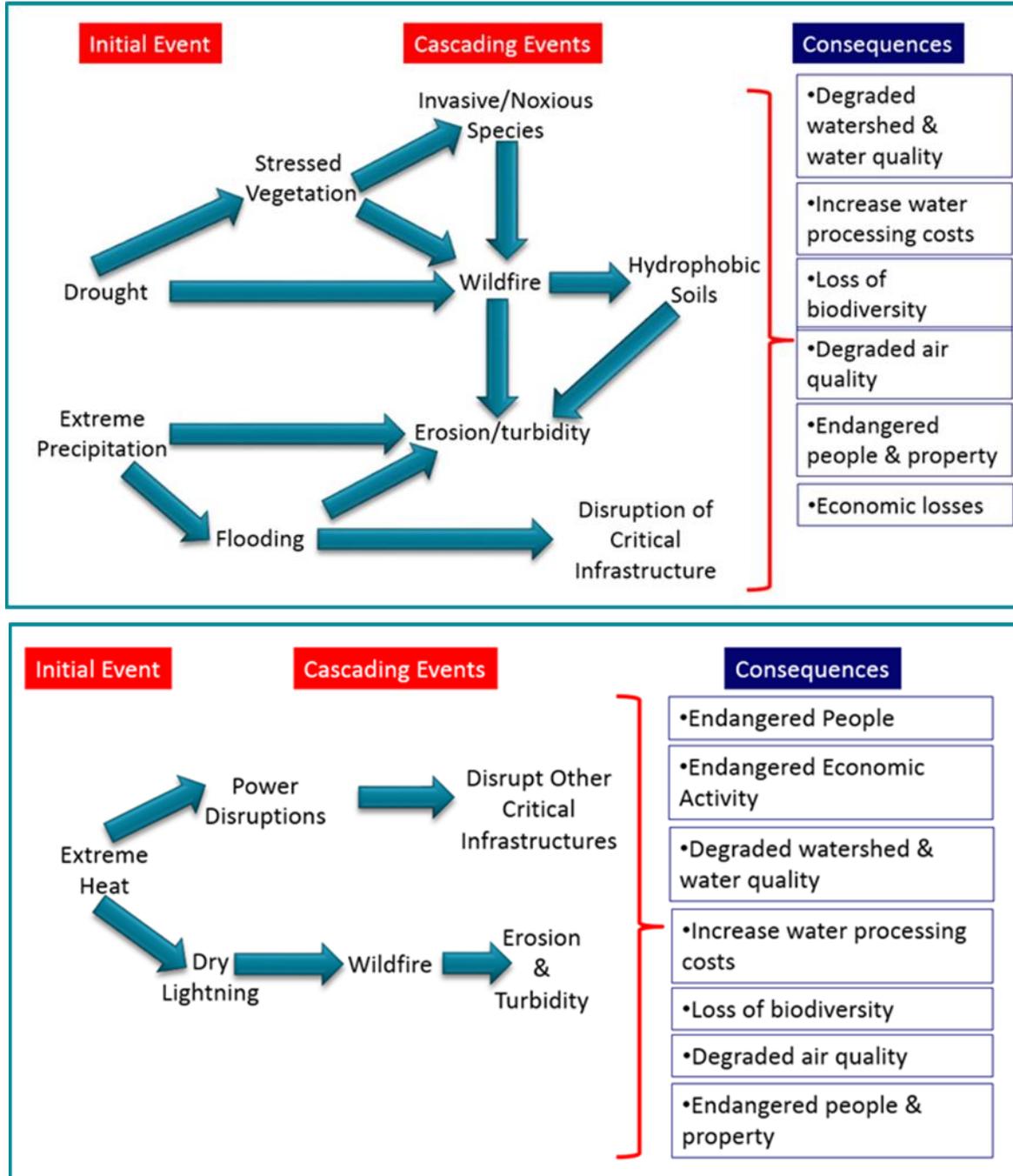


Source: Mountain Wave Weather NOAA

## 4.4 CONCLUSION ON NATURAL HAZARDS

Each natural hazard is the result of unique environmental factors. While we have examined each hazard individually, it is important to remember that one hazard may lead to a cascade of other natural or human caused hazards. Hazards are complex and often related. The following are a few examples of this cascading effect and some of the consequences that may result.

**Figure 4.68 Hazards Interrelationship and Cascading Events**



Source: City of Westminster

The availability and quality of water is central to the natural hazard concerns of Westminster. Individual and cascading natural hazards present a complex and persistent threat to our highly vulnerable water supply. Drought and extreme rain events are high probability, high impact events. The protracted nature of drought presents major challenges to our economic activity and the existing ecosystems that characterize Westminster. Extreme rain events resulting in flooding have the potential to suddenly

endanger a large number of people, damage or destroy critical infrastructure, businesses and homes, as well as, damage our parks and open spaces.

Severe winter storms and blizzards are our most common meteorological hazards. While overall annual snowfall has been decreasing and winters are warmer and shorter in recent years, extreme snow and cold events are a possibility that can endanger vulnerable populations, damage critical infrastructure, impact economic activity and result in significant snow removal expenses. The impact of climate change on our meteorological hazards continues to be subject to research and analysis, but the recent trends indicate overall warming, shorter, dryer winters, early snowpack run-off and more frequent and extreme hot/cold, wet/dry events. These meteorological trends are exacerbating the environmental stress of Front Range forests making these trees more vulnerable to various invasive species and increasing the risk of wildfire and endanger the watershed that Front Range communities depend upon for water.

Our water supply and infrastructure are also threatened by invasive/noxious species. The pine bark beetles that are native to Colorado's forest are beginning to encroach on the Front Range watersheds and create additional stress on these critical biomes. The Emerald Ash bore and other invasive species are a persistent threat to our urban landscapes and biodiversity. The threat posed by Zebra and Quagga mussels and other invasive aquatic species demands close monitoring and stringent biosecurity measures to protect our critical infrastructure and native species.

Lightning, hail and wind each present their unique dangers to people, critical infrastructure, homes and businesses. These lesser hazards are persistent, short-duration, rapid onset events that are well understood by the public that can take protective actions in response to short term predictions/notification. The resulting property damage and economic disruption can be substantial.

Westminster's geological hazards include swelling soils and earthquakes. Swelling soils are common throughout the city and can result in significant damage to foundations, road, sidewalks and pipelines. This hazard may be exacerbated by drought and extreme precipitation events. While swelling soils does not present a potential to cause an emergency/disaster event, it is a persistent and expensive hazard that can be mitigated to lessen its impact on property owners. Westminster's vulnerability to earthquake is limited to possible property damages and injuries due to falling objects. The proximity of several high-risk dams to small quaternary faults merits the inspection of these structures should we experience seismic activity. Although there are no active oil/gas wells within Westminster, there are significant extractive activities (including fracking) immediately north and east of the city. Colorado has a history of induced (or triggered) earthquakes and this hazard merits monitoring.

Emerging/re-emerging and resistant diseases are a perennial threat to humans, animals and plants. Improvements in public health surveillance, reporting and response greatly have reduced the effects threat of disease, but many pathogens (such as influenza) are constantly mutating to create new strains while other traditional diseases have developed resistance to many of antibiotics used to treat them. The rapid and continuous movement of people, animals, insects and goods globally has facilitated the rapid spread of new diseases such as severe acute respiratory syndrome (SARS), Middle East respiratory syndrome (MERS), West Nile Encephalitis, Ebola and Zika. We may also see a change in the spread of diseases that are transmitted by mosquitoes and other insects as climate change influences the environments in which these vectors breed and live. Diseases that have the potential to become epidemics or pandemics will continue to challenge public health and sanitation measures.

Geomagnetic storms have been included in this risk assessment because they, like mega droughts, are rare but have potentially devastating consequences for the city and the nation. The danger posed by this hazard has grown as the critical infrastructures we depend upon have become ingrained in every aspect of our lives. As with Electromagnetic Pulse (EMP), the human-caused equivalent resulting from nuclear detonations, the potential danger posed by geomagnetic storms continued to be the subject of study and debate. Although the potential national and global impact of geomagnetic storms (and EMP) goes far beyond the ability of the city to manage, it remains for us to be aware of this hazard, assess its potential impact on our critical infrastructures and implement appropriate measures to ensure local resilience.

Westminster is susceptible to numerous, metrological, geological and entomological natural hazards. Many of these hazards present the possibility of triggering additional natural and human-caused hazards. Some of the hazards we have identified have the potential to profoundly affect our residents, our economy, our critical infrastructures, environment and way of life.

## 5 MITIGATION STRATEGY

*Requirement §201.6(c)(3): [The plan shall include] a mitigation strategy that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools.*

This section describes the mitigation strategy process and mitigation action plan for the City of Westminster's Hazard Mitigation Plan. It explains how the city accomplished Phase 3 of FEMA's 4-phase guidance—Develop the Mitigation Plan—and Step 6 of FEMA's 9-step planning process – Develop a Mitigation Strategy - and includes the following from the CRS 10-step planning process:

- Planning Step 6: Set Goals
- Planning Step 7: Review Possible Activities
- Planning Step 8: Draft an Action Plan

### 5.1 MITIGATION STRATEGY: OVERVIEW

The results of the planning process, the risk assessment, the goal setting and the identification of mitigation actions are captured in this mitigation strategy and mitigation action plan. As part of the 2018 plan update process, a comprehensive review and update of the mitigation strategy portion of the plan was conducted by the HMPC. Some of the goals and objectives from the 2010 plan were revisited, reaffirmed and refined. The result is a mitigation strategy that reflects the updated risk assessment, progress on mitigation actions and the new priorities of this plan update. To support the updated goals, the mitigation actions from 2010 were reviewed and assessed for their value in reducing risk and vulnerability to the planning area from identified hazards and evaluated for their inclusion in this plan update (See **Section 5.4.1**). **Section 5.2** below identifies the current goals and objectives of this plan update and **Section 5.4.2** details the updated mitigation action plan.

### 5.2 GOALS AND OBJECTIVES

*Requirement §201.6(c)(3)(i):*

*[The hazard mitigation strategy shall include a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.*

Up to this point in the planning process, the Hazard Mitigation Planning Committee (HMPC) has organized resources, assessed natural hazards and documented mitigation capabilities. A profile of the City of Westminster's vulnerability to natural hazards resulted from this effort, which is documented in the preceding chapter. The resulting goals, objectives and mitigation actions were developed based on this profile. The HMPC developed the new updated mitigation strategy based on a series of meetings and worksheets designed to achieve a collaborative mitigation planning effort, as described further in this section. The goals for this plan were developed and updated by the HMPC based on the plan's risk assessment. This analysis of the risk assessment identified areas where improvements could be made and provided the framework for the HMPC to update planning goals and objectives and the mitigation strategy for the City of Westminster.

Goals were defined for mitigation plan as broad-based public policy statements that:

- Represent basic desires of the community
- Encompass all aspects of community, public and private
- Are nonspecific, in that they refer to the quality (not the quantity) of the outcome
- Are future-oriented, in that they are achievable in the future
- Are time-independent, in that they are not scheduled events.

Goals are stated without regard for implementation, that is, implementation cost, schedule, and means are not considered. Goals are defined before considering how to accomplish them so that the goals are not dependent on the means of achievement. Goal statements form the basis for objectives and actions that will be used as means to achieve the goals. Objectives define strategies to attain the goals and are more specific and measurable.

Based upon the risk assessment review and goal setting process, the HMPC developed the following goals with several objectives and associated mitigation measures. These were revisited and validated by the HMPC during the 2018 HMP update process. There were minor language changes to Goal 3 to include internal partners, not just external, as the HMPC saw this as an opportunity to strengthen both internal and external relationships. These goals and objectives also provide the direction for reducing future hazard-related losses within the City of Westminster.

***Goal 1: Increase Community Awareness of Westminster’s Vulnerability to Natural Hazards***

**Objective 1.1:** Inform and educate the community about the types of hazards the City of Westminster is exposed to, where they occur and recommended responses

- Create an outreach program:
  - Provide self-help resources and training
  - Describe mitigation alternatives
  - Identify funding sources

***Goal 2: Reduce Vulnerability of People, Property, and the Environment to Natural Hazards***

**Objective 2.1:** Provide mechanisms to enhance life safety

**Objective 2.2:** Reduce impacts to critical facilities and services

- Identify and protect the most “critical” facilities
- Protect hazardous materials locations

**Objective 2.3:** Reduce impacts to existing buildings to the extent possible

**Objective 2.4:** Reduce impacts to future development to the extent possible

**Objective 2.5:** Reduce impacts to the city’s natural resources

**Objective 2.6:** Reduce impacts to public health (natural health hazards, not biochemical terrorism)

***Goal 3: Increase Internal and Interagency Capabilities and Coordination to Reduce the Impacts of Natural Hazards***

**Objective 3.1:** Improve planning coordination

**Objective 3.2:** Improve funding coordination

**Objective 3.3:** Improve response coordination

**5.3 IDENTIFICATION AND ANALYSIS OF MITIGATION ACTIONS**

*Requirement §201.6(c)(3)(ii):*

*[The mitigation strategy shall include a] section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure.*

*[The mitigation strategy] must also address the jurisdiction’s participation in the National Flood Insurance Program (NFIP), and continued compliance with NFIP requirements, as appropriate.*

To identify and select mitigation measures to support the mitigation goals, each hazard identified in **Section 4.1: Identifying Hazards** was evaluated. Once it was determined which hazards warranted the development of specific mitigation measures, the HMPC analyzed a set of viable mitigation alternatives that would support

identified goals and objectives. Each HMPC member was provided with the following list of categories of mitigation measures, which originate from the Community Rating System:

- Prevention
- Property Protection
- Structural Projects
- Natural Resource Protection
- Emergency Services
- Public Information

The HMPC members were also provided with several lists of alternative multi-hazard mitigation actions for each of the above categories (See **Appendix D** for more discussion and examples of the actions considered). A facilitated discussion then took place to examine and analyze the alternatives. With an understanding of the alternatives, a brainstorming session was conducted to generate a list of preferred mitigation actions.

### 5.3.1 PRIORITIZATION PROCESS

Once the mitigation actions were identified, the HMPC was provided with several decision-making tools, including FEMA's recommended prioritization criteria, STAPLEE sustainable disaster recovery criteria and others to assist in deciding why one recommended action might be more important, more effective, or more likely to be implemented than another. STAPLEE stands for the following:

- Social: Does the measure treat people fairly? (e.g., different groups, different generations)
- Technical: Is the action technically feasible? Does it solve the problem?
- Administrative: Are there adequate staffing, funding and other capabilities to implement the project?
- Political: Who are the stakeholders? Will there be adequate political and public support for the project?
- Legal: Does the jurisdiction have the legal authority to implement the action? Is it legal?
- Economic: Is the action cost-beneficial? Is there funding available? Will the action contribute to the local economy?
- Environmental: Does the action comply with environmental regulations? Will there be negative environmental consequences from the action? In accordance with the DMA requirements, an emphasis was placed on the importance of a benefit-cost analysis in determining action priority. Other criteria used to assist in evaluating the benefit-cost of a mitigation action includes: Does the action address hazards or areas with the highest risk?
- Does the action protect lives?
- Does the action protect infrastructure, community assets or critical facilities?
- Does the action meet multiple objectives (Multiple Objective Management)?
- What will the action cost?
- What is the timing of available funding?

The mitigation categories, multi-hazard actions and criteria are included in Appendix D: Mitigation Categories, Alternatives and Selection Criteria.

Team members were then asked to prioritize projects with the above criteria in mind. After determining the initial hierarchy of how the actions should be ranked through discussion at the HMPC meeting, team members further discussed their reasoning for the prioritization with side-bar meetings in follow-up to the meeting. This process provided the end priority for the new mitigation actions identified in 2018. The priority levels on existing mitigation actions continuing in the plan from 2010 were also revisited using this process, and in some cases revised to reflect current priorities. The process of identification and analysis of mitigation alternatives allowed the HMPC to come to consensus and to prioritize recommended mitigation actions. During the voting process, emphasis was placed on the importance of a benefit-cost review in determining project priority; however, this was not a quantitative analysis. After completing the prioritization exercise, some team members expressed concern that prioritizing all the actions as a group is not very effective, since many of the actions are department-specific. However, the team agreed that prioritizing the actions collectively enabled the actions to be ranked in order of relative importance and helped steer the development of additional actions that meet the more important objectives while eliminating some of the actions which did not garner much support. Benefit-cost was also

considered in greater detail in the development of the Mitigation Action Plan detailed below in **Section 5.4**. Specifically, each action developed for this plan contains a description of the problem and proposed project, the entity with primary responsibility for implementation, any other alternatives considered, a cost estimate, expected project benefits, potential funding sources and a schedule for implementation. Development of these project details for each action led to the determination of a High, Medium or Low priority for each.

Recognizing the limitations in prioritizing actions from multiple departments and the regulatory requirement to prioritize by benefit-cost to ensure cost-effectiveness, the HMPC decided to pursue: mitigation action strategy development and implementation according to the nature and extent of damages; the level of protection and benefits each action provides; political support; project cost; available funding; and individual jurisdiction and department priority.

This process drove the development of an updated, prioritized action plan for the City of Westminster. Cost-effectiveness will be considered in greater detail through performing benefit-cost project analyses when seeking FEMA mitigation grant funding for eligible actions associated with this plan.

## 5.4 MITIGATION ACTION PLAN

*Requirement §201.6(c)(3)(iii):*

*[The mitigation strategy shall include] an action plan describing how the actions identified in section (c)(3)(ii) will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated losses.*

This section outlines the development of the updated mitigation action plan. The action plan consists of specific projects, or actions, designed to meet the plan’s goals. Over time the implementation of these projects will be tracked as a measure of demonstrated progress on meeting the plan’s goals. If completed, these projects will help to reduce the vulnerability of property, city infrastructure and people from loss or destruction.

The HMPC and the City of Westminster also realize that if a disaster or large-scale event occurs, the priority level of these mitigation projects may change.

### 5.4.1 PROGRESS ON PREVIOUS MITIGATION ACTIONS

During the 2018 update process, the HMPC reviewed and evaluated the 2010 mitigation strategy to determine the status of the actions. The purpose of this was to measure progress by determining which actions were completed, and to revisit the remaining items to determine if they should be carried forward or removed from the plan. The 2010 mitigation strategy contained 7 separate mitigation actions. Of these, two have been completed and five are continued in this 2018 update. The actions that have been completed are shown in **Table 5.1**. The review shows that progress has been made since 2010. Implementation of the actions has resulted in greater community awareness of Westminster’s vulnerability to natural hazards and reduced vulnerability for hazards such as flood. These actions have increased the response capabilities of the city, and thus will help save lives in future incidents. **Table 5.2** lists 4 actions from the 2010 plan being carried forward, as well as 15 new mitigation actions. More detailed descriptions of those actions follow. Completed Mitigation Actions from 2012 Plan.

**Table 5.1 Completed Mitigation Actions from 2012 Plan**

Hazard(s)	Action Description	Status	Comments/Progress
Flood/Stormwater - 1	Little Dry Creek Regional Detention Facility and Greenway Improvements near future Regional Transportation Department (RTD) FasTracks South Westminster Station	Completed	Community Development Department was lead.

Hazard(s)	Action Description	Status	Comments/Progress
Flood/Stormwater - 3	Impervious vs. Pervious Surface Mapping	Completed	Community Development Department conducts updates routinely.

#### 5.4.2 COMPLETED MITIGATION ACTIONS NOT IDENTIFIED IN 2010

The HMPC identified several mitigation projects that have been completed since 2010 but were identified in the 2010 plan. These mitigation actions include:

- Addressing climate change mitigation through investments in solar energy and greenhouse gas reduction program
- Hire of the city's first Sustainability Officer
- Conducted risk assessment
- Converted open space for flood control
- Continuous hazard awareness, mitigation and preparedness outreach using social media (Facebook)
- Development of natural hazards contact list
- Ditch companies doing some mitigation work with post-2013 flood recovery funding
- Documented lessons learned after 2013 floods
- Drought Management Plan – updated through Public Works
- Improved engagement between emergency management and the public on the HIRA
- Improvements to the McKay Drainageway Detention Facility
- Little Dry Creek drainage and flood control project
- Pilot project for green infrastructure
- Shaw Boulevard stormwater drainage project
- Source water protection plans/call downs in case of hazmat spill or natural hazard impacts
- Standley Lake bypass for water contamination
- Standley Lake High School was wired with generator hook-ups with FEMA funding

#### 5.4.3 CONTINUED COMPLIANCE WITH NFIP

Given the flood hazard and risk in the planning area, and recognizing the importance of the NFIP in mitigating flood losses, an emphasis has been placed on continued compliance with the NFIP by the City of Westminster. As of May 2013, the City of Westminster was listed as a Class 6 CRS Community. As an NFIP and CRS participating community, the city has and will continue to make every effort to remain in good standing with NFIP. This includes continuing to comply with the NFIP's standards for updating, adopting, and maintaining floodplain maps and maintain and updating the floodplain zoning ordinance. There are several action items identified in **Table 5.2** that address specifics related to NFIP continued compliance. Other details related to NFIP participation are discussed in the community capabilities **Section 2.5** of this plan and the flood vulnerability discussion in **Section 4.3.9**.

#### 5.4.4 UPDATED MITIGATION ACTION PLAN

A summary of the action items is captured in **Table 5.2**, including a description of the action priority, the year the action was first identified, the timeframe for implementation, what goals the action is linked to and the priority for the action. For each identified project, a worksheet designed to capture additional details was filled out by the HMPC member or organization taking the lead on project implementation. These details include: project background, other alternatives considered, responsible entity, priority, cost, benefits (losses avoided) and potential funding. Actions that were identified in the 2010 plan and carried forward in this plan update also have a description of progress to date. As the city is largely built out, many of these mitigation actions are intended to reduce impacts to existing development. Actions that protect future development from hazards, as required per the DMA 2000 regulations, are addressed by the city's continued compliance with the NFIP and CRS as well as through implementation of the Westminster Municipal Code, Westminster Comprehensive Plan and building code enforcement. See the discussion in **Section 2.5.1** related to these existing policies and regulations.

It is important to note that the City of Westminster has numerous existing, detailed project descriptions (including structural flood hazard mitigation and stormwater drainage projects) in other planning documents, such as the Westminster Comprehensive Plan and the Westminster Emergency Operations Plan. These projects are considered to be part of this plan, and the details, to avoid duplication, should be referenced in their original source document. Many of these studies include more detailed alternatives analysis and benefit-cost analyses. The city also realizes that new project needs and priorities may arise because of a disaster or other circumstances and reserves the right to support these projects, as necessary, as long as they conform to the overall goals of this plan.

**Table 5.2 City of Westminster Mitigation Action Plan Summary**

City of Westminster Action		Responsible Department/Division	Status	Priority	Estimated Cost	Potential Funding	Link to Goals*
<b>Multi-Hazard Actions</b>							
MH1	Natural Hazards Public Information Booths and Outreach	Fire Department/Emergency Management	Continuing from 2010	High	Staff Time	City of Westminster Fire Department/Emergency Management	1,2
MH2	Natural Hazards Information on Social Media	Fire Department/Emergency Management	Continuing from 2010	High	Staff Time	City of Westminster Fire Department/Emergency Management	1,2
MH3	Additional Awareness/Warning Systems	Emergency Management	New in 2018	Medium	\$45,000	Emergency Management Operations Budget	1,2
MH4	Public outreach in multiple languages	Emergency Management	New in 2018	Low	None	Emergency Operations budget	1,2
MH5	Local Climate Change Awareness	Sustainability Office, General Services, Economic Development	New in 2018	High	TBD	General Fund	1,2
<b>Flood Actions</b>							
F1	Continued Floodplain Land Acquisition	Community Development	Continuing from 2010	High	Land purchased at fair market value	Community Development	2,3
F2	Continued compliance with NFIP and potential improved CRS rating	Community Development	Continuing from 2010	Low	Staff Time	City of Westminster	2,3
F3	Address areas needing storm sewer upgrades	Community Development	New in 2018	Medium	None	Storm Water Utility Fund	2,3
F4	Obtain elevation certificates for all structures in SFHA	Community Development	New in 2018	Low	\$100,000	Stormwater Utility Fund	2
F5	LID policy for transit oriented development at Westminster Station	Community Development	New in 2018	Low	\$25,000	General Capital Improvement Fund	2
<b>Drought Actions</b>							
D1	Update Drought Management Plan	Public Works and Utilities	Continuing from 2010	Medium	Staff Time	Public Works and Utilities and Community Development	1,2,3
<b>Invasive Species Actions</b>							

City of Westminster Action		Responsible Department/Division	Status	Priority	Estimated Cost	Potential Funding	Link to Goals*
IS-1	Promote water wise and infestation resistant tree programs	Parks, Recreation and Libraries	New in 2018	Low	Staff Time	N/A	1,2
IS-2	Continue invasive species awareness/inspection	Parks, Recreation and Libraries	New in 2018	Low	Staff Time	N/A	1,2
<b>Open Space Fire / Wildfire / Erosion, Deposition and Turbidity Actions</b>							
OSF -1	Clear Creek Watershed Protection and Wildfire Mitigation	Public Works and Utilities – Water Resources & Quality Division	New in 2018	High	<\$100,000/year	Water Utility Fund Operating Budget along with Federal Grant Funding	2,3
OSF -2	Open Space Fire Mitigation	Parks, Recreation and Libraries/ Open Space and Fire Department	New in 2018	Low	Staff Time	N/A	2,3
OSF -3	Filter waste to Semper Water Treatment Facility	Public Works and Utilities	New in 2018	Medium	\$3 Million	Grants	2
<b>Winter Storm Actions</b>							
WS1	Protect Water Storage Tanks from Winter Storm Damage	Public Works and Utilities	New in 2018	Medium	\$4,600,000	City funds, Grants	2,3
<b>Weather Extremes Actions</b>							
WE1	Become a National Weather Service StormReady community	Emergency Management	New in 2018	Low	None	Emergency Management Operations budget	1,2,3
WE2	Business Mitigation, Preparedness and Continuity Information	Emergency Management with Chamber of Commerce	New in 2018	Low	None	Emergency Management Operations budget	2,3
WE3	Grid Resiliency	Chief Sustainability Officer	New in 2018	Medium	TBD	Financing/leasing options currently exist for solar	2,3

Goal 1: Increase Community Awareness of Westminster's Vulnerability to Natural Hazards

Goal 2: Reduce Vulnerability of People, Property, and the Environment to Natural Hazards

Goal 3: Increase Internal and Interagency Capabilities and Coordination to Reduce the Impacts of Natural Hazards

**Table 5.3 Mitigation Actions and CRS Mitigation Categories Matrix**

Mitigation Action ID	Prevention	Property Protection	Structural Protection	Natural Resource Protection	Emergency Services	Public Information
MH1						✓
MH2						✓
MH3					✓	
MH4						✓
MH5						✓
F1	✓			✓		
F2		✓			✓	✓
F3			✓			
F4		✓	✓			
D1	✓				✓	✓
IS1		✓		✓		✓
IS2	✓			✓		
OSF1	✓			✓	✓	
OSF2	✓	✓		✓	✓	
OSF3	✓				✓	
WS1	✓	✓	✓			
WE1					✓	✓
WE2	✓					✓
WE3	✓	✓	✓		✓	

**MULTI-HAZARD MITIGATION ACTIONS**

***MH-1. Natural Hazards Public Information Booths and Outreach***

**Project Description/ Background:** The City of Westminster strives to keep its citizens and employees educated about ways that they can help protect themselves, their families, their homes and their businesses from the potential destruction that can be caused by a natural hazard event. Having information about the potential hazards, available resources and prevention information is essential for helping to mitigate the effects of a potential disaster. Information on the following hazards will be provided:

- Climate Change
- Dam Failure
- Drought
- Earthquakes
- Extreme Temperatures
- Floods
- Geomagnetic Storms
- Hailstorms
- Heavy Rains/Storms
- Human Health Hazards
- Lightning
- Severe Weather
- Swelling Soils
- Tornadoes
- Wildland Fire
- Windstorms
- Winter Storms

Each year, the Westminster Fire Department participates in numerous public events, in which displays and information booths are set up. In the fall, the city hosts a Business Appreciation Event, which attracts businesses

from around the city. The HMPC decided that these events would provide the perfect opportunity for displaying information about the natural hazards that have the potential to occur within the city. The Emergency Management Coordinator is available to answer any questions and the city's adopted Natural Hazards Mitigation Plan would be available for review. The EMC also routinely shares natural hazard information during presentations to public/civic organization and through social media and our web page.

**Other Alternatives:** no action

**Responsible Office:** City of Westminster Fire Department/ Emergency Management Coordinator

**Priority (High, Medium, Low):** High

**Cost Estimate:** This mitigation action would come at virtually no cost, except for reproduction and display construction costs.

**Benefits (Avoided Losses):** Further educates the public on the natural hazards that could potentially affect their families, pets, homes, businesses, property etc. Provides informational resources and increases awareness for self-protective measures. Provides the public with an opportunity to review the City of Westminster's Hazard Mitigation Plan and to ask questions.

**Potential Funding:** City of Westminster Fire Department/Emergency Management

**Schedule:** Continuous

**Status:** Continuing from 2010

## ***MH-2. Natural Hazards Information on Social Media***

---

Project Description/ Background: The City of Westminster strives to keep its citizens and employees educated about ways that they can help protect themselves, their families, their homes and their businesses from the potential destruction that can be caused by a natural hazard event. Having information about the potential hazards, available resources and prevention information is essential for helping to mitigate the effects of a potential disaster. This ongoing social media effort provides information on the following hazards, which were all identified as potential hazards in this plan:

- Climate Change
- Dam Failure
- Drought
- Earthquakes
- Extreme Temperatures
- Floods
- Geomagnetic Storms
- Hailstorms
- Heavy Rains/Storms
- Human Health Hazards
- Lightning
- Severe Weather
- Swelling Soils
- Tornadoes
- Wildland Fire
- Windstorms
- Winter Storms

The City of Westminster currently has various information pamphlets available to the public that provide information about specific hazards. However, the HMPC thinks that developing an All-Hazard Information

Pamphlet would be a comprehensive way for providing hazards information to the public. The pamphlet would include information on each hazard that could potentially occur in Westminster, self-preventative measures, information on what to do if a hazard event occurs and resources for further information.

The City of Westminster routinely shares information about our natural hazards on social media. This allows seasonal information that is linked to additional information on hazards, mitigation and preparedness on the Westminster Emergency Management web page ([www.cityofwestminster.us/EmergencyManagement](http://www.cityofwestminster.us/EmergencyManagement)) as well as other county, state and federal resources.

**Other Alternatives:** no action

**Responsible Office:** City of Westminster Fire Department/ Emergency Management Coordinator

**Priority (High, Medium, Low):** High

**Cost Estimate:** \$5,000 (printing and promotion)

**Benefits (Avoided Losses):** Further educates the public on the natural hazards that could potentially affect their families, pets, homes, businesses, property, etc. Provides informational resources and increases awareness for self-protective measures. Also provides information in an easy to read, concise format that can be saved for later reference and provides links to additional resources.

**Potential Funding:** City of Westminster Fire Department / Emergency Management

**Schedule:** Continuous

**Status:** Continuing from 2010

### ***MH-3. Additional Awareness/Warning Systems***

---

**Project Description/ Background:** Westminster has relatively limited and infrequent experience with natural disasters and our large non-Colorado native population has created a lack of hazard awareness. The city currently utilizes CodeRed, but could increase awareness and warning through additional activities and systems.

**Other Alternatives:** Depend on the National Weather Service for hazard awareness and warning.

**Responsible Office:** Emergency Management Coordinator

**Priority (High, Medium, Low):** Medium

**Cost Estimate:** \$45,000.00

**Benefits (Avoided Losses):** Protect residents, property, economic and community activity through hazard awareness, mitigation and warning.

**Potential Funding:** Emergency Management Operations Budget

**Schedule:** Continuous

**Status:** New in 2018

#### ***MH-4. Public Outreach in Multiple Languages***

---

**Project Description/ Background:** Approximately 23-percent of our population speak English as a second language. 20-percent of our residents are Hispanic and three-percent are Southeast Asian. Language and cultural factors may limit the effectiveness of efforts to encourage hazard awareness, mitigation and preparedness. This project would develop public outreach material on hazards in multiple languages to broaden hazard awareness and encourage personal responsibility for protection of life and property.

**Other Alternatives:** Take no action to improve outreach and accessibility to our non-native English-speaking residents.

**Responsible Office:** Emergency Management Coordinator

**Priority (High, Medium, Low):** Medium

**Cost Estimate:** None

**Benefits (Avoided Losses):** Spanish, Hmong and Vietnamese materials help engage these residents and promotes personal, family, business and community mitigation and preparedness to protect lives, property and business activity.

**Potential Funding:** Emergency Management Operations Budget

**Schedule:** Continuous

**Status:** New in 2018

#### ***MH-5. Local Climate Change Awareness***

---

**Project Description/ Background:** The City of Westminster recognizes that climate is changing and exacerbating several natural hazards (drought, flooding, extreme cold/heat, invasive and noxious species, pandemics/epidemics, etc.). CO2 emissions are widely recognized as a contributing factor to climate change. The city plans on engaging in the following efforts:

- Develop a greenhouse gas emissions inventory for city operations and the community
- Develop a Sustainability Plan that will cover climate mitigation and adaptation issues
- Inform citizens and businesses about actions they can take to reduce energy use and save money
- Participate in regional efforts to address climate issues (e.g., Colorado Communities for Climate Action (CC4CA))
- Increase energy efficiency and renewable energy in city facilities
- Partner with Xcel Energy on developing a Reduced Energy District in Downtown Westminster
- Identify options for transitioning appropriate vehicles in the city's fleet to electric vehicles.

**Other Alternatives:** Ignore current trends as documented and projected by the available scientific research and seriously compromise the environmental and economic future of the community.

**Responsible Office:** Sustainability Office, General Services, Economic Development.

**Priority (High, Medium, Low):** High

**Cost Estimate:** TBD

**Benefits (Avoided Losses):** Accountability to our residents to promote local efforts as part of a global solution. Reduced operating costs to city operations, residents and businesses (buildings and vehicles). Contribute to air quality improvements by using less fossil-fuel energy and increasing the use of renewable energy.

**Potential Funding:** General Fund

**Schedule:** Continuous

**Status:** New in 2018

## FLOOD MITIGATION ACTIONS

### ***F-1. Continued Floodplain Land Acquisition***

---

**Project Description/ Background:** In the past, the City of Westminster has made acquiring land that resides within the 100-year floodplain a priority for ensuring safety and reducing the risk for loss of life or property damage. However, there are still properties that have not been obtained that the City of Westminster would like to purchase in the future. Due to the sensitive nature of this project and the public availability of this plan, the City of Westminster will not release prospective property locations.

**Other Alternatives:** Elevation of properties which continues to leave property at risk to large flood events.

**Responsible Office:** Community Development Department

**Priority (High, Medium, Low):** High

**Cost Estimate:** Land will be purchased at fair market value

**Benefits (Avoided Losses):** By purchasing land or property that resides in a potentially hazardous area, the city will further decrease the chance of life loss, and costs due to property damage from flooding. Purchased land is turned over to the city's Open Space Department and is monitored/ maintained. More open space within the city also provides for esthetic benefits as well. Floodplain acquisition also earns points towards improving the city's CRS rating, which is another outlined project in this plan.

**Potential Funding:** City of Westminster Community Development Department

**Schedule:** Continuous

**Status:** Continuing from 2010

### ***F-2. Continued Compliance with NFIP and Potential Improved CRS Rating***

---

**Project Description/ Background:** A community's participation and compliance with NFIP ensures that a community manages ordinances to reduce future flood damage. In exchange, the NFIP makes federally backed flood insurance available to homeowners, renters and business owners in these communities. The Community Rating System (CRS) is a way to gauge a community's compliance level and makes community with higher (better) CRS ratings eligible for insurance discounts. The City of Westminster currently stands with a CRS rating of 6. It is the goal of the city to continue to comply with NFIP standards and potentially take steps that would further improve the rating from a 6 to a 5.

**Other Alternatives:** Continued compliance and maintenance of CRS 6 rating

**Responsible Office:** Community Development Department

**Priority (High, Medium, Low):** Low

**Cost Estimate:** Staff Time

**Benefits (Avoided Losses):** The potential for further discounts on insurance would exist.

**Potential Funding:** City of Westminster

**Schedule:** Continuous

**Status:** Continuing from 2010

***F-3. Address Areas Needing Storm Sewer Upgrades to Mitigate Flooding***

---

**Project Description/ Background:**

The following areas will be investigated for drainage improvements or other flood mitigation:

- Improve storm sewer system along Wadsworth Blvd. from BNSF Railroad to Big Dry Creek.
- 94th Ave. between Raleigh & Quitman - open channel. Re-route or move drainage underground.
- Address bottle neck culvert crossings along Walnut Creek.
- Little Dry Creek channel improvements upstream from Lowell Blvd.

**Other Alternatives:** Continue current maintenance practice removal of debris from these locations before and after each storm event.

**Responsible Office:** Community Development Department

**Priority (High, Medium, Low):** Medium

**Cost Estimate:** None

**Benefits (Avoided Losses):** Resolve flooding issues at these locations. Minimize property damage.

**Potential Funding:** Stormwater Utility Fund

**Schedule:** Future scheduling as funding allows

**Status:** New in 2018

***F-4. Obtain elevation certificates for all structures in Special Flood Hazard Area***

---

**Project Description/ Background:** Elevation Certificates compare the structure elevation to the Base Flood Elevation associated with the adjacent FEMA Special Flood Hazard Area (SFHA). This information will help the city give better advice the residents on flood-proofing or mitigation measures to reduce risk to the structure.

**Other Alternatives:** no action

**Responsible Office:** Community Development Department

**Priority (High, Medium, Low):** Low

**Cost Estimate:** \$100,000

**Benefits (Avoided Losses):** Minimize property damage from flooding. May also help reduce flood insurance costs for certain properties. Also needed as part of CRS program participation.

**Potential Funding:** Stormwater Utility Fund

**Schedule:** 2020

**Status:** New in 2018

## DROUGHT MITIGATION ACTIONS

### ***D-1. Update Drought Management Plan***

---

**Project Description/ Background:** Colorado and the Front Range have experienced drought events throughout history. Droughts will continue to occur and the City of Westminster is committed to recognizing droughts that will affect water supply availability and to respond appropriately to these droughts. In 2002, the City of Westminster developed a drought guidance document that outlines specific options available to the city during a severe drought. This project is intended to update current documents and plans, develop new tools, and research ways the city may further mitigate the effects that a severe drought would have on the city. Some aspects of the drought program update include:

- GIS overlay of the irrigated areas within the city for watering restrictions
- GIS overlay that identifies unrestricted water usage during drought free periods
- Drought response strategies, including options for watering restrictions and public education.

These would help to determine the potential water reductions available for each account to conserve water for the city during a drought.

**Other Alternatives:** rely on outdated plan

**Responsible Office:** Public Works and Utilities and Community Development

**Priority (High, Medium, Low):** Medium

**Cost Estimate:** Staff Time

**Benefits (Avoided Losses):** This project is intended to further mitigate the effects that a severe drought would have on the City of Westminster by improving the drought guidance document by adding tools for drought response planning. This document and the related resources would improve efficiency in handling drought conditions and would help the city to gain a better assessment of drought conditions and respond suitably to these conditions.

**Potential Funding:** Public Works and Utilities

**Schedule:** Due for update in 4<sup>th</sup> quarter of 2018

**Status:** Continuing from 2010

## INVASIVE SPECIES MITIGATION ACTIONS

### ***IS-1. Promote Water Wise and Infestation Resistant Tree Programs***

---

**Project Description/ Background:** Much of the urban landscape of Westminster is based on non-native trees that may require more water than native species. We are also experiencing invasive species (Emerald Ash Borer) that threatens a significant percentage of our urban trees. This project would promote water wise and infestation resistant tree programs as a drought mitigation and invasive species mitigation action.

**Other Alternatives:** Let nature and economic forces take their course.

**Responsible Office:** Parks, Recreation and Libraries

**Priority (High, Medium, Low):** Low

**Cost Estimate:** Staff Time

**Benefits (Avoided Losses):** Raising awareness of the benefits of planting water wise trees and landscaping can help reduce water consumption and make our urban landscape more resilient to drought. Emerald Ash Borer awareness and mitigation helps reduce this hazard and preserve existing trees.

**Potential Funding:** n/a

**Schedule:** Continuous

**Status:** New in 2018

### ***IS-2. Invasive Species Prevention***

---

**Project Description/ Background:** Standley Lake is the city's primary water storage facility and an important recreational area for our residents. Several aquatic nuisance species have been identified as potential threats to our water supply infrastructure and native species.

**Other Alternatives:** Prevent the use of Standley Lake as a recreational facility.

**Responsible Office:** Parks, Recreation and Libraries

**Priority (High, Medium, Low):** Low

**Cost Estimate:** Staff Time

**Benefits (Avoided Losses):** Preserving and protecting our water infrastructure and recreational facilities.

**Potential Funding:** n/a

**Schedule:** Continuous

**Status:** New in 2018

## **OPEN SPACE FIRE / WILDFIRE / EROSION, DEPOSITION, AND TURBIDITY MITIGATION ACTIONS**

### ***OSF-1. Clear Creek Watershed Protection and Wildfire Mitigation***

---

**Project Description/ Background:** Clear Creek represents 90 percent of the city's water supply and is prone to significant wildfires. Wildfire could cripple the city's ability to divert water for treatment and can produce water that current water treatment process is unable to treat. This project is looking at a variety of methods to reducing wildfire risk in the watershed – largely through forest management practices and inter-organizational cooperation.

**Other Alternatives:** Treating for the effects of a wildfire after the fact is another option, but is much less effective and puts the city's water supply at significant risk in the meantime.

**Responsible Office:** Public Works & Utilities – Water Resources & Quality Division

**Priority (High, Medium, Low):** High

**Cost Estimate:** <\$100,000/year

**Benefits (Avoided Losses):** Protection of water supply. Losses could be catastrophic with loss of ability to provide a public water supply to the residents, businesses and industries of the community.

**Potential Funding:** Water Utility Fund Operating Budget along with Federal Grant Funding

**Schedule:** Continuous

**Status:** New in 2018

### ***OSF-2. Open Space Fire Mitigation***

---

**Project Description/ Background:** The city has over 3,000 acres of managed open space, much of it maintained as native grass and woodlands. These open spaces abut built environments in many areas and could present a wildfire/urban conflagration hazard during dry/drought periods and high wind events. This project would entail fuels management on city open space to reduce the potential for wildfires that could affect adjacent property.

**Other Alternatives:** no action, accept the potential hazard.

**Responsible Office:** Parks, Recreation and Libraries/Open Space and the Fire Department

**Priority (High, Medium, Low):** Low

**Cost Estimate:** Staff Time

**Benefits (Avoided Losses):** Maintaining the health and recreational value of our open spaces while reducing the potential hazard to adjoining built environments and the public.

**Potential Funding:** n/a

**Schedule:** Continuous

**Status:** New in 2018

### ***OSF-3. Filter to Waste (FTW) Semper Water Treatment Facility (SWTF)***

---

**Project Description/ Background:** FTW is a treatment tool that would aid the potable water treatment process in the event of watershed disasters such as the floods of 2013 or a forest fire. These types of events would release large amounts of organic and mineral matter from the soil into streams that eventually feed the canals that supply Standley Lake. This could cause huge turbidity and soluble contamination increases in the raw water supply. These would ultimately have to be removed through the treatment process and the final step in that process is filtration. The ability to FTW allows filtration treatment strategies to be developed (filter conditioning and strengthening) and tested without putting the finished water supply at risk, even if the strategy fails and the filter breaks through. SWTF has no FTW system as this was not prevalent in water treatment plants 50 years ago when SWTF was built.

**Other Alternatives:** FTW is not considered practical to retrofit into the Semper WTF. Full FTW capability on all the SWTF's 25 filters would be prohibitively expensive. In addition, it is not clear how this system could be built deep in the basement (limited access) of the plant where the retrofit would have to be located. SWTF would have to remain operational during construction which is also problematic.

- SWTF has a retrofit filter-to-drain system, designed by staff, which allows for filter media replacement and conditioning which meets current filtration turbidity regulations
- The city has preliminary plans to build a third WTF by 2025 which will include advanced, state of the art treatment, including a FTW system
- The city's Northwest WTF (NWTF) is a membrane filtration plant which does not require FTW and could provide the city's total indoor domestic demand if the SWTF could not treat the water due to water quality issues
- The bypass supply system uses canal water directly and is a potential alternative water supply

**Responsible Office:** Public Works and Utilities

**Priority (High, Medium, Low):** Medium

**Cost Estimate:** \$3 Million

**Benefits (Avoided Losses):** Reduce the potential impacts to the city water supply from wildfire, erosion, deposition and turbidity. Reduced treatment costs.

**Potential Funding:** To be determined

**Schedule:** Continuous

**Status:** New in 2018

## WINTER STORM MITIGATION ACTIONS

### ***WS-1. Protect Water Storage Tanks from Winter Storm Damage***

---

**Project Description/ Background:** North Ridge Storage Tanks 1&2 are water storage tanks that are over 50 years old. Both tanks 1 and 2 have a 3-million-gallon capacity. A comprehensive tank inspection was last performed in 2012. Water tanks were drained and inspected by a certified engineer. The inspections have identified corrosion on the roof support beams. Heavy snow loads on the roofs of the storage tanks could lead to collapse of the roofs thus operational storage could be compromised.

**Other Alternatives:** Perform visual inspections of the roofs when heavy snow fall occurs.

**Responsible Office:** Public Works and Utilities

**Priority (High, Medium, Low):** Medium

**Cost Estimate:** \$4,600,000 for replacement of both storage tanks

**Benefits (Avoided Losses):** Replace both 3-million-gallon water storage tanks. Fire flow storage is reduced if we were to lose these tanks

**Potential Funding:** City of Westminster, grants

**Schedule:** Continuous

**Status:** New in 2018

## WEATHER EXTREME MITIGATION ACTIONS

### ***WE-1. Become a National Weather Service Storm Ready Community***

---

**Project Description/ Background:** The City of Westminster is subject to severe and extreme weather events which can endanger our residents, cause physical and economic losses and damage our environment. Becoming a National Weather Service Storm Ready Community would help raise public awareness of our weather hazards and encourage mitigation and preparedness.

**Other Alternatives:** Continue current outreach and weather hazard awareness without seeking NWS Storm Ready status.

**Responsible Office:** Emergency Management Coordinator

**Priority (High, Medium, Low):** Low

**Cost Estimate:** None

**Benefits (Avoided Losses):** Raise public awareness of our weather hazards and encourage mitigation and preparedness. Can also result in CRS program points.

**Potential Funding:** Emergency Management Operations Budget.

**Schedule:** Continuous

**Status:** New in 2018

### ***WE-2. Business Mitigation, Preparedness and Continuity Information***

---

**Project Description/ Background:** Our business community is vital to our economy and tax base. Natural hazards have the potential to disrupt business operations and essential services they provide to our citizens. Providing information to businesses on how they can prepare for weather extremes on their property may help with both business preparedness pre-hazard event and continuity post-hazard event.

**Other Alternatives:** Take no action to improve natural hazard awareness and business preparedness/continuity.

**Responsible Office:** Emergency Management Coordinator

**Priority (High, Medium, Low):** Low

**Cost Estimate:** None

**Benefits (Avoided Losses):** Promoting business preparedness, continuity and resilience can help prevent the disruption of essential services and protect the economic vitality of the community.

**Potential Funding:** Emergency Management Operations Budget.

**Schedule:** Continuous

**Status:** New in 2018

### ***WE-3. Grid Resiliency***

---

**Project Description/ Background:** Solar panels in combination with battery storage can provide uninterruptible power sources during those times when the grid is disrupted. Costs of solar and batteries are dropping significantly and will soon be cost-competitive (if not already cost-competitive for certain businesses). One barrier to further adoption of solar is the lack of information and confusion over how to work with contractors. Information on solar/battery options will be promoted through the city's sustainability pages for residents and the city's Economic Development webpage for businesses.

**Other Alternatives:** The Chamber of Commerce can also help in distributing information to businesses.

**Responsible Office:** Chief Sustainability Officer

**Priority (High, Medium, Low):** Medium

**Cost Estimate:** Costs depend on the size of the installed systems, and would be incurred by businesses and homeowners. Minimal cost to the city to promote the options.

**Benefits (Avoided Losses):** Reduced frequency of blackout/brownouts for individual homeowners and businesses. Businesses able to continuous operate during outages. Certainty of operations is important. Also, savings to businesses/homeowners from reduced energy costs.

**Potential Funding:** Financing/leasing options current exist for solar.

**Schedule:** Underway

**Status:** New in 2018

## 6 PLAN ADOPTION

*Requirement §201.6(c)(5):*

*[The local hazard mitigation plan shall include] documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval of the plan (e.g., City Council, county commissioner, Tribal Council).*

The purpose of formally adopting this plan is to secure buy-in from the City of Westminster, raise awareness of the plan and formalize the plan's implementation. The adoption of this plan completes CRS Planning Step 9 of the 10-step planning process: **Adopt the Plan**. The governing board for the City of Westminster, the City Council, has adopted this natural hazard mitigation plan by passing a resolution. A copy of the resolution and the executed copy are included in the appendices section of this document. The plan was originally adopted on November 8, 2010. Re-adoption occurred by City Council in September of 2018, following the 2017-18 update of the Plan.

## 7 PLAN IMPLEMENTATION AND MAINTENANCE

*Requirement §201.6(c)(4):*

*[The plan maintenance process shall include a] section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five- year cycle.*

Implementation and maintenance of the plan is critical to the overall success of hazard mitigation planning. This is CRS Planning Step 10 of the 10-step planning process. This chapter provides an overview of the overall strategy for plan implementation and maintenance and outlines the method and schedule for monitoring, updating and evaluating the plan. The chapter also discusses incorporating the plan into existing planning mechanisms and how to address continued public involvement.

### 7.1 IMPLEMENTATION

Implementation will be accomplished by adhering to the schedules identified for each mitigation action (see **Chapter 5**) and through pervasive efforts to network and highlight the multi-objective, win-win benefits of each project to the community and its stakeholders. These efforts include the routine actions of monitoring agendas, attending meetings and promoting a safe, sustainable community. The three main components of implementation are:

- IMPLEMENT the action plan recommendations of this plan
- UTILIZE existing rules, regulations, policies and procedures already in existence
- COMMUNICATE the hazard information collected and analyzed through this planning process so that the community better understands what can happen where, and what they can do themselves to protect their loved ones and property and be better prepared. Also, publicize the “success stories” that are achieved through the HMPC’s ongoing efforts.

An important implementation mechanism that is highly effective and low-cost is incorporation of the hazard mitigation plan recommendations and their underlying principles into other city plans and mechanisms, such as the 2007 Storm Drainage Study, the Westminster Comprehensive Plan the Emergency Operations Plan and capital improvement plans and budgets. The city has and continues to implement policies and programs to reduce the loss of life and property from natural hazard events. This plan builds upon the momentum developed through previous and related planning efforts and mitigation programs and recommends implementing projects, where possible, through these other program mechanisms.

Mitigation is most successful when it is incorporated into the day-to-day functions and priorities of government and development. This integration is accomplished by constant, pervasive and energetic efforts to network, identify and highlight the multi-objective, win-win benefits to each program, the Westminster community and its stakeholders. This effort is achieved through the routine actions of monitoring agendas, attending meetings and promoting a safe, sustainable community. Additional mitigation strategies could include consistent and ongoing enforcement of existing policies and vigilant review of city programs for coordination and multi-objective opportunities.

Simultaneous to these efforts, it is important to maintain a constant monitoring of funding opportunities that can be leveraged to implement some of the costlier recommended actions. This will include creating and maintaining a bank of ideas on how any required local match requirements of state and federal grants can be met. When funding does become available, the HMPC will be able to capitalize on the opportunity. Funding opportunities to be monitored include special pre- and post-disaster funds, state or federal earmarked funds and grant programs, including those that can serve or support multi-objective applications.

### 7.1.1 ROLE OF HAZARD MITIGATION PLANNING COMMITTEE IN IMPLEMENTATION AND MAINTENANCE

With re-adoption of this plan, the Hazard Mitigation Planning Committee (HMPC) will be tasked with plan implementation and maintenance. The HMPC, led by the City of Westminster Emergency Management Coordinator agrees to:

- Act as a forum for hazard mitigation issues
- Disseminate hazard mitigation ideas and activities to all participants
- Pursue the implementation of high-priority, low/no-cost recommended actions
- Keep the concept of mitigation in the forefront of community decision making by identifying plan recommendations when other community goals, plans and activities overlap, influences, or directly affect increased community vulnerability to disasters
- Maintain a vigilant monitoring of multi-objective cost-share opportunities to help the community implement the plan's recommended actions for which no current funding exists
- Monitor and assist in implementation and update of this plan
- Report on plan progress and recommended changes to the Westminster City Council
- Inform and solicit input from the public

The HMPC will not have any powers over city staff; it will be purely an advisory body. Its primary duty is to see the plan successfully carried out and to report to the community governing board and the public on the status of plan implementation and mitigation opportunities for the city. Other duties include reviewing and promoting mitigation proposals, considering stakeholder concerns about hazard mitigation, passing concerns on to appropriate entities and posting relevant information on the city's website and social media.

## 7.2 MAINTENANCE

Plan maintenance implies an ongoing effort to monitor and evaluate plan implementation and to update the plan as progress, roadblocks or changing circumstances are recognized

### 7.2.1 MAINTENANCE METHOD AND MONITORING SCHEDULE

To track progress and update the mitigation strategies identified in the action plan, the HMPC Group will revisit this plan at the following times or occurrences:

- Annually, to assess if projects have been completed
- Following a significant hazard event
- Following a disaster declaration
- Any other time the HMPC sees it is prudent or necessary.

The City of Westminster Emergency Management Coordinator is responsible for initiating this review and will consult with members of the HMPC. This review may occur in concert with CRS review and recertification. The suggested time frame for the annual review is in the spring, prior to flood and wildfire season. This will also position the city for grant and CRS review cycles that occur in the fall. A five-year written update to be submitted to the state and FEMA Region VIII, unless disaster or other circumstances (e.g., changing regulations) require a change to this schedule.

This plan will be updated, approved, and adopted within a five-year cycle as per Requirement §201.6(c)(4)(i) of the Disaster Mitigation Action of 2000. Efforts to begin the update should begin no later than January 2022. The city will monitor planning grant opportunities from the Colorado Division of Homeland Security and Emergency Management (DHSEM) and FEMA for funds to assist with the update. This may include submitting a Pre- Disaster Mitigation planning grant application. This grant should be submitted in 2021, as there is a three-year performance period to expend the funds, plus there is no guarantee that the grant will be awarded when initially submitted. This allows time to resubmit the grant in subsequent years, if needed. Updates to this plan will follow the most current FEMA and DHSEM planning guidance. This first plan update is anticipated to be completed and reapproved by DHSEM and FEMA Region VIII by May 2023.

## 7.2.2 MAINTENANCE EVALUATION PROCESS

Evaluation of progress can be achieved by monitoring changes in vulnerabilities identified in the plan. Changes in vulnerability can be identified by noting:

- Decreased vulnerability as a result of implementing recommended actions
- Increased vulnerability as a result of failed or ineffective mitigation actions
- Increased vulnerability as a result of new development (and/or annexation).

The HMPC will use the following process to evaluate progress, note changes in vulnerability and consider changes in priorities because of plan implementation:

- A representative from the responsible entity identified in each mitigation measure will be responsible for tracking and reporting to the HMPC when project status changes. The representative will provide input on whether the project as implemented meets the defined goals and objectives and is likely to be successful in reducing vulnerabilities.
- If the project does not meet identified goals and objectives, the HMPC will select alternative projects for implementation.
- New projects identified will require an individual assigned to be responsible for defining the project scope, implementing the project, monitoring the success of the project.
- Projects that were not ranked high priority but were identified as potential mitigation strategies will be reviewed as well during the monitoring and update of this plan to determine feasibility for future implementation.
- Changes will be made to the plan to accommodate projects that have failed or are not considered feasible after a review for their consistency with established criteria, the time frame, priorities, and/or funding resources.

Updates to this plan will follow the most current FEMA, DHSEM, and CRS planning guidance and consider the following:

- Consider changes in vulnerability due to project implementation
- Document success stories where mitigation efforts have proven effective
- Document areas where mitigation actions were not effective
- Document any new hazards that may arise or were previously overlooked
- Document hazard events and impacts that occurred within the five-year period
- Incorporate new capabilities or changes in capabilities
- Document continued public involvement
- Document changes to the planning process, which may include new or additional stakeholder involvement
- Incorporate growth and development-related changes to building inventories
- Incorporate new project recommendations or changes in project prioritization
- Include a public involvement process to receive public comment on the updated plan prior to submitting the updated plan to DHSEM/FEMA
- Include re-adoption by all participating entities following DHSEM/FEMA approval.

## 7.2.3 INCORPORATION INTO EXISTING PLANNING MECHANISM

The mitigation strategy in **Section 5.3 Mitigation Strategy** of this plan recommends using existing plans and/or programs to implement hazard mitigation in the city, where possible. The point is also emphasized previously in this chapter. Based on this plan's capability assessment, the city has and continues to implement policies and programs to reduce losses to life and property from natural hazard events. This plan builds upon the momentum developed through previous and related planning efforts and mitigation programs and recommends implementing projects, where possible, through the following mechanisms:

- Capital improvement plans and budgets
- City Code of Regulations

- City of Westminster Comprehensive Plan
- Fire plans
- Stormwater management plans
- Sustainability planning.

At the kick off meeting for the planning process, the HMPC discussed recent studies, plans and reports with a mitigation focus that have been performed for the city. The studies or plans discussed included:

- City of Westminster Comprehensive Plan
- City of Westminster Drought Mitigation Plan
- City of Westminster Emergency Plan and Management System
- Source Water Protection Plan
- Colorado Communities for Climate Change Study
- Surrounding counties and communities' mitigation plans
  - The Thornton/Federal Heights/Northglenn Hazard Mitigation Plan
  - Adams County Hazard Mitigation Plan
  - City and County of Broomfield Hazard Mitigation Plan
  - Jefferson County Multi-Hazard Mitigation Plan
- City of Westminster Sustainability Plan (in process of being updated)
- Drainage infrastructure study (partnership with Urban Drainage and Flood Control District)
- Public Works and Utilities All Hazards Risk Assessment Westminster Station Area Specific Plan
- Downtown Specific Plan
- City of Westminster Strategic Plan.

More information on these existing plans and planning mechanisms can be referenced in **Section 2.5**. HMPC members involved in the updates to these mechanisms will be responsible for integrating the findings and recommendations of this plan with these other plans, as appropriate. An upcoming plan integration project will bridge all city plans and include public and interdepartmental feedback. This will be in place for the HMPC members to reference in 2019. The mitigation plan can be considered as a “hub on the wheel” with spokes radiating out to other related planning mechanisms that will build from the information and recommendation contained herein.

#### 7.2.4 CONTINUED PUBLIC INVOLVEMENT

Continued public involvement is also imperative to the overall success of the plan's implementation. The update process provides an opportunity to publicize success stories from the plan implementation and seek additional public comment. At least one public meeting or workshop to receive public input will be held during the next update period. When the HMPC reconvenes for the update, they will coordinate with all stakeholders participating in the planning process-including those that joined the committee since the planning process began-to update and revise the plan. The plan maintenance and update process will include continued public and stakeholder involvement and input through attendance at designated committee meetings, web postings, social media and press releases to local media. Social media was a vital resource in the 2017-2018 update. Using the Westminster Emergency Management Facebook page, the HMPC was able to engage thousands of residents and invite them to participate in the plan update process. Public involvement using social media will continue to be an important outreach tool for the HMPC.

Public awareness of the plan and individual flood mitigation strategies could be developed each spring prior to the beginning of runoff and flood season. This can also occur with coordination with CRS public notification activities.

## **APPENDIX A REFERENCES**

---

# APPENDIX A REFERENCES

---

## REFERENCES AND RESOURCES

Andreas Prein, Roy Rasmussen, Kyoko Ikeda, Changhai Liu, Martyn Clark, Greg Holland. 2016. *The Future Intensification of Hourly Precipitation Extremes*. University Corporation for Atmospheric Research. December 5, 2016. <http://www2.ucar.edu/atmosnews/news/124334/extreme-downpours-could-increase-fivefold-across-parts-us>

Big Dry Creek Watershed Association. *Big Dry Creek Watershed Summary of Existing Conditions*. August, 2017. <http://www.bigdrycreek.org/pdfs/BDCSummary.pdf>

Cantu, Dave, interview by Greg Moser. 2016. *Street Operations Manager* (January 11).

Centers for Disease Control, 2012. *Principles of Epidemiology in Public Health Practice, Third Edition, An Introduction to Applied Epidemiology and Biostatistics*. Accessed December 22, 2016. <https://www.cdc.gov/opphss/csels/dsepd/SS1978/Lesson1/Section11.html>

Centers for Disease Control. *Coronavirus*. November 9, 2017. <https://www.cdc.gov/coronavirus/about/index.html>

Church Ditch Authority, 2016. <http://www.churchditch.org/>. n.d.

CIRSA. 2016. *2016 CIRSA Property Schedule*. Annual insurance valuation estimate, Broomfield, CO: CIRSA.

City and County of Broomfield. *Great Western Reservoir 2006 EAP*.

City of Arvada, *Fortune Dam EAP-2017*.

City of Westminster (City Clerk and GIS), 2016. *Economic Activity Quarterly Reports*,

City of Westminster, 2015. *Explore Westminster-About the City*. Accessed Oct 10, 2015. <http://www.ci.westminster.co.us/ExploreWestminster/AbouttheCity/Awards>.

City of Westminster, 2016. *Comprehensive Annual Financial Report*. <http://www.ci.westminster.co.us/CityGovernment/Finance/ComprehensiveAnnualFinancialReport>

City of Westminster, 2017. *City Government*. <http://www.ci.westminster.co.us/CityGovernment>

City of Westminster, 2017. *City Profile*. <http://www.westminstereconomicdevelopment.org/Westminster/media/Westminster/Demographic%20PDF%20Downloads/Westminster-Profile-2015-2016.pdf?ext=.pdf>

City of Westminster, 2017. *Wildlife and Natural Resource Management Plan for Open Space Properties*. Accessed March 8, 2017.

City of Westminster, August 10, 2015. *Community Development Planning Division*. Accessed April 6, 2017. [http://www.ci.westminster.co.us/Portals/0/Repository/Documents/CityGovernment/Community%20Development/COMPLETE%20Comp%20Plan\\_2015%20Update\\_WEB.pdf](http://www.ci.westminster.co.us/Portals/0/Repository/Documents/CityGovernment/Community%20Development/COMPLETE%20Comp%20Plan_2015%20Update_WEB.pdf)

---

City of Westminster, City-Data 2016. Accessed 3 2016, March. <http://www.city-data.com/city/Westminster-Colorado.html>

City of Westminster, *Ketner Dam EAP-2017*.

City of Westminster. *McKay Lake 2017 EAP*.

City of Westminster. *Schools Serving Westminster, 2016*.  
<http://www.ci.westminster.co.us/ExploreWestminster/Schools#a12>

City of Westminster. *Standley Lake 2017 EAP*.

City of Westminster. *Westminster Lake 2015 EAP*.

Colorado Data. <http://coloradoview.org/cwis438/websites/ColoradoView/Data.php?WebSiteID=15>

Colorado Department of Agriculture. 2018. *Noxious Weed Species*.  
<https://www.colorado.gov/pacific/agconservation/noxious-weed-species>

Colorado Department of Natural Resources, 2016. *Colorado Water Conservation Board*. Accessed June 14, 2017. <http://cwcb.state.co.us/public-information/publications/Pages/StudiesReports.aspx>

Colorado Department of Public Health & Environment, 2016. *Health Professional Shortage Area maps and data*. Accessed December 2016. <https://www.colorado.gov/pacific/cdphe/shortage-area-maps-and-data>

Colorado Department of Public Health & Environment. 2016. "The History, Status, and Long-Term Funding Needs of the Colorado CERCLA Program." Government, Denver, 13, 22. Accessed June 14, 2017. [https://www.colorado.gov/pacific/sites/default/files/HM\\_sf-2016-CERCLA-program-report.pdf](https://www.colorado.gov/pacific/sites/default/files/HM_sf-2016-CERCLA-program-report.pdf)

Colorado Department of Public Health & Environment. 2017. *Brownfields Program*. Accessed June 14, 2017. <https://colorado.gov/pacific/cdphe/brownfields>

Colorado Department of Public Health and Environment, 2016. *Find and Compare Facilities*.  
<https://www.colorado.gov/pacific/cdphe/find-and-compare-facilities>.

Colorado Department of Public Health and Environment, Branch, Communicable Disease Branch. 2015. *Zoonotic Disease in Colorado: An Annual Report*. Government Report, Denver:

Colorado Department of Public Health and Environment. *Community Inclusion in Colorado*. November 21, 2016. [http://www.coephtmaps.dphe.state.co.us/cdphe\\_maps/briefingbook/](http://www.coephtmaps.dphe.state.co.us/cdphe_maps/briefingbook/)

Colorado Department of Public Safety Division of Homeland Security and Emergency Management, 2015. "State Emergency Operations Plan." *Colorado Division of Homeland Security and Emergency Management*. March. Accessed December 2016.  
<http://www.dhsem.state.co.us/sites/default/files/2015%20SEOP%20Consolidated.pdf>

Colorado Department of Public Safety, 2013. *Colorado Hazardous and Nuclear Materials Route Restrictions*.  
<https://www.colorado.gov/pacific/sites/default/files/Hazardous%20Materials%20Routing%20Map.pdf>

---

Colorado Department of Transportation, Division of Transportation Development Section - GIS. 2012. "Colorado Hazardous and Nuclear Materials Route Restrictions." Westminster: Colorado Department of Transportation, November.

Colorado Geologic Geological, n.d. *Colorado Geologic Survey-Swelling Soils*. Accessed February 29, 2016. <http://coloradogeologicalsurvey.org/geologic-hazards/swelling-soils/definition/>

Colorado Geologic Survey, Colorado Earthquake Hazard Mitigation Council, 2008. *Colorado Earthquake Hazards*. Accessed June 14, 2017. [http://coloradogeologicalsurvey.org/wp-content/uploads/2013/08/Earthquake\\_Map\\_20081.pdf](http://coloradogeologicalsurvey.org/wp-content/uploads/2013/08/Earthquake_Map_20081.pdf)

Colorado Geologic Survey. n.d. "The Big One -Colorado's Largest Historic Earthquake: November 7, 1882 - Magnitude 6.6." Government. <http://coloradogeologicalsurvey.org/geologic-hazards/earthquakes/the-big-one/>

Colorado Geological Survey, 2016. *Geological Hazards*. <http://coloradogeologicalsurvey.org/geologic-hazards/>

Colorado Geological Survey, 2017. *Swelling Soils*. Accessed June 19, 2017. <http://coloradogeologicalsurvey.org/geologic-hazards/swelling-soils/>

Colorado Geological Survey. *HAZUS-MH: Earthquake Event Report*. June 21, 2005. <http://coloradogeologicalsurvey.org/wp-content/uploads/2013/07/1882%20m6.6%20state%20rmp%206-21-05.pdf>

Colorado Geological Survey. *Triggered (Induced) Earthquakes, 2018*. Accessed Feb 6, 2018. <http://cogcc.state.co.us/data2.html#/downloads>

Colorado State Forest Service, 2018. *Emerald Ash Borer*. January. <http://csfs.colostate.edu/forest-management/emerald-ash-borer/>

Colorado Storage Tank Information System, 2017. <https://opus.cdle.state.co.us/OIS2000/home.asp> .

Colorado Water Conservation Board. 2017. "Colorado Department of Natural Resources-CWCB." *Factsheets*. Accessed June 14, 2017. <http://cwcb.state.co.us/public-information/publications/Pages/FactSheets.aspx>

Colorado Water Conservation Board. August, 2013. *Colorado Drought Mitigation and Response Plan*. <http://cwcb.state.co.us/water-management/drought/documents/statedroughtmitplan2013/coloradodroughtmitigationresponseplan2013.pdf>

Community Collaborative Rain, Hail & Snow Network, 2017. *Hail Facts*. Accessed June 12, 2017. <https://www.cocorahs.org/Content.aspx?page=hailfacts>

Congressional Research Service, July 15. *Drought in the United States: Causes and Issues for Congress*. <http://www.congressionalresearch.com/RL34580/document.php?study=Drought+in+the+United+States+Causes+and+Issues+for+Congress>

David C. Noe, Candace L. Jochim, and William P. Rogers. 2014. *A Guide to Swelling Soil for Colorado Homebuyers and Homeowners*. Golden, CO: Colorado Geologic Survey.

---

Department of Homeland Security-ICS-CERT. *Industrial Control Systems Cyber Emergency Response Teams*. n.d. Accessed Jan 23, 2017. <https://ics-cert.us-cert.gov/advisories/ICSA-11-084-01>

DHSEM, Colorado. 2013. *State of Colorado Natural Hazard Mitigation Plan*. Natural Hazard Mitigation Plan, Centennial, CO: State of Colorado Office of Emergency Management. Accessed Apr 5, 2016. <http://www.dhsem.state.co.us/sites/default/files/2013%20Colorado%20Natural%20Hazards%20Mitigation%20Plan%20-%20Final.pdf>

Dr. John S. Foster, Jr, Mr. Earl Gjelde, Dr. William R. Graham (Chairman), Dr. Robert J. Hermann, Mr. Henry (Hank) M. Kluepfel, Gen Richard L. Lawson, USAF (Ret.), Dr. Gordon K. Soper, Dr. Lowell L. Wood, Jr., Dr. Joan B. Woodard. 2008. *Report of the Commission to Assess the Threat to the United Earth System Research Laboratory*, 2016. *Boulder Colorado Weather and Climate*. Accessed December 2016. <https://www.esrl.noaa.gov/psd/boulder/wind.html>

*Emerging Viral Diseases, 2015: The One Health Connection: Workshop Summary*. <https://www.nap.edu/catalog/18975/emerging-viral-diseases-the-one-health-connection-workshop-summary>

Environmental Protection Agency, 2016. *Search Definitions*. Accessed December 2016. <https://www.epa.gov/>

Environmental Protection Agency, 2017. *EPA-MyEnvironment*. Accessed June 14, 2017. <https://www3.epa.gov/myenv/myenvview2.html?minx=-105.25246&miny=39.81592&maxx=-104.87137&maxy=39.95028&ve=11,39.88331,-105.06190&pSearch=Westminster,%20CO>

Federal Advisory Committee on Climate Change. GlobalChange.gov. *U.S. Global Change Research Program. Third National Climate Assessment Downloads and Materials*. May, 2014. Accessed June 26, 2017. <http://www.globalchange.gov/browse/reports>

Federal Emergency Management Agency. *Disaster Declarations by State/Tribal Government*. Accessed March 26, 2018. <https://www.fema.gov/disasters/state-tribal-government/0/CO>

*FEMA Flood Map Service Center: Search By Address*. February 5, 2014, <https://msc.fema.gov/portal/search?AddressQuery=80401#searchresultsanchor> .

FEMA. 2005. *HAZUS-MH: Earthquake Event Report*. Accessed June 14, 2017. <http://coloradogeologicalsurvey.org/wp-content/uploads/2013/07/1882%20m6.6%20state%20rmnp%206-21-05.pdf>

FEMA.gov. *Local Mitigation Planning Handbook*. May 8. Accessed June 26, 2017. <https://www.fema.gov/media-library/assets/documents/31598>

FEMA-DHS. 2013. *Comprehensive Preparedness Guide 201: Threat and Hazard Identification and Risk Assessment Guide*. Accessed Mar 23, 2018. <https://www.fema.gov/media-library/assets/documents/26335>

Geist, Steve. n.d. *Freezing Temperatures brought on by a Typhoon in the Philippines Impact Landscapes in the Rocky Mountain Region*.

---

Gerald Meehl, Claudia Tebaldi, Dennis Adams-Smith. University Corporation for Atmospheric Research. November 21, 2016. *US Daily Temperature Records Past, Present, and Future*.  
<http://www2.ucar.edu/atmosnews/news/124082/days-record-breaking-heat-ahead>

Heinemann, Jeff. 2014. *Westminster Fire Department, 80 Years of Service*. Westminster: The Publishing House.

*Homeland Infrastructure Foundation - Level Data*. Accessed December 2016. [https://hifld-dhs-gii.opendata.arcgis.com/datasets?group\\_id=19e8e1cb6bfa4d6997f2128c876bc186](https://hifld-dhs-gii.opendata.arcgis.com/datasets?group_id=19e8e1cb6bfa4d6997f2128c876bc186)

Howard, Brian Clark. 2015. "National Geographic." *National Geographic*. February 12. Accessed June 26, 2017. <http://news.nationalgeographic.com/news/2015/02/150212-megadrought-southwest-water-climate-environment/>

International Federation of Red Cross and Red Crescent Societies. 2015. *Climatological Hazards: Extreme Temperatures*. Accessed February 29, 2016. <http://www.ifrc.org/en/what-we-do/disaster-management/about-disasters/definition-of-hazard/extreme-temperatures/>

Jensenius, John S. Jr. 2017. *NOAA Lightning Safety*. Accessed June 12, 2017.  
<http://www.lightningsafety.noaa.gov/fatalities/analysis03-17.pdf>

Keith Stouffer, Joe Falco, Karen Kent. 2006. *Guide to Supervisory Control Data Acquisition (SCADA) and Industrial Control Systems*. Government, Gaithersburg, MD: National Institute of Standards and Technology, 2, 2-7. Accessed June 14, 2017. <https://www.dhs.gov/sites/default/files/publications/csd-nist-guidetosupervisoryanddataacquisition-scadaandindustrialcontrolsystemssecurity-2007.pdf>

Lukas, Jeff. 2014. *Climate Change in Colorado-A Synthesis to Support Water Resource Management and Adaptation*. Government, Cooperative Institute for Research in Environmental Science (CIRES), University of Boulder, Boulder: University of Colorado Boulder, Pages 2 and 9.  
[http://wwa.colorado.edu/climate/co2014report/Climate\\_Change\\_CO\\_Report\\_2014\\_FINAL.pdf](http://wwa.colorado.edu/climate/co2014report/Climate_Change_CO_Report_2014_FINAL.pdf)

Maikranz, Dave. 2013. *Rocky Mountain Metropolitan Airport-An Officers Guide*.

McQuiston, Ron, interview by Greg Moser. 2017. *Battalion Chief, Westminster Fire Department* (June 15).

National Center for Environmental Health, 2011. *Climate Change and Extreme Heat Events*. Government Report, Atlanta: Center for Disease Control and Prevention.

National Center for Environmental Health. 2012. *Climate Change and Extreme Heat Events-CDC*. Accessed June 19, 2017.  
<https://www.cdc.gov/climateandhealth/pubs/ClimateChangeandExtremeHeatEvents.pdf>

National Center for Environmental Information. n.d. NOAA National Center for Environmental Information. Accessed June 15, 2017. <https://www.ncdc.noaa.gov/news/month-climate-history-january-1982-damaging-chinook-winds>.

National Intelligence Council, 2017. *Global Trends: Paradox of Progress*. Government Report, Washington DC: National Intelligence Council.

National Pipeline Mapping System, 2016. <https://www.npms.phmsa.dot.gov/default.aspx>

- 
- National Severe Storms Laboratory. n.d. *Severe Weather 101 - Lightning*. Accessed April 18, 2017. <http://www.nssl.noaa.gov/education/svrwx101/lightning/>
- National Transportation Safety Board, 2016. *Railway Accident Report*. Accessed December 2016. <http://www.nts.gov/investigations/AccidentReports/Pages/railroad.aspx>
- National Weather Service Forecast Office. 2017. *Denver-Boulder, CO*. Accessed June 26, 2017. <http://w2.weather.gov/climate/xmacis.php?wfo=bou>
- National Weather Service, 2014. *Lightning Flash Density Maps of Colorado, the United States and the World*. Accessed December 2016. <http://www.weather.gov/pub/lightningFlashDensityMaps>
- National Weather Service. 2017. *Denver Area Low Temperature Extremes*. Accessed June 19, 2017. <http://www.weather.gov/bou/lowtempextremes>
- National Weather Service. 2017. *Summer Temperatures for Denver*. Accessed June 19, 2017. <https://www.weather.gov/Bou/DenverSummerTemperatureStatistics>
- National Weather Service-Office of Climate, Water, and Weather Services. 2017. *Weather Fatalities 2016*. Silver Spings MD. <http://www.nws.noaa.gov/om/hazstats.shtml>
- NOAA Earth System Research Laboratory. 2017. *Boulder, Colorado Weather and Climate*. Accessed June 15, 2017. <https://www.esrl.noaa.gov/psd/boulder/wind.html>
- NOAA National Centers for Environmental Information. 2017. *Perspectives on Global Warming- Paleoclimatic Data for the Last 2000 Years*. Accessed June 26, 2017. <https://www.ncdc.noaa.gov/global-warming/last-2000-years>
- NOAA National Weather Service Glossary, 2017. Accessed June 26, 2017. <http://w1.weather.gov/glossary/index.php?word=Climate+change>
- NOAA National Weather Service. 2017. "Storm Prediction Center." SVRGIS. May 15. Accessed June 15, 2017. <http://www.spc.noaa.gov/gis/svrgis/>
- NOAA. 2017. "NOAA Climate." Accessed June 26 2017, 2017. <http://www.noaa.gov/climate>
- NOAA. *Severe Weather 101-Damaging Winds, 2016*. Accessed April 5, 2016. <http://www.nssl.noaa.gov/education/svrwx101/wind/>
- NOAA. *Severe Weather 101-Floods*. Accessed February 29, 2016. <http://www.nssl.noaa.gov/education/svrwx101/floods/types/>
- NOAA-National Weather Service. 2009. *National Weather Service Glossary*. June 25. Accessed Apr 5, 2016. <http://w1.weather.gov/glossary/index.php?letter=h>
- NOAA-National Weather Service. 2017. *National Weather Service, Colorado Coverage, NOAA Weather Radio*. Accessed June 20, 2017. <https://www.weather.gov/nwr/colorado>
- Nolan Doesken, Roger Pielke Sr, & Odilia Bliss. 2003. *Climate of Colorado*. January. <http://ccc.atmos.colostate.edu/climateofcolorado.php>
- Nolte, John, interview by Greg Moser. 2016. *Infrastructure Asset Management Lead, PWU* (Nov 8)

---

NOWData - NOAA Online Weather Data. December 18, 2014. Accessed December 2016.  
<http://w2.weather.gov/climate/xmacis.php?wfo=bou>

NWS Boulder Denver Weather History, 2016. Accessed December 2016.  
<http://www.weather.gov/bou/wxhistory>.

Organization, World Health. 2018. *WHO Climate Change and Health*. Accessed Jan 29, 2018.  
<http://www.who.int/mediacentre/factsheets/fs266/en/>

Peter Folger, Betsy Cody, Nicole Carter. 2012. "Congressional Research Service." *Drought in the United States: Causes and Issues for Congress*. August 15.  
<http://drought.unl.edu/Portals/0/docs/Drought%20in%20the%20US%20Causes%20and%20Issues%20for%20Congress.pdf>

PhysicalGeography.net. 2012. *Fundamentals of Physical Geography-Glossary of Terms*. Accessed February 29, 2016. <http://www.physicalgeography.net/glossary.html>

*Pipeline Incident 20 Year Trends*, 2016. <http://www.phmsa.dot.gov/pipeline/library/data-stats/pipelineincidenttrends>

Prevention, Center for Disease Control and. *Influenza (Flu)*. January 19, 2018.  
<https://www.cdc.gov/flu/index.htm>

Prevention, Centers for Disease Control and. 2017. *Bovine Spongiform Encephalopathy (BSE), or Mad Cow Disease*. August 9. <https://www.cdc.gov/prions/bse/index.html>.

Puntenney, David. 2017. "Information Technology Department Strategic Plan February 2017." *City of Westminster, City Government, Information Technology*. February. Accessed April 3, 2017.  
<http://www.ci.westminster.co.us/CityGovernment/InformationTechnology.aspx>

Resources, Department of Water. 2017. *DWR Dam Safety Jurisdictional Dam*. Accessed April 20, 2017.  
<https://data.colorado.gov/Water/DWR-Dam-Safety-Jurisdictional-Dam/mgjv-xmr5/data>

*Retail Sales Report, 2016*. <https://www.colorado.gov/pacific/revenue/retail-sales-report>

Rocky Mountain Insurance Information Association, 2015. *Catastrophe Facts and Statistics*. Accessed December 2016. [http://www.rmiia.org/catastrophes\\_and\\_statistics/catastrophes.asp](http://www.rmiia.org/catastrophes_and_statistics/catastrophes.asp)

Rocky Mountain Insurance Information Association, *Winter Storms, 2017*. Accessed Jun 12, 2017.  
[http://www.rmiia.org/catastrophes\\_and\\_statistics/Winter\\_Storms.asp](http://www.rmiia.org/catastrophes_and_statistics/Winter_Storms.asp)

Rocky Mountain Insurance Information Association. 2017. Accessed June 12, 2017.  
[http://www.rmiia.org/catastrophes\\_and\\_statistics/Hail.asp](http://www.rmiia.org/catastrophes_and_statistics/Hail.asp)

Rocky Mountain Metro Airport, 2017. *Rocky Mountain Metro Airport*. Accessed June 21, 2017.  
<http://jeffco.us/airport/>

Safety, Insurance Institute for Business & Home Safety. 2009. *Hale Activity in the United States*. Accessed December 2016. [http://disastersafety.org/wp-content/uploads/hail-map\\_IBHS.jpg](http://disastersafety.org/wp-content/uploads/hail-map_IBHS.jpg)

---

Senate Armed Services Committee, 2015. "Worldwide Threat Assessment of the US Intelligence Community." *dni.gov*. February 26. Accessed March 8, 2017.

[https://www.dni.gov/files/documents/Unclassified\\_2015\\_ATA\\_SFR\\_-\\_SASC\\_FINAL.pdf](https://www.dni.gov/files/documents/Unclassified_2015_ATA_SFR_-_SASC_FINAL.pdf)

*Severe Space and Weather Events--Understanding Societal and Economic Impacts: A Workshop Report, 2008.* <https://www.nap.edu/catalog/12507/severe-space-weather-events-understanding-societal-and-economic-impacts-a>

Space Studies Board. 2008. *Committee on the Societal and Economic Impacts of Severe Space Weather Events: A Workshop*. Government Workshop, Washington: National Academies Press. Accessed June 19, 2017. <https://www.nap.edu/catalog/12507/severe-space-weather-events-understanding-societal-and-economic-impacts-a>

Space Weather Prediction Center. 2016. *NOAA Space Weather Prediction Center*. Apr 5. Accessed Apr 5, 2016. <http://www.swpc.noaa.gov/>

Space Weather Prediction Center-NOAA. 2017. *Space Weather Prediction Center-Geomagnetic Storms*. Accessed June 19, 2017. <http://www.swpc.noaa.gov/phenomena/geomagnetic-storms>

Stephen Saunders, Tom Easley, Melissa Mezger. 2016. "Future Climate Extremes in Boulder County." *Colorado Department of Health & Environment*. September. Accessed December 2016. <https://www.colorado.gov/pacific/cdphe/colorado-greenhouse-gas-reports>

Storm Prediction Center. Apr 7, 2014. Accessed Apr 5, 2016. <http://www.spc.noaa.gov/new/SVRclimo/climo.php?parm=sigWind>

StudioCPG and ERO Resource Corporation. 2014. *City of Westminster 2014 Open Space Stewardship Plan*. Management Plan, Westminster: City of Westminster.

Susan Morea, Nicole Rowan, Mark McCluskey, Bill Fernandez. *Basin N&I Gap Analysis*. Colorado Water Conservation Board Public Information. June 22, 2011. <http://cwcb.state.co.us/public-information/publications/Documents/ReportsStudies/GapAnalysisMemo062111FinalWFigures.pdf>

United States Census, 2015. *Quick Facts, City of Westminster Colorado*. Accessed Mar 4, 2016. <http://www.census.gov/quickfacts/table/PST045215/0883835>

United States Department of Agriculture. 2018. *National Invasive Species Information Center*. January 23. <https://www.invasivespeciesinfo.gov/index.shtml>

United States Geological Survey, 2012. *Earthquake Glossary-Earthquake*. July 24. Accessed February 29, 2016. <http://earthquake.usgs.gov/learn/glossary/?term=earthquake>

United States Geological Survey, 2016. *The Modified Mercalli Intensity Scale*. <http://earthquake.usgs.gov/learn/topics/mercalli.php>.

United States Geological Survey. All Earthquakes 1900-Present, 2016. <http://earthquake.usgs.gov/earthquakes/byregion/colorado.php>

USDA National Agricultural Library, 2018. *Aquatic Species*. January 9, 2018. <https://www.invasivespeciesinfo.gov/aquatics/zebramussel.shtml>

---

USDA-Forest Service. 2016. *Forest & Grassland Health, 2016 Quad Maps*. Accessed June 21, 2017. <https://www.fs.usda.gov/detailfull/r2/forest-grasslandhealth/?cid=fseprd510095&width=full>

*UV Index: Annual Time Series, 2016*. Accessed December 2016. [http://www.cpc.ncep.noaa.gov/products/stratosphere/uv\\_index/uv\\_annual.shtml](http://www.cpc.ncep.noaa.gov/products/stratosphere/uv_index/uv_annual.shtml)

Walsh, Bryan. 2014. *Ecocentric*. Jan 6. Accessed Feb 7, 2018. <http://science.time.com/2014/01/06/climate-change-driving-cold-weather/>

Warner, Lori, interview by Greg Moser-Westminster Emergency Management Coordinator. 2017. *Xcel Energy Public Safety Coordinator* (March 16).

*Welcome to QuickFacts, 2016*. <http://www.census.gov/quickfacts/>

White House Archives. February 12, 2013. *Presidential Policy Directive 21: Critical Infrastructure Security and Resilience*. Obama Accessed April 4, 2017. <https://obamawhitehouse.archives.gov/the-press-office/2013/02/12/presidential-policy-directive-critical-infrastructure-security-and-resil>

# **APPENDIX B PLANNING PROCESS DOCUMENTATION**

---

# Natural Hazard Mitigation Plan-Update 2017 Meeting Records

Meeting Date: June 27, 2017

Meeting Time: 16:30-~~17:30~~ 18:00

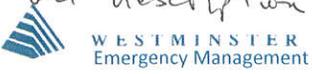
Location: PWU Conference Rm, City Hall *Water Resource Group - Raw water*

Topic/Agenda: Review and discuss water related resource for the community description and water related hazard draft materials. Discuss risk scoring criteria and process. *Reviewed Marplot files with them and time keeping. Watershed - Standley*

**Attendance:**

Name	Position	Department
Greg Moser	EM Coordinator	FD
Sarah Borgers	WRQ Manager	PWU
Bob Krugmine	WR Engineer	PWU
Megan Orloff	Sr WR Engineer	PWU
Mary Fabisrak	Water Quality Admin	PWU
Stu Feinglas	Senior Analyst	PWU

Group responsible for water resources from watersheds to Standley Lake. Providing existing studies, review comment on description, climate change, drought, water quality & security. Requested updates/input w/in 10 days.





Sign In Sheet

- Storm water ; flood plain

July 13, 2017  
16:00-17:15

<u>Name</u>	<u>Position</u>	<u>Dept.</u>
Will Moser	Intern	Fire
Greg Moser	EMC	FD
Seth Plas	Sr. Projects Engineer	CD
Sharon Williams	Sr. Projects Engineer	CD

Agenda:

- Review draft risk assessment
- Community Descriptions of water resources
  - Climate Change
  - Drought
  - Riverine Flooding
  - Water Quality / Security

Seth and Sharon will provide additional references, comments and review.

## Natural Hazard Mitigation Plan-Update 2017 Meeting Record

Meeting Date: July 18, 2017

Meeting Time: 10:00 to ~~10:30~~ 10:45 : 75

Location: City Council Meeting Rm

### Topic/Agenda:

- Update the Department Heads on the status of our Hazard Mitigation Plan-Update grant and activities.
- Overview of relationship between the risk assessment, mitigation plan, EOP, COOP, and recovery plan.
- Solicit input and guidance on risk assessment and Mitigation Planning Committee.

### Attendance:

Name	Position	Department
Mike Crossman	Dep. Chief PD.	PD.
Will Moser	Intern OEM	OEM
Matthew Bore	General Services Dir.	GS
John Hall	Econ. Devl. Dir.	ED
DAVE DOWNING	COMMUNITY DEVELOPMENT DIRECTOR	CD
Barbara Opie	Deputy City Manager	CME
Jason Gewick	PRL Director	PRL
Arthur Rea	Information Technology Acting Director	
Max Kirschbaum	Dir Public Works & Util	PWU
Tammy Hitchens	Finance Director	FIN
Dee Martin	HR Director	HR
Chris Lindsey	Planned Budget Division Mgr	CMD
Doug Hall	FIRE CHIEF	FD



**AGENDA**  
**Emergency Management Working Group**  
**August 10, 2017**  
**3:00pm – 4:00pm**  
**(Initial Meeting)**

- Introductions
- Review/Questions about the Overview document
  - Purpose
  - Work Products
  - Membership
  - Schedule/Workload
  
- Risk Assessment/Scoring participation
- Hazard Mitigation Plan participation
- EOP Basic Plan Review
- Emergency Support Functions (ESF) Definitions review
- ESF Roles
- Follow-up meetings
- Risk Assessment input and scoring
- ESF feedback



## Emergency Management Working Group Overview-July 2017

**Purpose of Emergency Management:** The purpose of Westminster emergency management is to help the City and our residents prepare for, mitigate, respond to, and recovery from major disaster and emergency events. Routine emergencies happen every day and are managed by Fire Department (FD), Police Department (PD) and Public Works and Utilities (PWU) without the involvement of other City departments/divisions. In the context of this working group, emergencies and disaster are larger events which may require extended operations (>12 hours) by our first responders and which produce broader human, material, economic, environmental and operational consequences that fall outside the responsibilities and capabilities of the FD, PD and PWU. Emergency management is an ongoing collaborative process to create relationships, identify capabilities, assess hazards, develop plans, provide training, and evaluate our efforts through exercises. It is a contingency we hope we will never need to use, but it is essential to meeting our responsibility to ensure the City and our residents are as prepared as possible for any situation.

**Phases and Activities of Emergency Management:** Comprehensive emergency management has four phases: preparedness, mitigation/prevention, response and recovery. The bulk of routine emergency management is in the creation and maintenance of our capabilities to rapidly adapt to crisis situations, effectively support first responder activities, assess and manage the disaster consequences that fall outside the responsibilities of first responders, provide for the continuity of City operations, and coordinate post-disaster community recovery efforts. The creation and maintenance of emergency management capabilities is based on a robust all-hazards community risk assessment that provides a context for our planning and preparedness efforts.

**Emergency Management Working Group:** This group is being established to provide a focal point and linkage to all City departments and divisions. The Emergency Management Coordinator will act as the chair of this working group and integrate the input of all City departments and divisions. Each department/division is asked to identify a point of contact who can participate in this effort, share information and expertise, and serve as a liaison for their department before and during emergency/disaster situations. The general activities of this committee will be to coordinate and develop:

- 
- Emergency: An incident, natural or human caused, that requires responsive actions to protect life, property, environment, or critical systems.
  - Disaster: A Severe or prolonged incident which threatens life, property, environment, or critical systems.  
*(Section 4.5 of the City Charter)*

- The All-Hazards Community Risk Assessment: This document includes a detailed description of our community, resources and capabilities, our identified hazards, and a community risk assessment methodology. The working group is invited to review and comment of the current draft materials and participate in the scoring of the hazards. (working draft available at P:Emergency Management/Risk Assessment 2017)
- The Hazard Mitigation Plan (HMP): This document includes the All-Hazards Risk Assessment and identifies and prioritizes policies, programs and projects that can reduce the likelihood, frequency or intensity of events resulting from the hazards identified in the risk assessment. We recently received a grant to hire a consultant to assist with the update of our Hazard Mitigation Plan and working group members will be requested to participate as needed/appropriate in this activity.
- The Emergency Operations Plan (EOP): This document provides a framework for the mobilization of all City and community resources to support the efforts of first responders and assess and address the broader human, material, economic, environmental and operational consequences of major emergencies and disasters. The EOP is based on the 15 Emergency Support Functions (ESFs) of the National Response Framework (NRF). Our EOP provides for the activation of City ESFs as needed to staff the Emergency Operations Center. The EOP and EOC support the decision making processes (emergency/disaster declarations) of the City's senior management and leadership during crisis situations. The EOP also provides the bases for a transition to long-term community recovery. Working group members will be asked to review the draft EOP and provide input on both the Basic Plan and our ESFs. The draft EOP is available at P:Emergency Management/EOP 2017.
- The Continuity of Operations Plan (COOP): Until recently, the City had contracted the Bold Solutions to provide online support for our COOP. The grant funding for this effort is no longer available and this program has been discontinued. The committee will be asked to consider options to revisit our approach to continuity of operations planning.
- The Recovery Plan: The Recovery Plan supports the transition from the preliminary damage assessment (PDA) and short-term recovery (ESF 14 of the EOP) to long-term recovery. It identifies key resources, partnerships, and priorities to restore critical infrastructure, businesses, homes, the environment, and community activities.
- Training: The City of Westminster adopted the National Incident Management System (NIMS) in 2004. NIMS identifies (and provides) basic/required training and more advance/optional training for anyone who may be expected to support emergency/disaster operations. This working group may recommend and facilitate training activities to improve the City's and community's preparedness.
- Exercises: Exercises provide a valuable opportunity to train, evaluate and improve on our planning and training activities. Exercises can also provide insights into the

complexity of hazards and the relationships/cascades that may also be created. This committee may recommend and support exercise activities to be included in the City's Emergency Management Training and Exercise Plan (TEP).

- **Collaborative Benefits:** Our city departments and divisions are often involved in activities which may affect our community risk profile through policies, activities, or capabilities. The working group will provide a venue for greater interdepartmental information sharing and potential collaboration.

**Working Group Membership:** All city departments and divisions are requested to identify a representative(s) to this working group. Representatives will be asked to contribute expertise and guidance relative to the responsibilities and capabilities of their department or division. They will also be asked to be the liaison to identify and invite other department/division members to be involved as needed.

**Scheduling/Workload:** Once the department/division heads have identified their representative(s), the Emergency Management Coordinator (EMC) will schedule an organizational meeting to review the activities previously listed and discuss need for future meetings. Not all departments/divisions will need to be involved in all activities. It will be largely up to the department/division representatives to identify the level of involvement for each of the activities. **The immediate priority will be to review and score the hazards in the community risk assessment and to identify the primary stakeholders in the mitigation plan.** Departments/ divisions with a stake in these projects will be invited to activity specific meetings.

At the organizational meeting, the EMC will also review the ESFs in the draft EOP and ask departments/divisions to identify the functions in which they have responsibilities and capabilities. Follow-up meetings will be scheduled based on the response of the participants.

Once the working group has become familiar with the overall emergency management program, we will determine the need for quarterly, semi-annual or annual meetings of all working group members to ensure a sustained collaborative effort.

**Conclusion:** Emergency management is a broad ongoing function that involves all City departments/ division in varying degrees. The level of department/division activity will vary depending on the task at hand. Community outreach and engagement are also essential to this effort. Our immediate tasks are the risk assessment, the mitigation plan and the EOP/ESF review. This working group will provide an ongoing venue for a coordinated and sustained effort to ensure the City and the community are as prepared as possible in case of major emergency or disaster events.

If you have questions or comments, please contact Greg Moser, Emergency Management Coordinator at x4550.

**Meeting Minutes**  
**Emergency Management Working Group**  
**August 10, 2017**  
**3:00pm – 4:00pm**  
**(Initial Meeting)**

- **Attendance**
  - Sarah Borgers, PWU-Water Quality & Resource Manager
  - Dave Cantu, PWU-Street Operations Manager
  - JR Clanton, PRL-Library Services Manager
  - Martee Erikson, HR-Risk Manager
  - Stephen Gay, PWU-Utilities Operations
  - Brian Grucelski, GS-Facilities Manager
  - Greg Moser, FD-Emergency Management Coordinator
  - Will Moser, FD-Emergency Management Volunteer
  - Brian Poggenclass, MC-Probations Supervisor
  - Jen Phren, GS-Interim Fleet Manager
  - Ed West, IT-Info Systems Manager
  - Stephanie Troller, Economic Development
  
- The EMC opened the meeting and provided a brief overview of the immediate and longer-term goals of the committee. It was also explained that the level of participation will vary significantly depending on the project (risk assessment, hazard mitigation plan (HMP), emergency operations plan (EOP), continuity of operations plan (COOP), and recovery plan). This was an initial meeting to begin a broader involvement of city departments/divisions as appropriate.
  
- **Goals/Results:** The EMC identified the following goals for the meeting. The results are noted.
  - Consensus on purpose of the working group
    - Result: No objections or comment. The group agreed that a training session would help everyone better understand the Emergency Management function and the role of this committee. The EMC will schedule a follow-on training session.
  - Overview of EM plans
    - Results: This was the group's first opportunity to discuss the various plans (mitigation, emergency operation, continuity of operations and recovery). Although some had worked on the previous EOP and COOP, it was agreed that more time to digest the overview documents and take refresher National Incident Management System (NIMS) training would be helpful. The EMC will provide links to the Emergency Management Institute (EMI) and recommended course list (and additional training at the next meeting).
    - Training Links
      - Intro to Incident Command  
<https://training.fema.gov/is/courseoverview.aspx?code=IS-100.b>

- Introduction to the National Incident Management System  
<https://training.fema.gov/is/searchis.aspx?search=IS-700>
  - Introduction to the National Response Framework  
<https://training.fema.gov/is/searchis.aspx?search=IS-800>
- If members would like to get credit/documentation that you have complete these courses, you need a Student ID Number (SID). This is pretty easy, just go to <https://cdp.dhs.gov/femasid>. If you have problems or questions, please contact Greg Moser at X4550.
- Identify risk assessment and mitigation participants
  - Results: This portion of the meeting occurred from 3:15-3:35 (20 minutes and will be documented against the soft-match requirement of the HMP grant)
  - The EMC reviewed work to date on the draft community risk assessment and the upcoming Hazard Mitigation Plan kick-off with the consultant. The group expressed concern about the amount of effort required and the limited role of the consultant. The EMC explained the Statement of Work was based on the template provided by the State and agreed to make a copy available of the team's review. All members were encouraged to review the current draft risk assessment (P:Drive/Emergency Management/Risk Assessment 2017). The group also expressed interest in seeing the previous HMP. This and the consultants Statement of Work are available on the P:Drive/Emergency Management/Mitigation Plan 2017.
  - The Mitigation Planning Team was identified as:
    - Sarah Borgers, PWU-Water Quality & Resource Manager
    - Dave Cantu, PWU-Street Operations Manager
    - PRL Rep to be determined
    - Stephen Gay, PWU-Utilities Operations
    - Brian Grucelski, GS-Facilities Manager
    - Greg Moser, FD-Emergency Management Coordinator
    - Will Moser, FD-Emergency Management Volunteer
    - Ed West, IT-Info Systems Manager
    - Community Development Rep to be determined
    - Other members may be identified once the EMC has met with the consultant.
  - Sarah Borgers and Greg Moser met after the meeting to discuss the PWU-Water Quality & Resource Divisions review and input on the draft risk assessment (based on a previous meeting).
- Review ESF definitions
  - Results: This was the group's first opportunity to discuss the draft Emergency Operations Basic Plan. The EMC recommended working group members review the current draft posted at P:Drive/Emergency Management/EOP 2017. It was also agreed that the training proposed for the next meeting will help members better understand the purpose of the EOP and how we can proceed in

developing the update. The group expressed interest in seeing the previous plan. It is available for review a P:Emergency Management/EOP 2017.

- Review ESF lead and support roles
  - Results: The group reviewed the proposed format of the ESF summaries in the Basic Plan. Future meetings will review the draft ESF definitions and identify which departments/divisions are best suited to act in ESF Lead and Support roles. Once the working group has validated the ESF definitions and identified probable staff positions for Lead and Support roles, the EMC will work with ESF teams to develop ESF annexes with more details to support the Basic Plan.
  - After a brief discussion on ESF-1 Transportation, the team member recommended including the following as possible points of contact:
    - Arismendi, Gabriella
    - Baskett, Deborah
    - Giedraitis, Barb
- Future Continuity and Recovery Planning
  - Results: The EMC explained that the grant funding for the COOP plan was no longer available and the consultant services (Bold Solutions) no longer supports our Continuity Planning. Steven Gay, requested that the EMC look into getting a download of the information for Bold Solutions.
  - Continuity and Recovery planning are being differed for the time being and will be addressed in future meetings/activities.

#### Tasks:

- The EMC will provide links and training recommendations (see above)
- The EMC will provide a training session to working group members at our next meeting
- The EMC will share the following documents: (See the P:drive/Emergency Management)
  - 2010 Emergency Operations Plan (EOP)
  - 2010 Hazard Mitigation Plan (HMP)
  - Draft EOP Basic Plan
  - Draft Community Risk Assessment
  - HMP Consultant Proposal/Statement of Work
- The EMC will work with the Hazard Mitigation Planning Team to discuss the work load, expectations, schedule, and working with the consultant.
- The EMC will create a folder on the P:drive of PWU-Water Quality materials.
- The EMC will check on getting a download of our old COOP materials for Bold Solutions.
- Team members will review the available documents and begin considering the ESF definitions and which city offices would be the most likely candidates to support the ESF development
- Team members visit the training links and take courses as appropriate.

**Conclusions:** The team expressed support and commitment to addressing the activities outlined by the EMC. Although the HMP update has a firm completion date, (July 2017 due to grant funding), all other

activities will be an ongoing process. It was agreed that future training will help member better understand Emergency Management and how we can best organized our efforts.

3-4 p.m., Aug 10, 2017

### Emergency Management Working Group

Initial	Last	First	Dept/Division	Title	Extension	Risk Assessment	Mitigation Plan	EOP	COOP	Recovery Plan
SB	Borgers	Sarah	Public Works and Utilities	Water Quality and Resource Manager	x2182	✓	✓			
DC	Cantu	Dave	Public Works and Utilities	Street Operations Manager	x2520	✓	✓			
	Clanton	JR	Parks, Rec & Libraries	Library Services Manager	x2189					
	Erichson	Martee	Human Resources	Risk Manager	x2156					
	Gay	Stephen	Public Works and Utilities	Utilities Operations Manager	x2507	✓	✓			
	Grucelski	Brian	General Services	Facilities Manager	x2555					
	LaChance	Scott	Police Department	Police Commander	x4226					
	Moser	Greg	Fire Department	Emergency Management Coordinator	x4550	✓	✓	✓	✓	✓
	Poggenklass	Brian	Municipal Court	Probations Supervisor	x2270	✓	✓			
	Prehn	Jen	General Services	Int. Fleet Manager	x2149					
	WEST Rope	ED Scott	Information Technology	Info Systems Manager	2093 x2057	✓	✓			
	Troller	Stephanie	Economic Community Development	Administrative Assistant	x2318					

**From:** Moser, Greg <gmoser@CityofWestminster.us>  
**Sent:** Tuesday, August 22, 2017 10:37 AM  
**To:** Andrews, Jody; Booco, Matthew; Carlson, Tim; Downing, Dave; Erb, Kodi; Frankel, David; Genck, Jason; Hall, Doug; Hall, John; Hitchens, Tammy; Kirschbaum, Max; Lindsey, Chris; Martin, Dee; Opie, Barbara; Puntenney, David; Reid, Joe; Sorice, Tiffany; Tripp, Don  
**Cc:** Plas, Seth; Gay, Stephen; Williams, Sharon; Rope, Scott; Larsen, Rod; Cantu, Dave; Borgers, Sarah; Clanton, J.R.; Grucelski, Brian; Poggenklass, Brian; Prehn, Jen; Troller, Stephanie; Brislawn, Jeff P; LaChance, Scott; Thompson - CDPS, Mark; Cory Stark (Cory.Stark@state.co.us); Erichson, Martee  
**Subject:** Hazard Mitigation Planning Update, Invitation and Documentation

Good Morning All,

As you know from the Department Heads meeting on July 18<sup>th</sup> and the kick-off meeting of the Emergency Management Working Group on August 10<sup>th</sup>, the City is beginning the process of updating its 2010 Multi-Hazard Mitigation Plan to meet the requirements of the Disaster Mitigation Act of 2000 (DMA 2000). **This email is to provide you an update and document the invitation of all City departments to participate in this planning effort.**

*“Does the Plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process? (Requirement §201.6(b)(2))”*

The primary purpose of the Hazard Mitigation Plan is to reduce or eliminate long-term risk to people and property from natural and human-caused hazards and to mitigate their effects on the City. The plan will allow the City to become eligible for future federal mitigation grant funding. The emphasis of DMA 2000 is on creating an ongoing, community-wide planning process that involves the Hazard Mitigation Planning Committee, the public and other key stakeholders. The City Office of Emergency Management is taking the lead on the project in coordination with a Hazard Mitigation Planning Committee (HMPC) comprised of various City departments and other stakeholders. Professional planning assistance is being provided by Amec Foster Wheeler.

**It is important that the HMPC has representation from municipal departments that have a stake or role in reducing hazard losses.** As part of the planning process we are reaching out to City agencies, as well as additional state, federal, and local stakeholders. Another objective of this outreach is to coordinate with those who may bring additional information to the planning process regarding hazard issues or mitigation efforts within the City. Any information, studies, or related plans or hazard mitigation projects which might inform the plan and supplement the work of the Hazard Mitigation Planning Committee would be welcomed. Additionally we invite your participation at our committee and public meetings throughout the planning process. Let me know if you are able to represent your department. You will be added to an email distribution so that you can stay informed of the planning process and upcoming meetings.

Based on previous discussions, the following City staff have been identified as members of the Hazard Mitigation Plan-Update Planning Committee:

- Community Development-Senior Project Engineer, Seth Plas
- Community Development-Senior Project Engineer, Sharon Williams
- Fire Department-Emergency Management Coordinator, Greg Moser
- Information Technology-Information Systems Manager, Scott Rope
- Parks, Recreation and Libraries-Open Space Manager, Rod Larsen
- Public Works and Utilities-Utilities Operations Manager, Stephen Gay
- Public Works-Street Operations Manager, Dave Cantu
- Public Works-Water Quality & Resource Manager, Sarah Borgers

A kickoff meeting with our consultant is set for **August 31st, 2017 from 10am-11:30** at Big Dry Creek Conference Room (13150 Huron St). The purpose of the meeting is to introduce and outline the process, identify hazards, collect information, plan for public involvement, and answer any questions. This meeting will be an opportunity to identify the primary and supporting roles of City departments. If you think your department has a stake in our Hazard Mitigation Plan-Update, please share this with your staffs and have them contact me at (303) 658-4550 or [gmoser@CityofWestminster.us](mailto:gmoser@CityofWestminster.us). Jeff Brislawn is the planning consultant project manager with Amec Foster Wheeler and can be contacted at 303-820-4654 or [jeff.brislawn@amecfw.com](mailto:jeff.brislawn@amecfw.com).

Greg Moser  
Emergency Management Coordinator  
City of Westminster  
(303) 658-4550 (office)  
(303) 589-7812 (cell)  
(303) 706-3913 (fax)  
[gmoser@CityofWestminster.us](mailto:gmoser@CityofWestminster.us)



**From:** Moser, Greg <gmoser@CityofWestminster.us>  
**Sent:** Thursday, August 24, 2017 6:11 PM  
**To:** Brislawn, Jeff P  
**Subject:** FW: Westminster Hazard Mitigation Plan Kick-off Invitation (Aug 31, 10:00-11:30)

Missed you on the CC.

Have a great weekend,

Greg

---

**From:** Moser, Greg  
**Sent:** Thursday, August 24, 2017 6:08 PM  
**To:** Richard Atkins (ratkins@adcogov.org) <ratkins@adcogov.org>; Brian Daley <bdaley@co.jefferson.co.us>; 'Kent Davies' <kdavies@broomfield.org>; Kevin Stewart (kstewart@udfcd.org) <kstewart@udfcd.org>; Enessa Janes <ejanes@arvada.org>; Ryan Doyle (Ryan.Doyle@cityofthornton.net) <Ryan.Doyle@cityofthornton.net>; 'Ron Osgood (rosgood@northglenn.org)' <rosgood@northglenn.org>; Michael Queen (mqueen@cmwc.net) <mqueen@cmwc.net>; Scott Edgar (Scott@farmersres.com) <Scott@farmersres.com>; Dianna (Dianna@farmersres.com) <Dianna@farmersres.com>; Terry Barnhart (tbarnhart@hylandhills.org) <tbarnhart@hylandhills.org>; Michael Bollinger (fhl.gm.mike@gmail.com) <fhl.gm.mike@gmail.com>; Tami Moon <tmoon@northglenn.org>; Nathan McCoy (nmccoy@churchditch.org) <nmccoy@churchditch.org>; Curt Aldstadt (pres@ecentral.com) <pres@ecentral.com>; Steve Heger (sh3280@comcast.net) <sh3280@comcast.net>; Krugmire, Bob <bkrugmir@CityofWestminster.us>; Scott Applegate (scott@novationchurch.org) <scott@novationchurch.org>; Scott Edgar (Scott@farmersres.com) <Scott@farmersres.com>  
**Subject:** Westminster Hazard Mitigation Plan Kick-off Invitation (Aug 31, 10:00-11:30)

Good Afternoon All,

The City of Westminster is beginning the process of updating its Multi-Hazard Mitigation Plan to meet the requirements of the Disaster Mitigation Act of 2000 (DMA 2000). The primary purpose of the Hazard Mitigation Plan is to reduce or eliminate long-term risk to people and property from natural and human-caused hazards and their effects on the City planning area. The emphasis of DMA 2000 is on creating an ongoing, community-wide planning process that involves the Hazard Mitigation Planning Committee, the public and other key stakeholders. The City's Emergency Management Coordinator is the lead on the project in coordination with a Hazard Mitigation Planning Committee (HMPC) comprised of various City departments and other stakeholders. Professional planning assistance is being provided by Amec Foster Wheeler.

As part of the planning process we are reaching out to other agencies, neighboring jurisdictions, and stakeholders to raise awareness of this effort and provide an opportunity for input. Another objective of this outreach is to coordinate with those who may bring additional information to the planning process regarding hazard issues or mitigation efforts within the City. Any information, studies, or related plans or hazard mitigation projects which might inform the plan and supplement the work of the Hazard Mitigation Planning Committee would be welcomed. Additionally we invite your participation at our committee and public meetings throughout the planning process. Let me know if you would like to be added to an email distribution so that you can stay informed of the planning process and upcoming meetings. As a stakeholder your participation is optional but welcomed.

A kickoff meeting is set for **August 31st, 2017 from 10am-11:30** at the Multipurpose Room on the lower

level of Westminster City Hall, 4900 W. 92<sup>nd</sup>) . The purpose of the meeting is to introduce and outline the process, identify hazards, collect information, plan for public involvement, and answer any questions.

Please RSVP so I can make sure we have room for everyone. If you cannot attend this meeting, but are interested in this effort, please let me know and I will send you updates and schedule one-on-one if needed. If you are aware of other community stakeholder who may be interested in this effort, please share this invitation with them.

As the lead coordinator on this project I can be contacted at (303) 658-4550 or [gmoser@CityofWestminster.us](mailto:gmoser@CityofWestminster.us). Jeff Brislawn is the planning consultant project manager with Amec Foster Wheeler and can be contacted at 303-820-4654 or [jeff.brislawn@amecfw.com](mailto:jeff.brislawn@amecfw.com).

Thanks in advance,

Greg Moser  
Emergency Management Coordinator  
City of Westminster  
(303) 658-4550 (office)  
(303) 589-7812 (cell)  
(303) 706-3913 (fax)  
[gmoser@CityofWestminster.us](mailto:gmoser@CityofWestminster.us)



**From:** Moser, Greg <gmoser@CityofWestminster.us>  
**Sent:** Wednesday, August 30, 2017 9:45 AM  
**To:** Borgers, Sarah; Cantu, Dave; Gay, Stephen; Kellam V, Fred; Kevin Stewart (kstewart@udfcd.org); Klein, Heath; Krugmire, Bob; Larsen, Rod; Martin Postma; Michael Bollinger (fhl.gm.mike@gmail.com); Plas, Seth; Rope, Scott; Thompson - CDPS, Mark; Williams, Sharon; Michael Queen (mqueen@cmwc.net); Scott Edgar (Scott@farmersres.com); Dianna (Dianna@farmersres.com); Terry Barnhart (tbarnhart@hylandhills.org); Tami Moon; Nathan McCoy (nmccoy@churchditch.org); Curt Aldstadt (pres@ecentral.com); Steve Heger (sh3280@comcast.net); Brian Daley; Richard Atkins (ratkins@adcogov.org); Thompson - CDPS, Mark; Ryan Doyle (Ryan.Doyle@cityofthornton.net)  
**Cc:** Murray, Dave; Malesky, Sandy; Plas, Seth; Brislawn, Jeff P  
**Subject:** Westminster Hazard Mitigation Plan Kick-off Invitation (Aug 31, 10:00-11:30)  
**Attachments:** City of Westminster HMP Update Kickoff Agenda.docx

Good Morning All,

I am forwarding the agenda for tomorrow's Hazard Mitigation Plan-Update kick off meeting. Please join us (or send an alternate) if you are available

Time: 10:00-11:30

Location: Westminster City Hall, 4900 W. 92<sup>nd</sup> (one block east of Sheridan on the south side of 92<sup>nd</sup>). The Multi-Purpose Room is on the lower level. You enter on the main level. Take the elevator or stairs down to the lower level. Turn right out of the elevator, left off the stairs, follow the hallway and the Multi-Purpose Room is on the right.

Thanks in advance,

Greg Moser  
Emergency Management Coordinator  
City of Westminster  
(303) 658-4550 (office)  
(303) 589-7812 (cell)  
(303) 706-3913 (fax)  
[gmoser@CityofWestminster.us](mailto:gmoser@CityofWestminster.us)



---

## **Summary of the City of Westminster Multi-Hazard Mitigation Plan Update Kick-Off and Hazard Identification Review Meeting**

**10:00am to noon**

**August 31, 2017**

**Multipurpose Room, Westminster City Hall**

**4900 W. 92<sup>nd</sup>, Westminster**

### **Introductions and Opening Remarks**

Welcoming remarks and an introduction to the hazard mitigation plan were presented by Greg Moser from Westminster Emergency Management. Greg asked everyone around the room to introduce themselves. Twenty persons representing a mix of City departments and stakeholders, including neighboring jurisdictions and ditch companies, were present and documented on sign-in sheets. At the outset of the meeting, Greg spoke about the importance of documenting time spent on the new mitigation plan; the City is matching a federal grant through in-kind contribution of hours spent to the project.

### **Mitigation, Disaster Mitigation Act (DMA) Requirements, and the Planning Process**

A PowerPoint presentation was presented by Jeff Brislawn, the project manager from Amec Foster Wheeler; Amec Foster Wheeler will be assisting the City as the consultant on the project. The presentation described objectives for the Multi-Hazard Mitigation Plan update and the ten-step planning process that will be followed. The plan is intended to identify hazards, assets at risk, and ways to reduce impacts through long-term, sustainable mitigation projects. The plan will also maintain eligibility for FEMA mitigation grant funding. Mark Thompson from DHSEM spoke to the group regarding types of projects eligible for FEMA funding and provided examples from other communities that have received Hazard Mitigation Grant Program or Pre-Disaster Mitigation (PDM) Grant Program funds.

### **The Role of the Hazard Mitigation Planning Committee (HMPC)**

This meeting is the first meeting of the City of Westminster Hazard Mitigation Planning Committee (HMPC) during the update process. Participation in the planning process will include:

- Attending and participating in the HMPC meetings,
- Providing available data requested by the HMPC coordinator or Amec Foster Wheeler's project manager,
- Providing or updating hazard profiles and vulnerability details specific to the City,

- 
- Developing or updating the local mitigation strategies (action items and progress to date),
  - Advertising and assisting with the public input process,
  - Reviewing and commenting on plan drafts, and
  - Coordinating formal re-adoption of the updated plan.

This plan will also be developed to conform to Community Rating System (CRS) floodplain management planning requirements. This program rewards communities that go above and beyond implementing the minimum National Flood Insurance Program (NFIP) standards by providing discounts on flood insurance rates. The City participates in the CRS and is a Class 6 community.

### **Overview of the 2010 City of Westminster Multi Hazard Mitigation Plan**

Jeff Brislaw talked about the existing plan originally developed in 2010. The plan is being updated again in accordance with the five-year update requirement of the Disaster Mitigation Act of 2000 (DMA). Mr. Brislaw pointed out some of the hazards data in the plan, the goals of the plan, and referred to some of the mitigation action strategies identified in the 2010 plan. The progress on implementation of these strategies will be assessed and documented during the update process.

Jeff asked about progress on projects identified in the 2010 plan, or other projects related to mitigation in the community since the 2010 plan. The committee identified the following projects:

- Improvements to the McKay Drainageway Detention Facility
- Standley Lake bypass for water contamination
- Standley Lake High School was wired with generator hook-ups with FEMA funding
- Documented lessons learned after 2013 floods
- Conducted risk assessment
- Converted open space for flood control
- Little Dry Creek drainage and flood control project
- Shaw Boulevard stormwater drainage project
- Pilot project for green infrastructure
- Community looking to hire person focused on sustainability
- Addressing climate change mitigation through investments in solar energy and greenhouse gas reduction program
- Sourcewater protection plans/call downs in case of hazmat spill or natural hazard impacts
- Development of natural hazards contact list
- Drought Management Plan – updated through Public Works
- Ditch companies doing some mitigation work with post-2013 flood recovery funding
- Improved engagement between emergency management and the public on the HIRA

---

## Discussion of Objectives and Schedule for the Plan Update

Objectives of the process were discussed that included:

- Update the City's Multi-Hazard Mitigation Plan per the DMA and CRS requirements
- Update the risk assessment to reflect current hazards, risk and vulnerability
- Update the City's mitigation strategies as appropriate
- Document progress and success stories

The plan update will be developed over the next seven months, with two more meetings of the HMPC. Amec Foster Wheeler will be working with Greg Moser to ensure the draft risk assessment is compliant with DMA requirements and reflects current conditions and vulnerabilities. The next meeting of the HMPC will likely be in October, with exact dates to be determined (TBD).

## Review of Identified Hazards

Based on hazards from the 2010 plan, the list of potential natural hazards was reviewed. The focus is on natural hazards, since manmade hazards are not required by DMA 2000 regulations and often are dealt with through separate planning mechanisms. However, some human health and related hazards were included in the 2010 plan. For the City of Westminster, the hazards in the 2010 plan include:

- Dam Failure
- Drought
- Earthquakes
- Floods (riverine and stormwater)
- Human Health Hazards: Pandemic Flu
- Human Health Hazards: West Nile Virus
- Severe Weather:
  - Hailstorms
  - Heavy Rain
  - Lightning
  - Tornadoes
  - Windstorm
  - Winter Storm
- Wildland/Grassland Fire

Drought, dam failure and tornadoes were considered the most significant hazards in the previous plan.

Greg Moser discussed a draft Hazard Identification and Risk Assessment that is being developed to support the Hazard Mitigation Plan update and other emergency planning efforts. This

---

assessment includes additional natural and human-caused hazards. The additional hazards in this assessment include:

- Climate Change
- Erosion and Deposition
- Expansive Soils
- Extreme Cold
- Extreme Heat
- Invasive Species
- Solar/Geomagnetic Storm
- Water Quality/Security
- Open Space Fire
- Active Shooter/Attacker
- Aircraft Incident
- Commuter Rail Incident
- Critical Infrastructure Disruption
- Cyber Attack – Information
- Cyber Attack – Control Systems
- Hazardous Materials – Fixed Site
- Hazardous Materials – Transportation
- Major Gas Leak/Explosion
- Major Police Event
- Nationally Significant Event
- Planned Event
- Tech/Industrial Accidents
- Terrorism
- Traffic – Mass Casualty

Jeff noted that the mitigation plan should focus on the most significant hazards and those that can be feasibly mitigated or not already addressed in other planning mechanisms. The group also had a discussion on turbidity and its impact on water quality, and whether that should be included; turbidity will be noted in the plan, but not included as its own separate hazard. Greg is planning a hazard ranking workshop in the future which will be used to help prioritize the final list of hazards to be addressed in the mitigation plan.

Jeff Brislaw asked HMPC members to review specific hazard chapters and comment on how they could be enhanced or updated with:

- Historic incidents
- Incident logs
- Public perception
- Scientific studies
- Other plans and reports (e.g., flood and drainage studies)
- Recent disasters

A discussion of recent studies of hazards in other documents and reports performed by or for the City followed. Recent studies or plans for reference included:

- Drought Plan
- Source Water Protection Plan
- Watershed Fire Study (in progress)
- Colorado Communities for Climate Change study

- 
- Mitigation plans – surrounding counties/communities
    - The Thornton/Northglenn Hazard Mitigation Plan was recently completed
    - Adams County is beginning an update of their hazard mitigation plan
    - Broomfield
    - Jefferson County – updated in 2016

Development trends in the City were discussed. These include some new development and re-development. The Westminster Light Rail Station area and new downtown were also noted.

### **Coordination with Other Plans**

Jeff asked the group if the Westminster HMP had been cross-referenced in any other planning efforts in the past five years, or if opportunities might exist to do so in the future. Recent or related plans in development that may have opportunities to potentially cross reference the mitigation plan included:

- Comprehensive Plan which is currently being updated

### **Planning for Continued Public and Stakeholder Involvement**

Public involvement will be a required part of the planning process. Greg has already been posting information on social media regarding the planning effort. An upcoming meeting/workshop on hazard ranking will involve the public. Another meeting will be held later in the process when the public review draft becomes available.

Some additional ideas for further outreach and public feedback included using social media methods to disseminate and receive information; “piggy backing” plan update meetings on other public hearings, events, etc.

### **Data Collection Needs and Next steps**

An email group will be used to communicate with the HMPC on upcoming meetings and events. Jeff encouraged the group to email Greg Moser or himself the related information discussed that may inform the plan update process.

### **Adjourn**

The meeting adjourned at 11:50 am.

***Summary prepared by Jeff Brislawn, Amec Foster Wheeler***

[jeff.brislawn@amecfw.com](mailto:jeff.brislawn@amecfw.com)

303-820-4654

1942 Broadway, Suite 314

Boulder, CO 80302

**From:** Moser, Greg <gmoser@CityofWestminster.us>  
**Sent:** Wednesday, September 27, 2017 9:38 AM  
**To:** Borgers, Sarah; Cantu, Dave; Gay, Stephen; Kellam V, Fred; Kevin Stewart (kstewart@udfcd.org); Klein, Heath; Krugmire, Bob; Karsjen, Kyle; Larsen, Rod; Martin Postma; Michael Bollinger (fhl.gm.mike@gmail.com); Nathan McCoy (nmccoy@churchditch.org); Plas, Seth; Rachael Bacon (rbacon@adcogov.org); ratkins@adcogov.org; Rope, Scott; Malesky, Sandy; Tami Moon; Thompson - CDPS, Mark; Will Moser (wjmoser35@gmail.com); Williams, Sharon  
**Cc:** Brislawn, Jeff P  
**Subject:** FW: Summary of Mitigation Plan kickoff meeting  
**Attachments:** Westminster Kickoff Meeting Summary.doc; WestminsterKickoffMtgPresentation.pdf; Kick off meeting sign in and agenda.pdf

Good Morning All,

Thank you for attending the Hazard Mitigation Plan-Update kick-off meeting on August 31<sup>st</sup>. Attached are the materials related to the meeting. Please let Jeff and me know if you have questions or comments.

Also, thank you for your continued support of this effort. More to follow!

Regards,

Greg Moser  
Emergency Management Coordinator  
City of Westminster  
(303) 658-4550 (office)  
(303) 589-7812 (cell)  
(303) 706-3913 (fax)  
[gmoser@CityofWestminster.us](mailto:gmoser@CityofWestminster.us)



---

**From:** Brislawn, Jeff P [mailto:Jeff.Brislawn@amecfw.com]  
**Sent:** Thursday, September 21, 2017 11:30 AM  
**To:** Moser, Greg <gmoser@CityofWestminster.us>  
**Cc:** Karsjen, Kyle <kyle.karsjen@amecfw.com>  
**Subject:** Summary of Mitigation Plan kickoff meeting

Greg,

Please review the attached summary and let me know if you have any changes or edits. If it looks good it can be sent out to the planning committee along with a copy of the presentation and sign in sheet.

I'm out at the CASFM conference this week but maybe we can find some time to discuss next steps early next week.

Thanks

Jeff

**Jeff Brislawn**  
**Hazard Mitigation Lead/Sr Associate**  
**Amec Foster Wheeler**

Environment & Infrastructure/Hazard Mitigation and Emergency Management Program  
1942 Broadway, Suite 314, Boulder CO, 80302  
Direct 303-820-4654, mobile/cell 303-704-5506  
[jeff.brislaw\\_n@amecfw.com](mailto:jeff.brislaw_n@amecfw.com)  
[www.amecfw.com](http://www.amecfw.com)

This message is the property of Amec Foster Wheeler plc and/or its subsidiaries and/or affiliates and is intended only for the named recipient(s). Its contents (including any attachments) may be confidential, legally privileged or otherwise protected from disclosure by law. Unauthorised use, copying, distribution or disclosure of any of it may be unlawful and is strictly prohibited. We assume no responsibility to persons other than the intended named recipient(s) and do not accept liability for any errors or omissions which are a result of email transmission. If you have received this message in error, please notify us immediately by reply email to the sender and confirm that the original message and any attachments and copies have been destroyed and deleted from your system. If you do not wish to receive future unsolicited commercial electronic messages from us, **please forward this email to: [unsubscribe@amecfw.com](mailto:unsubscribe@amecfw.com) and include "Unsubscribe" in the subject line**. If applicable, you will continue to receive invoices, project communications and similar factual, non-commercial electronic communications.

Please click <http://amecfw.com/email-disclaimer> for notices and company information in relation to emails originating in the UK, Italy or France.

**From:** Moser, Greg <gmoser@CityofWestminster.us>  
**Sent:** Wednesday, September 27, 2017 2:34 PM  
**To:** Angel Ferns (angelsferns@gmail.com); Bassett, Steve; Deb Rinkenberger (Deb.Morrell.0767@gmail.com); Jon Rinkenberger (Jon.rink@msn.com); Karrey Van Sky (karreyvansky@comcast.net); Lynn Jacobs (nlynnj@comcast.net); Rick Andrews (rieckiea@gmail.com); Shannon Mayes (shannon.m.mayes@gmail.com); Steve Polutchko (spolutch@ball.com); Tammy Wrightsman (wrightsmant@gmail.com); Wendy Fulks  
**Cc:** Thompson - CDPS, Mark; 'patricia.gavelda@state.co.us'; Brislawn, Jeff P  
**Subject:** Mitigation Plan Update for Community Volunteers

Good Afternoon Everyone,

First, I would like to thank you for your interest in our community hazard mitigation planning effort and patience while we have been getting organized. I know many of you registered your interest several months ago and I have not been providing regular updates. That is about to change! We finally got the grant, hired a consultant and have had an organizational meeting of the city staff. I now need to ask you for your input on scheduling a review of our community hazards and risk scoring workshop. I think this will be about 3-4 hours long. I will provide breakfast, lunch or dinner depending on the time that works best for everyone. In the meantime, please let me know if you have a preference for one of the following options:

- Weekday morning
- Weekday afternoon
- Weekday evening
- Saturday morning
- Saturday afternoon
- Saturday evening
- Sunday afternoon
- Sunday evening

Once we have scored our natural hazards, we will also brainstorm mitigation ideas which will be provided to the city staff, other community stakeholders and our consultant for inclusion in our draft mitigation strategy. Once the mitigation strategy has been drafted, we will have a follow-on event for public review and comment (which I hope you will also join).

I will be promoting/recruiting one last time in the upcoming Oct/Nov City Edition and on the City of Westminster Emergency Management Facebook page. If you know of others who would like to participate in this project, please ask them to contact me. I would like to schedule the risk assessment for mid-October.

Again, thank you for your interest, patience and support. Hazard mitigation is an important part of making our community as resilient as possible and we can't do it without you!

Best Regards,

Greg Moser  
Emergency Management Coordinator  
City of Westminster  
(303) 658-4550 (office)  
(303) 589-7812 (cell)  
(303) 706-3913 (fax)  
[gmoser@CityofWestminster.us](mailto:gmoser@CityofWestminster.us)



WESTMINSTER

**From:** Moser, Greg <gmoser@CityofWestminster.us>  
**Sent:** Thursday, September 28, 2017 1:34 PM  
**To:** Brislawn, Jeff P; Thompson - CDPS, Mark; Hose, Bob; Nicole Aimone  
(nicole.aimone@fema.dhs.gov)  
**Subject:** Public event

Good Afternoon,

FYI, Tri-State Generation has an annual preparedness event tomorrow. I have been invited to do two sessions on our local hazards and why people should prepare (and mitigate). I plan to focus on our natural hazards and will give the attendees a scoring sheet so I can collect their assessment based on the info provided. The sessions are only an hour long, but I thought I would see what I get from them and incorporate it into the community scoring if appropriate.

I still plan to have a risk scoring workshop in Oct for the 15 volunteers I have to date. I will also invite the Tri-State folks to let me know if they would like to be in a more in depth discussion/scoring effort. FYI, Tri-State is CI. They manage the power grid for 49 co-ops in 3-4 states.

My presentations are at 10am and 1:30pm if you are interested/available.

FYI, my final call (3<sup>rd</sup> in the City Edition) for risk scoring workshop participants went out today (about 6000 are mailed and it is posted on our web page at <http://www.cityofwestminster.us/Portals/1/Documents/News/CEOctNov2017FINAL.pdf>) By the end of next week, I plan to have a date and time finalized. I am polling the current volunteers for the best day and time and will let you know.

Sorry for the late notice. Don't worry if you can't make it. There will be other outreach events. This is just sort of a 2-fer. I am finalizing the presentation and scoring sheet and will send them when final.

Best Regards,

Greg Moser  
Emergency Management Coordinator  
City of Westminster  
(303) 658-4550 (office)  
(303) 589-7812 (cell)  
(303) 706-3913 (fax)  
[gmoser@CityofWestminster.us](mailto:gmoser@CityofWestminster.us)



**From:** Moser, Greg <gmoser@CityofWestminster.us>  
**Sent:** Thursday, September 28, 2017 8:14 PM  
**To:** Brislawn, Jeff P; Nicole Aimone (nicole.aimone@fema.dhs.gov); Thompson - CDPS, Mark; 'patricia.gavelda@state.co.us'  
**Subject:** FW: Public event  
**Attachments:** Risk Overview for Tri State Sep 29 2017.pdf

FYI, Tri-State is located at 1100 W. 116<sup>th</sup> Ave. Westminster, CO 802234. (just west of I-25 and south of 120<sup>th</sup>).

Attached is the PPT I will be using to review the hazards. Participants will be given a scoring sheet and scoring criteria. It will be a little rushed, but I hope to get some good input (especially related to the electrical industry). I have two groups over 2 hours, so I may split-up the actual scoring. It will also be good prep for the longer risk scoring workshop in Oct.

Best Regards,

Greg Moser  
Emergency Management Coordinator  
City of Westminster  
(303) 658-4550 (office)  
(303) 589-7812 (cell)  
(303) 706-3913 (fax)  
[gmoser@CityofWestminster.us](mailto:gmoser@CityofWestminster.us)



---

**From:** Moser, Greg  
**Sent:** Thursday, September 28, 2017 1:34 PM  
**To:** Jeff Brislawn <jeff.brislawn@amec.com>; Thompson - CDPS, Mark <markw.thompson@state.co.us>; Hose, Bob <bhose@CityofWestminster.us>; Nicole Aimone (nicole.aimone@fema.dhs.gov) <nicole.aimone@fema.dhs.gov>  
**Subject:** Public event

Good Afternoon,  
FYI, Tri-State Generation has an annual preparedness event tomorrow. I have been invited to do two sessions on our local hazards and why people should prepare (and mitigate). I plan to focus on our natural hazards and will give the attendees a scoring sheet so I can collect their assessment based on the info provided. The sessions are only an hour long, but I thought I would see what I get from them and incorporate it into the community scoring if appropriate.

I still plan to have a risk scoring workshop in Oct for the 15 volunteers I have to date. I will also invite the Tri-State folks to let me know if they would like to be in a more in depth discussion/scoring effort. FYI, Tri-State is CI. They manage the power grid for 49 co-ops in 3-4 states.

My presentations are at 10am and 1:30pm if you are interested/available.

FYI, my final call (3<sup>rd</sup> in the City Edition) for risk scoring workshop participants went out today (about 6000 are mailed and it is posted on our web page at <http://www.cityofwestminster.us/Portals/1/Documents/News/CEOctNov2017FINAL.pdf> ) By the end of next week, I plan to have a date and time finalized. I am polling the current volunteers for the best day and time and will let you know.

Sorry for the late notice. Don't worry if you can't make it. There will be other outreach events. This is just sort of a 2-fer. I am finalizing the presentation and scoring sheet and will send them when final.

Best Regards,

Greg Moser  
Emergency Management Coordinator  
City of Westminster  
(303) 658-4550 (office)  
(303) 589-7812 (cell)  
(303) 706-3913 (fax)  
[gmoser@CityofWestminster.us](mailto:gmoser@CityofWestminster.us)



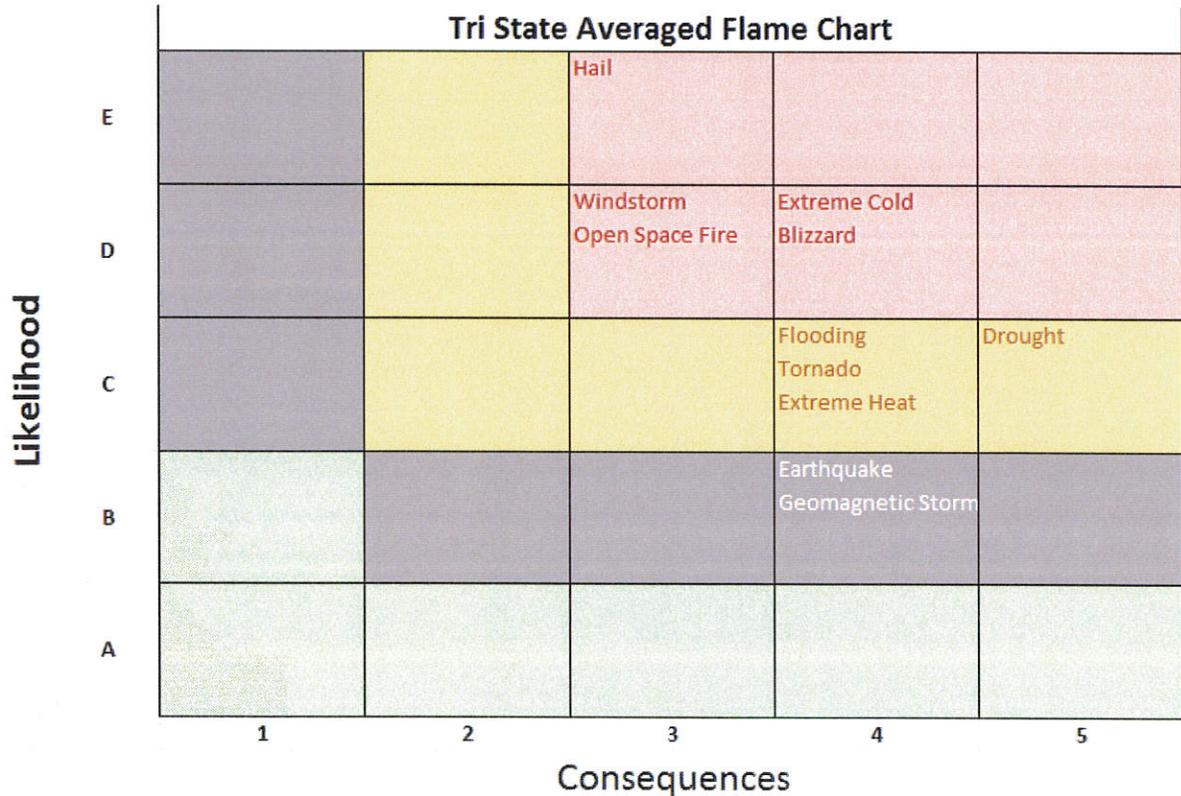
**Subject: HMP-Update Public Engagement/Outreach**

Westminster Emergency Management routinely participates in the Tri-State Generation Association’s annual employee’s wellness and preparedness fair. Tri-State Generation is a nationally significant critical infrastructure that sells energy to 43 rural electric cooperatives in Colorado, New Mexico, Wyoming and Nebraska.



The Westminster Emergency Management September 29, presentation, was “Community Risk Overview: Why Should We Mitigate and Prepare.” The one-hour presentation was given twice to a total of 33 Tri-State employees.

The presentation included an overview of our primary natural hazards and attendees were invited to assess the risk based on criteria provided. The following summarizes the result of this community risk scoring activity:



The results from this event will be incorporated into future risk scoring workshops being scheduled for interested members of the public.

This community outreach event also resulted in 35.5 volunteer hours (\$25.97 rate), for a total soft-match of \$947.91.

A handwritten signature in black ink, appearing to read "G. Moser", written over a horizontal line.

Greg Moser  
City of Westminster  
Emergency Management Coordinator

**Natural Hazard Mitigation Plan-Community Engagement/Input**

Meeting Date: \_\_\_Sep. 29 2017\_\_\_

Meeting Time: 10:00am to 11:15

Location: \_\_\_Tri-State\_\_\_

**Topic/Agenda:**

- Review community hazards
- Solicit input on hazard scoring
- Promote mitigation and preparedness awareness

**Attendance:**

Name	Position	Department
Irish Floyd	Sr. Acct.	Acctg Src
Shawn McKinsey	ACCOUNTANT	ACCTG SERV
BILL MIDDAGH	SYST. PROT. MGR	SYSTEM PROTECTION
Ryan Walter	Reliability Compliance Analyst	Reliability Compliance
Tom Pettitator	buyer III	purchasing
Son Ha	Designer	Electri.
John Petrick	Sr. Compliance Analyst	Reliability Compliance
Karen Green	Admin. Assistant	Member Relations
Cathy Franz	QA	IT
Sam Hetchler	IT Sys Analyst	Apps Dev
Michael Mize	IT Sys Anal	Apps Dev
Roman Sanchez	Plant Accounting Mgr.	Plant Acctg
Myles Jensen	Sr. Mgr. Member Relations	Member Relations
Vince Loung	Engineer	Planning



TriState Generation  
Assoc. Preparedness Day

## Natural Hazard Mitigation Plan-Community Engagement/Input

Meeting Date:      Sep. 29 2017     

Meeting Time: 1:30 to 2:35

Location:      Tri-State     

### Topic/Agenda:

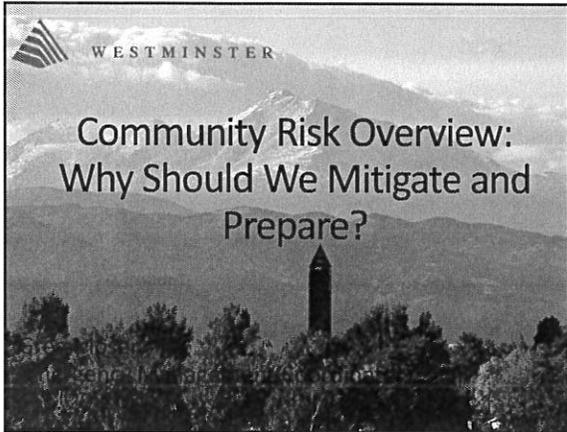
- Review community hazards
- Solicit input on hazard scoring
- Promote mitigation and preparedness awareness

### Attendance:

Name	Position	Department
Kenny Sanchez	DCS	CAD Systems
DEAN EDGER	ZF	
Shelly Cunningham	BSA	IT
BRIAN WILCOXSON	IT PM	IT
Tim Floyd	SR. ANALYST	MARKETING
Jon Schneider	sr. Mgr. ER	ER
Stephan Rutherford	Plant Accty	Accounty
CHESEA GRAYSON	BSA LEAD	IT
Shelly Martindal Campo	Contract Administrator	Contracts
Anat Mehle	Sr. Accountant	Accounting
DAVE BRAUN	ERM Analyst	Risk management
Steve Rothenburgh	Payroll Associate	Payroll
Drew Statzer	Compliance Analyst	Reliability Compliance
DAVID SAYLES	Bus. Reshore/ mfg.	ERM







---

---

---

---

---

---

---

---

### Overview

- Review of risk scoring worksheet
- Overview of natural hazards
- Personal, family and community mitigation and preparedness overview

---

---

---

---

---

---

---

---

City of Westminster Hazard Scoring Worksheet

Hazard	Likelihood (A-E)	Scale (1-5)	Duration (1-5)	Consequence (1-5) X 2	Overall (Average)	Comments
Flooding						
Hail						
Windstorm						
Tornado						
Extreme Cold						
Blizzards						
Extreme Heat						
Drought						
Open Space Fire						
Earthquake						
Geosynthetic Storm						
Other Comments/Notes:						

---

---

---

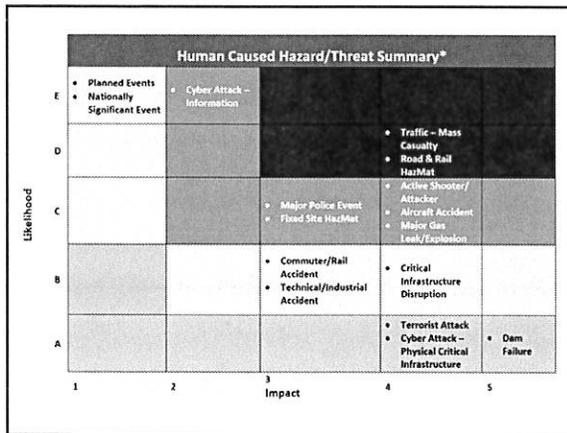
---

---

---

---

---




---

---

---

---

---

---

---

---

---

---

---

---

### Risk Scoring Criteria/Methodology

- Review hazard information
- Rate/estimate likelihood
- Rate/estimate impacts
  - Extent
  - Duration
  - Consequences

**Consequences**

- Human
- Material
- Economic
- Environmental
- Operational

---

---

---

---

---

---

---

---

---

---

---

---

### Hazards, Vulnerabilities, and Risk

<p><b>Natural Hazards</b></p> <ul style="list-style-type: none"> <li>Flooding</li> <li>Hail</li> <li>Windstorms</li> <li>Tornadoe</li> <li>Extreme Cold</li> <li>Extreme Heat</li> <li>Drought</li> <li>Open Space Fire</li> <li>Earthquake</li> <li>Geomagnetic Storm</li> </ul>	<p style="text-align: center;"><b>HAZARDS</b>      <b>VULNERABILITIES</b></p> <p style="text-align: center;">↓</p> <p style="text-align: center;"><b>RISK</b></p>	<p><b>Vulnerabilities</b></p> <ul style="list-style-type: none"> <li>Population</li> <li>Critical Infrastructures</li> <li>Homes</li> <li>Businesses</li> <li>Sense of well-being</li> <li>Environment</li> <li>Pets and wildlife</li> <li>Economic activity</li> </ul>
---	---	---

---

---

---

---

---

---

---

---

---

---

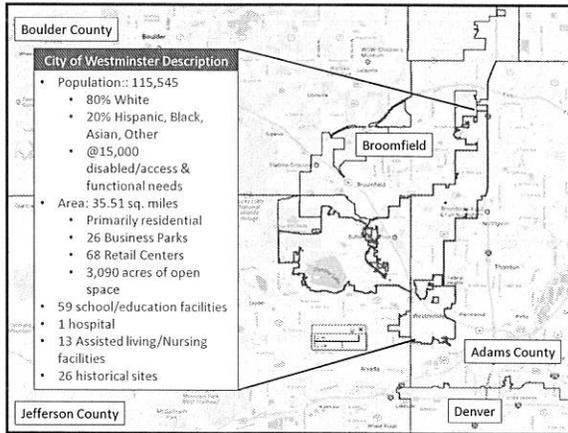
---

---



# WESTMINSTER Emergency Management

10/2/2017




---

---

---

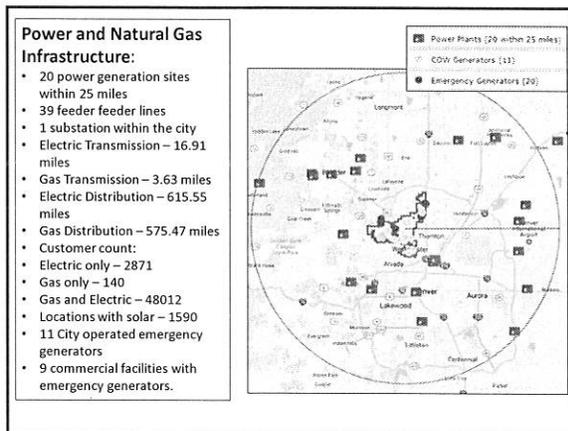
---

---

---

---

---




---

---

---

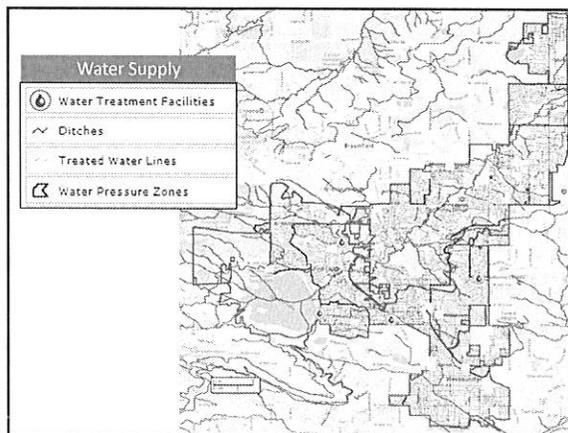
---

---

---

---

---




---

---

---

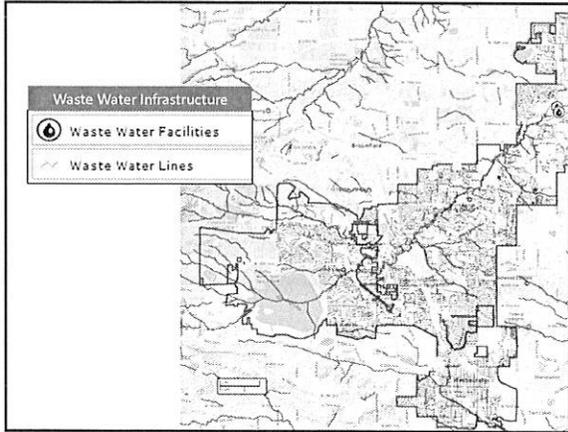
---

---

---

---

---




---

---

---

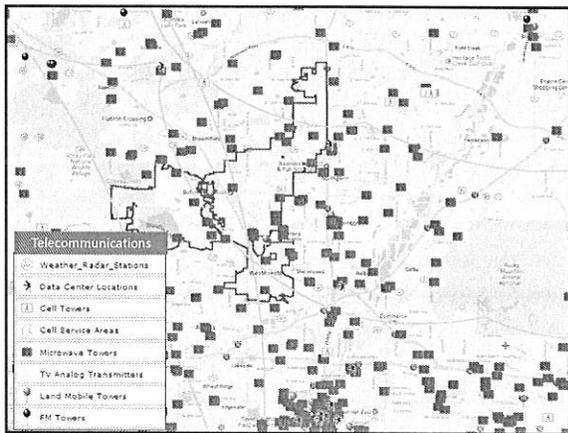
---

---

---

---

---




---

---

---

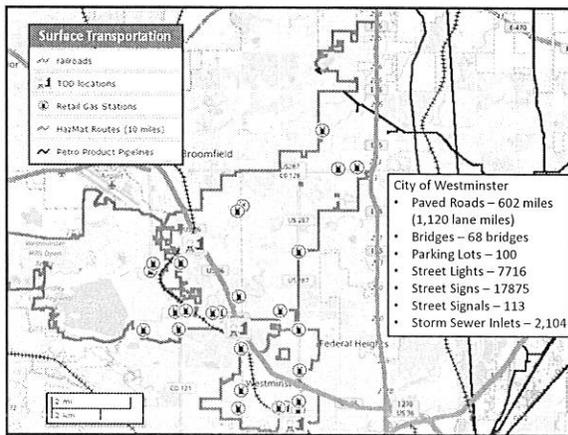
---

---

---

---

---




---

---

---

---

---

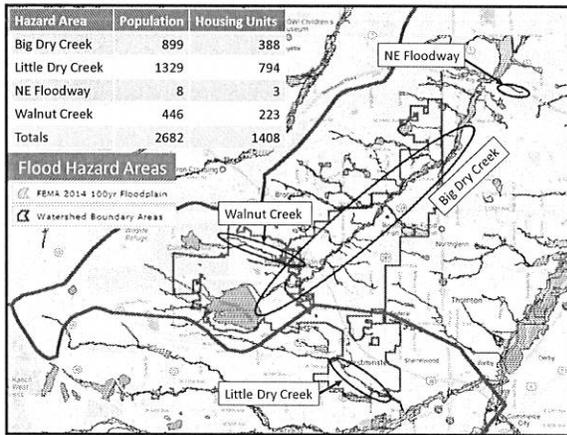
---

---

---








---

---

---

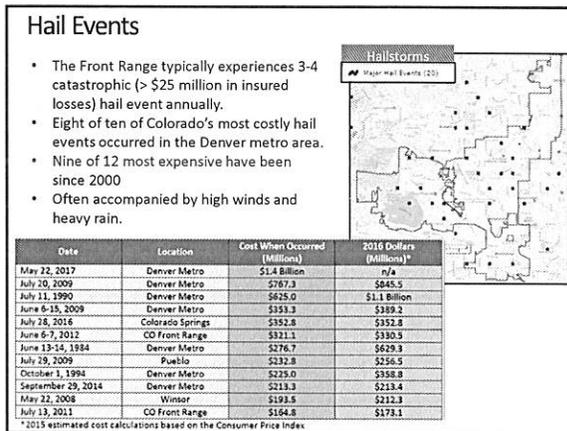
---

---

---

---

---




---

---

---

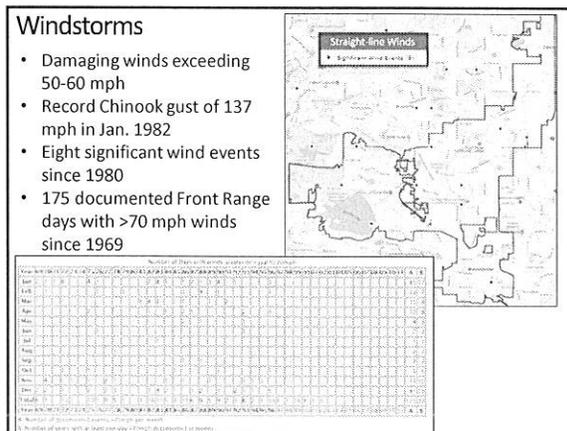
---

---

---

---

---




---

---

---

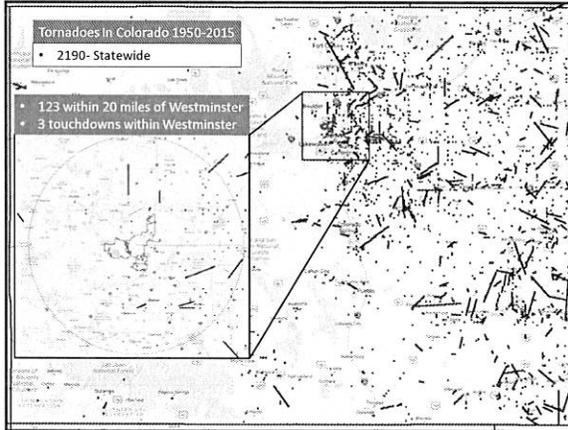
---

---

---

---

---




---

---

---

---

---

---

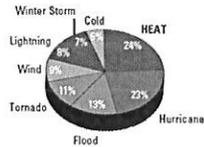
---

---

**Extreme Cold**

- Coldest temperature on record: -29 degrees Jan. 1875
- 29 days of -20 degrees or below since 1872
- Last -20 day was Dec. 21-22, 1990
- Seven of the warmest monthly lows have occurred since 2000
- One of the the coldest monthly lows has occurred since 2000
- Potential impact on critical infrastructures and AFN community

DEATHS IN THE UNITED STATES ATTRIBUTED TO WEATHER CONDITIONS, 2000-2009\*



Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean	-5	0	8	20	31	43	52	50	35	23	7	-3	-11
Max	14	21	24	30	40	51	59	56	45	31	22	13	4
(Year)	2006	1992	2000	2012	1992	2015	2012	1983	1981	2015	1949	2001	1999
Min	-25	-25	-10	-2	22	30	43	41	17	3	-10	-25	-25
(Year)	1963	1951	1948	1975	1954	1951	1972	1964	1965	1969	2014	1990	1990

---

---

---

---

---

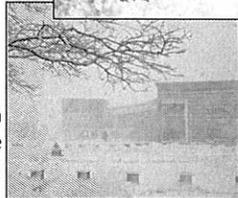
---

---

---

**Blizzards**

- 24 snow events between 15.9 and 45.7 inches of snow since 1881.
- March 2003 event was our most expensive
  - 28,000 claims
  - \$93.3 million in insured losses
- Significant impact on critical infrastructure and AFN community




---

---

---

---

---

---

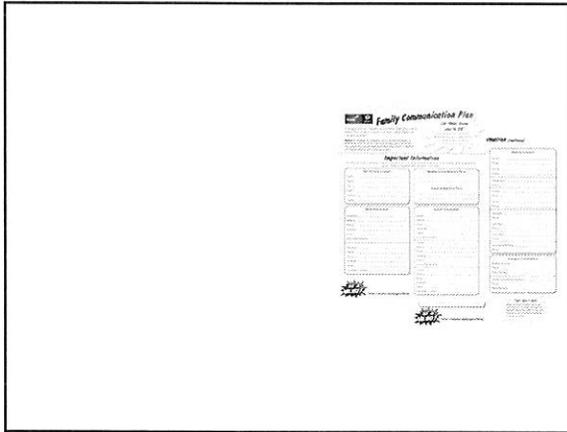
---

---









---

---

---

---

---

---

---

---

**Interested in FEMA Training?**

- <https://training.fema.gov/is/crslist.aspx>
- Create a student ID (Apply tab at the top)
- Review the available courses
- Recommended:
  - IS 394 Protecting your Home or Small Business From Disaster
  - IS-100 Intro to Incident Command
  - IS-700 Intro to the NIMS
  - IS-800 National Response Framework



---

---

---

---

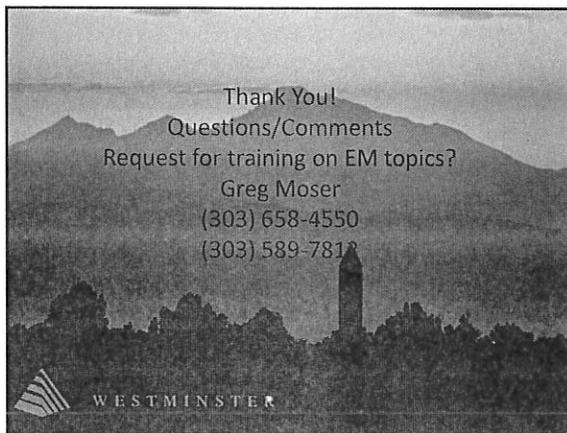
---

---

---

---

Thank You!  
 Questions/Comments  
 Request for training on EM topics?  
 Greg Moser  
 (303) 658-4550  
 (303) 589-7817




---

---

---

---

---

---

---

---

**From:** Moser, Greg <gmoser@CityofWestminster.us>  
**Sent:** Wednesday, October 11, 2017 5:41 PM  
**To:** AB Contractor; Amy Wilbur (awilbur@americanrenal.com); Angel Ferns (angelsferns@gmail.com); Anna Neidig (annabneidig@yahoo.com); Bassett, Steve; Beverly Best (Best2all@msn.com); Carol Hendrix (clhhendrix@gmail.com); Carol Thompson (carolann65@yahoo.com); Carole Beck (2raintree3@indra.com); Charles and Angelina Bagalow (xmasangieb@aol.com); Craig Aschenback (craiga.ca69@gmail.com); Deb Rinkenberger (Deb.Morrell.0767@gmail.com); diane edes; Gloria Fisher; Ilene Wiburn (ileneuls@aol.com); Jon Rinkenberger; Karrey Van Sky (karreyvansky@comcast.net); Kathy Tribelhorn (kjtrib@live.com); Lynn Jacobs (nlynnj@comcast.net); Mary Lindsey; Neville Gaffioni (topgun@ecentral.com); Paul McPherson; Rick Andrews (rieckiea@gmail.com); Rick Lentz (writingman@comcast.net); Shannon Mayes (shannon.m.mayes@gmail.com); Steve Polutchko (spolutch@ball.com); Tammy Wrightsman (wrightsmant@gmail.com); Wendy Fulks; Bethune, Alana; Borgers, Sarah; Brislawn, Jeff P; Cantu, Dave; Gay, Stephen; Hose, Bob; Kellam V, Fred; Kevin Stewart (kstewart@udfcd.org); Klein, Heath; Krugmire, Bob; Karsjen, Kyle; Larsen, Rod; Martin Postma; Michael Bollinger (fhl.gm.mike@gmail.com); Nathan McCoy (nmccoy@churchditch.org); Nicole Aimone (nicole.aimone@fema.dhs.gov); Plas, Seth; ratkins@adcogov.org; Rope, Scott; Malesky, Sandy; Schmiechen, Paul; Tami Moon; Thompson - CDPS, Mark; Will Moser (wjmoser35@gmail.com); Williams, Sharon  
**Subject:** Community Risk Assessment Workshop info

Good Afternoon All,

As of today, I have 23 "yes" responses for the workshop scheduled on Oct 30<sup>th</sup>, 3-6 pm in the east training room on the second floor of the Public Safety Center at 9110 Yates. This is a great turnout and I hope those who have not RSVP'ed yet will be able to join us. I am planning on pizza and soft drinks.

I would invite you to take a look at the draft presentation I have posted at <https://www.facebook.com/City-of-Westminster-Emergency-Management-409969596020244/> I am not sure if you can see this without a Facebook account. It is not necessary to review this presentation prior to the workshop, but I know some folks are curious about what we are doing. FEMA also has some hazard information on their web site at <https://www.ready.gov/be-informed> but it is pretty generic and focused on preparedness measures.

This will be a facilitate discussion of our natural hazards. The presentation summarizes some of the Westminster specific research I have been doing. There will be other city staff present to share their knowledge of our hazards and of course we want to learn from the knowledge and experience of our residents. Once we have shared information, we will score the hazards based on likelihood, scale, and consequences.

Again, this is not a homework assignment, so don't worry. I know some have been curious to know a little more about what we are doing.

Thanks again for your interest and support of this important project. Your input and this assessment are essential elements of our Hazard Mitigation Plan update which will be used to identify projects and priorities. It is also a requirement for the maintenance of our eligibility for pre- and post-disaster federal mitigation grant funds.

I look forward to seeing everyone on the 30<sup>th</sup>!

Best Regards,

Greg Moser  
Emergency Management Coordinator  
City of Westminster  
(303) 658-4550 (office)  
(303) 589-7812 (cell)  
(303) 706-3913 (fax)  
[gmoser@CityofWestminster.us](mailto:gmoser@CityofWestminster.us)



**Memo for Record:** Community Participation in Risk Assessment Workshop for the Westminster HMP-Update, October 30, 2017, 15:00-18:00

**Community Participation:** Involvement of the whole community is one of the goals of the HMP-Update process. To facilitate this involvement, the Westminster Emergency Management Coordinator (EMC) has used Facebook

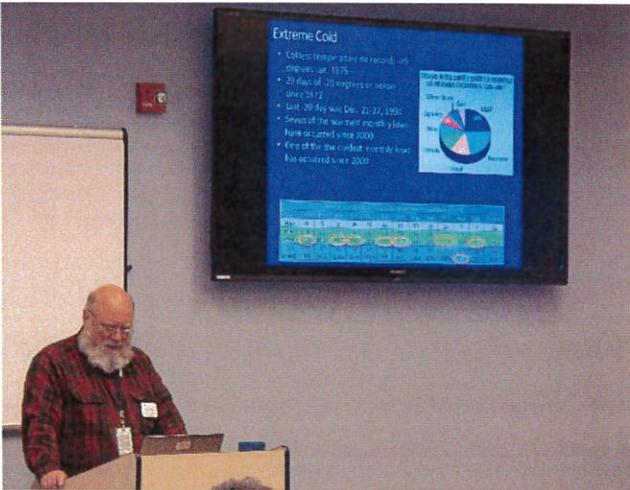
(<https://www.facebook.com/City-of-Westminster-Emergency-Management-409969596020244/>),

and the City Edition to invite community participation in our Community Risk Assessment. Four Facebook post between April 19<sup>th</sup> and October 11<sup>th</sup>, (reaching 9,496) and three articles in the City Edition (circulation of approx. 6,000) resulted in 27 community volunteers for the Community Risk Assessment Workshop which was held 3-6 pm (3 hours) on Oct. 30<sup>th</sup> in the Westminster Public Safety Center.



In addition to these local resident volunteers, eight city employees who are involved in the risk assessment process, representatives from Adams County, North Glenn, the Urban Drainage and Flood Control District and the National Weather Service-Boulder also participated. (sign-in sheet attached)

**Workshop Process:** Participants were invited to introduce themselves and describe their familiarity with the community and our natural hazards. The EMC provided a presentation that provided an overview of the HMP-Update, the community risk assessment process, and background information on the natural hazards. Subject matter experts and the residents were invited to share their knowledge and experience of our natural hazards. After the review of each hazard and brief discussion, the group was invited to complete worksheets that documented their assessment of each hazards likelihood, scale, duration and consequences.

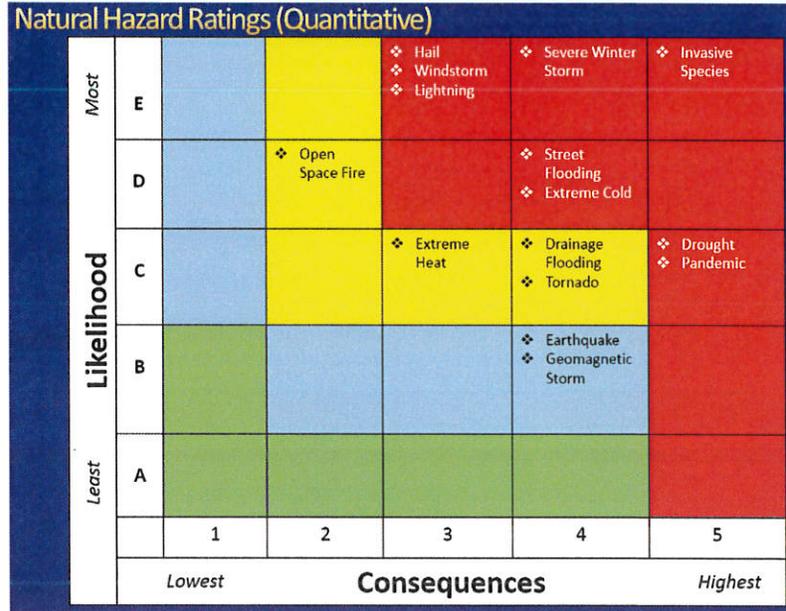


We are using a combination of quantitative and qualitative risk assessment. Each hazard is quantitatively scored using similar criteria as much as possible. Due to the diversity of hazards, this often leads to a distorted relative rating of the hazards. Using a qualitative approach, the scores are adjusted/rationalized by the EMC for review by the workshop participants and HMP Planning Team. Each qualitative adjustment is justified and documented.

In addition to scoring the hazards, participants were also asked whether they thought climate change was or was not a factor in the assessment of our local natural hazards.

**Workshop Roll-up and Reporting:**

The EMC intern collected the worksheets of the workshop participants and build an Xcel spreadsheet to average the results of the scoring process. The following flame chart is based on the quantitative methodology of the Community Risk Assessment Workshop.



Based on feedback and the continued interest of some city residents, a follow-on meeting is being scheduled to get more community input and “rationalize” the relative rating of the natural hazards based on individual and local concerns.

**Soft-Match Summary:** The following table summarizes the soft match resulting from the time of volunteers and city employees. The time of EMPG funded staff, federal employees, and the consulting staff is not reflected in this table (not eligible).

Name	Position	Hourly Rate	Hourly Rate X 3
27 Community Volunteers	Volunteer	\$25.97	\$2099.52
Rod Larsen	Open Space Manager	\$57.02	\$171.07
Bob Krugmire	Water Resources Engineer	41.46	\$124.37
John Kasza	City Forester	\$28.30	\$42.45 (1.5 hours)
Paul Schmiechen	Chief Sustainability Officer	\$59.52	\$178.55
Fred Kellam	Policy & Budget Analyst	47.92	\$143.75
Alana Bethune	Management Analyst	\$35.87	\$107.62
Bob Hose	Fire Marshall	\$59.52	\$178.55
<b>Soft Match Value</b>			<b>\$3,045.90</b>

Prepared by: Greg Moser  
 Emergency Management Coordinator  
[gmoser@cityofwestminster.us](mailto:gmoser@cityofwestminster.us)  
 November 9, 2017



# Natural Hazards Mitigation Plan-Update 2017 Meeting Record

Meeting Date: \_\_\_October 30, 2017\_\_\_

Meeting Time: \_\_\_3:00pm\_\_\_ to \_\_\_6:00pm\_\_\_

Location: \_\_\_PSC Training Room\_\_\_

**Topic/Agenda:**

- Introductions
- Overview of Methodology and Community Description
- Hazard Scoring

**Attendance:**

	Name	Position or Volunteer	Email
1	Kathy Tribelhorn		Kjtrib@live.com
2	Neville Gaggiani <sup>2</sup>		topgun@ecentral.com
3	Jeff. Brislawn	Amec Foster Wheeler	JeffBrislawn@woodcliff.com
3	Rick Andrews	Volunteer	rickiea@gmail.com <del>rickiea</del>
4	Jon Rink	Volunteer	Jon.rink@msis
5	Rod Larsen	OpenSpace Mgr.	rlarsen@cityofwestminster.us
5	Jason Aschenbrenner	American Red Assoc.	JAschenbrenner@AmericanRedCross
6	Debra Morrell	Volunteer	deb.morrell.0767@gmail.com
7	Anna Weidig	Volunteer	annabneidig@yahoo.com
8	Carol Hendrix	Volunteer	clhendrix@gmail.com
9	Ran Willoughby	Thornton Kidney Center Manager	dwilloughby@americanrenal.com
10	Bob Krugmir	Wat Ros Engineer	bkrugmir@cityofwestm...
10	Erica Forrette	Volunteer	elf2588@gmail.com
11	MATT TALESFORE	Volunteer	MTALS4@GMAIL.com



# Natural Hazards Mitigation Plan-Update 2017 Meeting Record

Meeting Date: \_\_\_October 30, 2017\_\_\_

Meeting Time: \_\_\_3:00pm\_\_\_ to \_\_\_6:00pm\_\_\_

Location: \_\_\_PSC Training Room\_\_\_

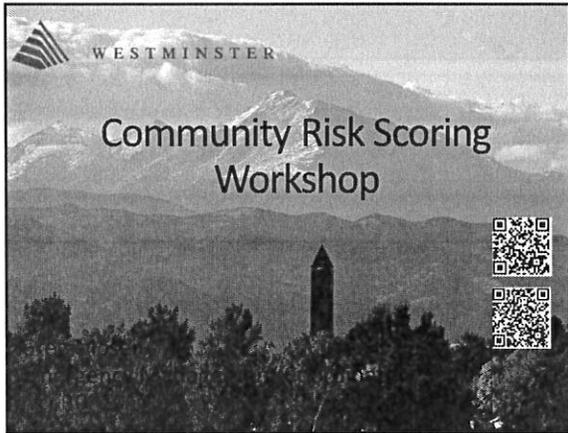
## Topic/Agenda:

- Introductions
- Overview of Methodology and Community Description
- Hazard Scoring

## Attendance:

	Name	Position or Volunteer	Email
14	Vicki Long		snappyjean1@gmail.com
15	Sherry Jones	Volunteer	sher.a.chocolate@gmail.com
16	Craig Aschenbach	Volunteer	craig.a.c69@gmail.com
	RICHARD ATKINS	ADAM'S CO OEM	ratkinse@adco.gov.org
	MARTIN POSTMA	City of Thornton	Martin.Postma@CityofThornton.net
17	CAROL THOMPSON	VOLUNTEER	Carolann65@yahoo.com
18	Irene Wilson	Volunteer	ilene.wilson@aol.com
19	JACOB ARUNUETA	AREA	JARUNUETA@AmericanEthal.com
20	Rick Lett	Vol	writingman@comcast.net
E3	Paul Schmiechen	Westminster CMO	
21	Maie Barton	Volunteer	thebartons_1@msn.com
	GREG HANSON	WARMING CODED - METEOROLOGIST NOAA/NWS	gregory.hanson@noaa.gov
E4	Fred Kellam	CMO Policy & Budget Analyst	f.kellam@cityofwestminster.us
22	Beverly Best	Volunteer	best2all@msn.com

23	Annie Contractor	Volunteer	abecontractor7@gmail
24	MARY LINDSEY HERR	Volunteer	mary@DENVERBallroomDancing.com
25	Karney Van Sky	Volunteer	karneyvansky@comcast.net
26	Shannon Mayes	Volunteer	Shannon.M.Mayes@gmail
E5	ALANA BETHUNE	CITY EMPLOYEE	ABETHUNE@CITYOFWESTMINSTER.US
E6	BOB HOSE	WFO EMPLOYEE	bhose@cityofwestminster.us
E7	Greg Moser	WM EMP	gmoser@cityofwestminster.us
<del>E8</del> 27	Will Moser	WM EMP <small>intern</small>	willmoser@gmail.com
	26 Citizens		
	3 City Employee		
	Reps of NWS, ; UN7ED		
	neig min ; Adams City DEM		
	40		



---

---

---

---

---

---

---

---

**Overview**

- Project Background
- Review of risk scoring worksheet
- Overview of natural hazards
- Hazard evaluation and scoring

Purpose:

- Learn from one another
- Gather citizen input

---

---

---

---

---

---

---

---

**Hazard Mitigation & Risk Assessment**

- What is mitigation?
- Why do we do it?
- The mitigation planning process
  - Risk assessment
  - Mitigation strategies & priorities
  - Implementation
  - Review and update

---

---

---

---

---

---

---

---



### Risk Scoring Criteria/Methodology

- Review hazard information
- Rate/estimate likelihood
- Rate/estimate impacts
  - Extent
  - Duration
  - Consequences

- Consequences

  - Human
  - Material
  - Economic
  - Environmental
  - Operational

---

---

---

---

---

---

---

---

### Likelihood of Occurrence

- A – Negligible: This event occurs periodically over the course of multiple generations
- B – Rare: This is a “once in a lifetime” type of event
- C – Unlikely: This event tends to occur once a decade
- D – Likely: This event occurs multiple times a decade
- E – Probable: This event is common and can occur on a yearly basis

---

---

---

---

---

---

---

---

### Scale-Area Directly Affected

- 1 – Single Site: A single building or portion of
- 2 – Local Event: Multiple buildings, up to a city block
- 3 – Community Event: Multiple city blocks
- 4 – Broad Area Event: Affects up to ten square miles of Westminster, or the entire city
- 5 – Regional/National Event: Affects ten or more square miles of Westminster

---

---

---

---

---

---

---

---



**Minor Consequences (2)**

- ☛ Some **minor injuries**, but no impact on routine hospital operations
- ☛ Up to a 5% increase in calls for first responders
- ☛ **Minor impacts** on the quality of life and the environment, (up to 3 hour disruptions of power, water and/or communications and other critical infrastructures)
- ☛ **Property losses of less than 2%**
- ☛ No negative reporting of the response efforts.
- ☛ Minor anxiety, possible press reporting on the event
- ☛ Litigation is probable

---

---

---

---

---

---

---

---

**Moderate Consequences (3)**

- ☛ **Some injuries** requiring medical treatment, possible impact on hospital operations.
- ☛ Up to a 20% increase in calls for first response, addition staffing required
- ☛ **Moderate impacts on the quality of life and environment** (loss of, or delayed services; degraded environment causing possible health problems)
- ☛ **Disruption of essential services** (power, water, and/or communications) and other critical infrastructures disrupted for 12-24 hours.
- ☛ **Property losses up to 10%.**
- ☛ Increased calls for/expectations of local officials.
- ☛ Moderate anxiety. People's routines are being disrupted. Increased press reporting on the event and the impact it is having on people's lives and sense of well-being.
- ☛ Possibility of class action in excess of \$1 million

---

---

---

---

---

---

---

---

**Significant Consequences (4)**

- ☛ **Some injuries** requiring medical treatment, possible impact on hospital operations.
- ☛ Up to a 20% increase in calls for first response, addition staffing required
- ☛ **Moderate impacts on the quality of life and environment** (loss of, or delayed services; degraded environment causing possible health problems)
- ☛ **Disruption of essential services** (power, water, and/or communications) and other critical infrastructures disrupted for 12-24 hours.
- ☛ Property losses up to 10%.
- ☛ Increased calls for/expectations of local officials.
- ☛ Moderate anxiety. People's routines are being disrupted. Increased press reporting on the event and the impact it is having on people's lives and sense of well-being.
- ☛ Possibility of class action in excess of \$1 million

---

---

---

---

---

---

---

---

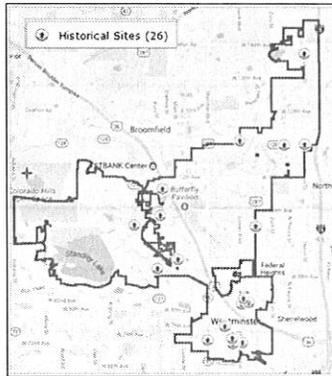






### Historic Sites

- 6 X Residences
- 9 X Farm, ranch, agriculture related
- 4 X Commercial
- 2 X Civic/government
- 4 X Educational
- 1 X Cemetery




---

---

---

---

---

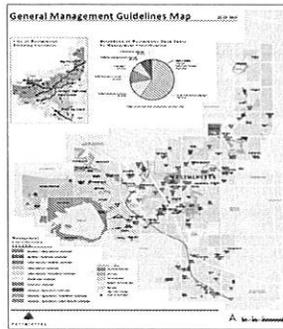
---

---

---

### Open Space

- Urban and Natural Landscape - 1,815 acres
- Transitional Landscape - 393 acres
- Functional Landscape - 332 acres
- Historic/Agricultural - 208 acres
- Sensitive Landscape - 78 acres
- Other - 241 acres
- 14,000 trees




---

---

---

---

---

---

---

---

Natural Hazard Review  
& Scoring

---

---

---

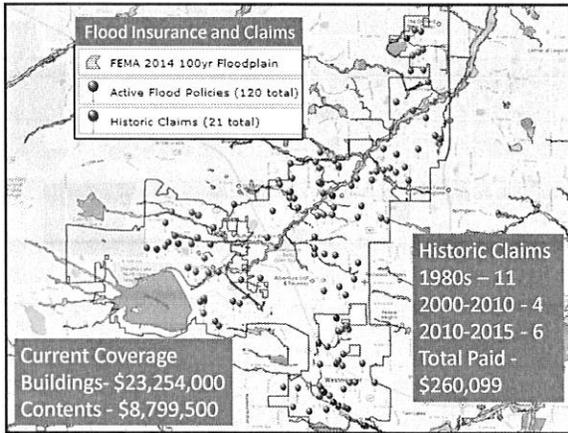
---

---

---

---

---




---

---

---

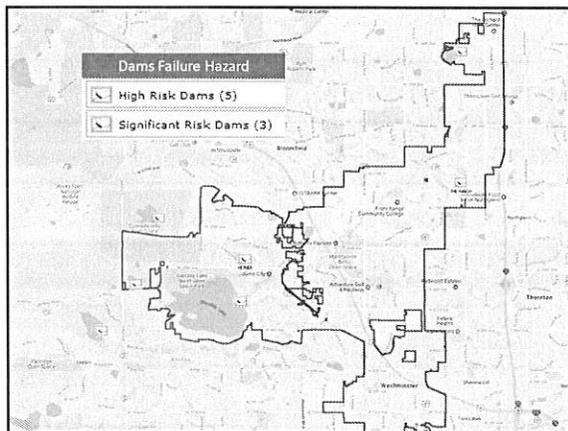
---

---

---

---

---




---

---

---

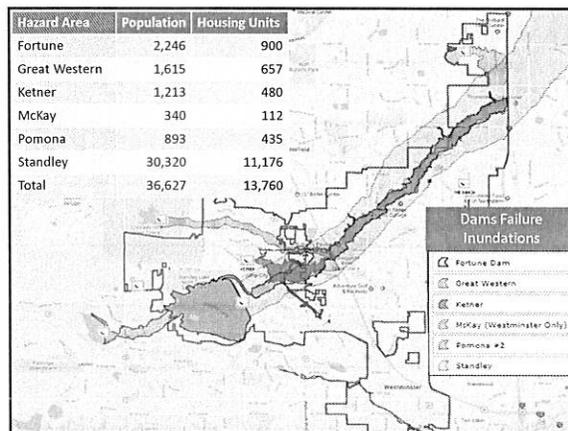
---

---

---

---

---




---

---

---

---

---

---

---

---







Is climate change a factor in Westminster's natural hazards?

- a: Yes
- b: Possibly
- c: No
- d: No opinion

---

---

---

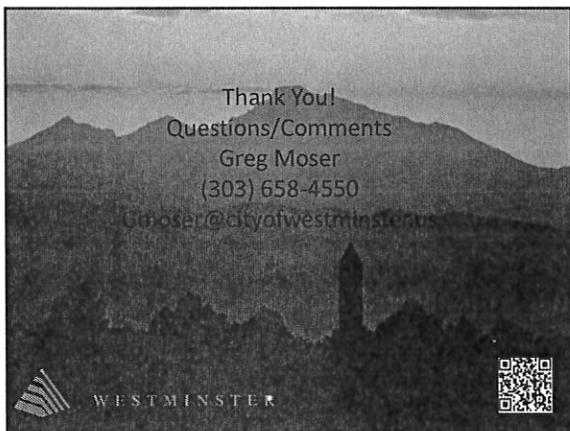
---

---

---

---

---



---

---

---

---

---

---

---

---

Community Hazard Scoring Worksheet (Oct. 30, 2017)

Hazard	Likelihood (A-E)	Scale (1-5)	Duration (1-5)	Consequence (1-5)	Comments
Riverine Flooding					
Street Flooding					
Hail					
Windstorm					
Tornado					
Extreme Cold					
Blizzards					
Extreme Heat					
Drought					
Open Space Fire					
Earthquake					
Geomagnetic Storm					
Pandemic					
Invasive Species					

Is climate change a factor in Westminster's natural hazards?

- a. Yes
- b. Possibly
- c. No
- d. No opinion/I don't know

Other Comments/Notes:

## Likelihood

- **A – Negligible:** This event occurs periodically over the course of multiple generations
- **B – Rare:** This is a “once in a lifetime” type of event
- **C – Unlikely:** This event tends to occur once a decade
- **D – Likely:** This event occurs multiple times a decade
- **E – Probable:** This event is common and can occur on a yearly basis

## Scale (the area directly affected by the event)

- **1 – Single Site:** A single building or portion of
- **2 – Local Event:** Multiple buildings, up to a city block
- **3 – Community Event:** Multiple city blocks
- **4 – Broad Area Event:** Affects up to ten square miles of Westminster, or the entire city
- **5 – Regional/National Event:** Affects ten or more square miles of Westminster

## Duration (Onset, Response and Recovery)

- **1 – Single Operational Period:** Up to 12 hours
- **2 – Extended Operations:** Up to 24 hours
- **3 – Short Term:** Up to one week
- **4 – Medium Term:** Up to three weeks
- **5 – Long Term:** A month or longer

## Consequences (if the event meets any single criteria, use the associate score)

### 1 -Negligible:

- No direct injuries
- Minimal impact on quality-of-life and the environment (less than 1 hour disruption of water, power or communications, minor reduction in air or water quality)
- Routine 1<sup>st</sup> response activities
- No impact on critical facilities
- Less than 1% in property damages.
- No change in people’s normal routine
- Low probability of litigation

### 2-Minor:

- Some minor injuries, but no impact on routine hospital operations
- Up to a 5% increase in calls for first responders



- Minor impacts on the quality of life and the environment, (up to 3 hour disruptions of power, water and/or communications and other critical infrastructures)
- Property losses of less than 2%.
- No negative reporting of the response efforts.
- Minor anxiety, possible press reporting on the event
- Litigation is probable

### **3-Moderate:**

- Some injuries requiring medical treatment, possible impact on hospital operations.
- Up to a 20% increase in calls for first response, addition staffing required
- Moderate impacts on the quality of life and environment (loss of, or delayed services; degraded environment causing possible health problems)
- Disruption of essential services (power, water, and/or communications) and other critical infrastructures disrupted for 12-24 hours.
- Property losses up to 10%.
- Increased calls for/expectations of local officials.
- Moderate anxiety. People's routines are being disrupted. Increased press reporting on the event and the impact it is having on people's lives and sense of well-being.
- Possibility of class action in excess of \$1 million

### **4-Significant:**

- Some deaths; major and minor injuries; hospital capacity is under stress.
- Up to a 50% increase in calls for first-response or a loss of emergency calling services.
- Limited mutual aid requested for neighboring communities or national agencies
- Significant impacts on the quality of life and environment (limitations on transportation, reduction or loss of power, water and/or communications; reduced air and water quality)
- Disruptions of essential services (power, water and/or communications) for 24-72 hours.
- Increased calls for/expectations of national officials and leadership. Some evidence of frustration or anger with public officials. Possible press reporting of public frustration
- Property losses of up to 25%.
- Class action highly probable for multiple millions of dollars

### **5-Catastrophic:**

- Numerous deaths and serious injuries; hospital capacity exceeded and outside medical assistance is required
- Emergency services capacity exceeded; significant mutual aid is needed from adjacent communities and national agencies
- Increased emergency calls (or loss of service) are resulting in delayed responses exceeding 1 hour.
- Impact on environment poses a serious threat to the health and safety, wildlife, and flora.
- Essential services (water, power and/or communications) and other services are disrupted in excess of 72 hours.
- Evidence of significant frustration or anger directed at public officials or leadership. Frequent negative national and/or international press reporting on the event and response efforts.
- Property losses exceed 50%



- Class action in excess of \$500 million

# Natural Hazards Mitigation Plan-Update 2017 Meeting Record

Meeting Date: \_\_\_ October 30, 2017 \_\_\_

Meeting Time: \_\_\_ 3:00pm \_\_\_ to \_\_\_ 6:00pm \_\_\_

Location: \_\_\_ PSC Training Room \_\_\_

## Topic/Agenda:

- Introductions
- Overview of Methodology and Community Description
- Hazard Scoring

## Attendance:

	Name	Position or Volunteer	Email
1	Kathy Tribelhorn		Kjtrib@live.com
2	Neville Gaggiani		topgun@ecentral.com
3	Jeff Brislawn	Amer Foster Wheeler	Jeffbrislawn@woodplc.com
3	Rick Andrews	Volunteer	rickiea@gmail.com <del>rickiea@</del>
4	Jon Rinkenburg	Volunteer	jon.rink@ms
5	Rod Larsen	OpenSpace Mgr.	rlarsen@cityofwestminster.us
5	Jason Aschenbrenner	American Red Cross	JAschenbrenner@AmericanRedCross
6	Debra Morrell	Volunteer	deb.morrell.0767@gmail
7	Anna Weidig	Volunteer	annabneidig@yahoo.com
8	Carol Hendrix	Volunteer	clhendrix@gmail.com
9	Ron Willoughby	Thornton Kidney Center Manager	rwilloughby@americanrenal.com
10	Bob Krugmir	Wat Res Engineer	bkrugmir@cityofwestm...
10	Erica Forrette	Volunteer	elf2588@gmail.com
11	MATT TALESFORE	Volunteer	MATLS4@GMAIL.COM



# Natural Hazards Mitigation Plan-Update 2017 Meeting Record

Meeting Date: \_\_\_ October 30, 2017 \_\_\_

Meeting Time: \_\_\_ 3:00pm \_\_\_ to \_\_\_ 6:00pm \_\_\_

Location: \_\_\_ PSC Training Room \_\_\_

## Topic/Agenda:

- Introductions
- Overview of Methodology and Community Description
- Hazard Scoring

## Attendance:

	Name	Position or Volunteer	Email
14	Vicki Long		snappyjeant@gmail.com
15	Sherry Jones	Volunteer	sher.a.chocolate@gmail.com
16	Craig Aschenbach	Volunteer	craig.a.c69@gmail.com
	RICHARD ATKINS	ADAM'S CO OEM	ratkinse@adco.gov.org
	MARTIN POSTMA	City of Thornton	Martin.Postma@CityofThornton.net
17	CAROL THOMPSON	VOLUNTEER	Carolann65@yahoo.com
18	Irene Wilson	Volunteer	ilene.wilson@aol.com
19	JACOB ARMULETA	ARMA	JARWUETA@AmericanEchell.com
20	Rick Lett	Vol	writingman@comcast.net
E	Paul Schmiechen	Westminster CMO	
21	Maie Barton	Volunteer	thebartons_1@msn.com
	GREG HANSON	WARNING CODED. METEOROLOGIST NOAA/NWS	gregory.hanson@noaa.gov
E	Fred Kellam	CMO Policy & Budget Analyst	fkellam@cityofwestminster.us
22	Beverly Best	Volunteer	best2all@msn.com



## Moser, Greg

---

**Subject:** Management Team Meeting  
**Location:** City Park Rec. Center

**Start:** Thu 1/25/2018 7:30 AM  
**End:** Thu 1/25/2018 9:00 AM

**Recurrence:** (none)

**Meeting Status:** Accepted

**Organizer:** Holland, Alyssa

**Required Attendees:** Management Team; Gralund, Rachel; Schroeder, Kathryn

**Optional Attendees:** Hord, Dan; Cohen, Jodi; Miller, Marina; Schulte, Kelli; Cressman, Mike; Kmita, Patricia; Greenfield, Jane; Genck, Jason; Dowling, Bob; Ault-Williams, Angie; Stevens, Karen; Elliott, Jeri; Bowers, Russ; Birk, Erik; Gray, Christine; Korrell, Kiara; Loseman, Dave; Chrisman, Lisa; Joy, Caroline; Erichson, Martee; Booco, Matthew; Martin, Dee; Noonung, Tami; June, Jackie; Pendleton, Samuel; Lachermeier, Joe; Gay, Stephen; Schutt, Cassandra; Lester, Dave; Skarbek, Kate; Johnson, Lance; Diaz, Donna; Betz, Jeff; Opie, Barbara; McConnell, John; Varney, Dave; Carlson, Tim; Takahashi, Scott; Prehn, Jen; Baskett, Debra; LaChance, Scott; Booco, Theresa; Cutler, Justin; Barron, Kim; Gray, Christopher; Garcia, Joyce; Puntenney, David; Erb, Kodi; Tripp, Don; Otzelberger, Aric; Thornton, Jonathan; Kayl, Cindy; McCabe, Traves; Beren, Kevin; Barker, Rick; Sagel, Dave; Carroll, Jodie; Annand, Leslie; Byerhof, Bob; Murdie, Scott; McDaniel, Kim; Sanchez, Cherie; Haubert, Norm; Garlick, Larry; Gay, Karen; Hitchens, Tammy; Rea, Art; Fuselier, Brian; Schwab, Sandy; Sorice, Tiffany; Priddy, Alexa; Spellman, Paul; Grucelski, Brian; Smith, Bev; Kirschbaum, Max; Layfield, Karen; Borgers, Sarah; Harris, Mike; Hegreness, Ryan; Wood, Shelby; Reid, Joe; Martinez, Marie; Lindsey, Chris; Reeves, Todd; Moser, Greg; Andrews, Jody; Grafton, Jenni; Horras, Dave; Troller, Stephanie; Plas, Seth; Bowers, Jackie; Hall, John; Klein, Heath; Burke, John; Minard, Derik; Nurmela, Sarah; Hunter, Maggie; Dolan, Barb; Boespflug, Gene; Hall, Doug; Grooters, Stephen; Cantu, Dave; Kellam V, Fred; Parker, Michelle; Hose, Bob; Fabisiak, Mary; Maikranz, Dave; Frankel, David; Work, Bill; Shires, Phil; Lieser, Jake; McCuiston, Ron; Schmiechen, Paul; Villano, Dean; Downing, Dave; Takata, Jill; Hendershot, Edna; Littlejohn, Emily; Cline, Candyce; Kyle, Rhoda; Clanton, J.R.

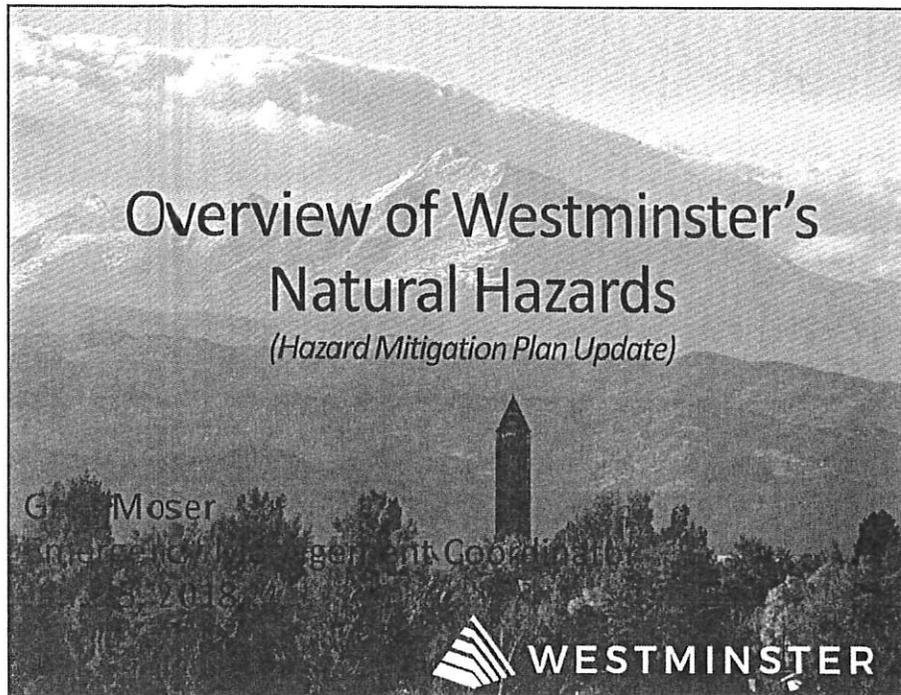
Please remember that this Thursday's meeting will be held at City Park Rec Center. Apologies for any inconvenience this change causes. But... BREAKFAST and HOT COFFEE will still be served!

The morning will consist of-

15min-Introduction and welcome

40min- Homelessness: Don Burnes

30min- Emergency Preparedness & Natural Hazards: Greg Moser, Fire Department



Agenda  
for Emergency  
Management - EWP

## Overview

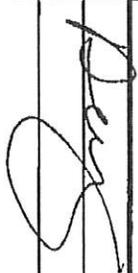
- Overview of mitigation planning effort
- Overview of natural hazards
- Review of risk scoring worksheet
- Hazard assessment requests
  - Be aware of the Mitigation Plan and risk assessment
  - Review the draft risk assessment (P Drive, Emergency Management, Risk Assessment)
  - Share your knowledge and expertise
  - Complete a worksheet
  - Sign up for the EMC classes
  - Like the EM Facebook page for updates

Citywide Management Team Attendance Sheet  
 Thursday, January 25, 2018

OK 1.5 hrs City Team  
 1/25/18

Employee #	Last Name	First Name	DEPT	Title	Signature
[REDACTED]	Andrews	Jody	CMO	Deputy City Manager	
[REDACTED]	Annand	Leslie	CAO	Assistant City Attorney II	
[REDACTED]	Arguello	Ron	CAO	Assistant City Attorney	<i>[Signature]</i>
[REDACTED]	Barron	Kim	POLICE	Deputy Police Chief	
[REDACTED]	Baskett	Debra	CD	Senior Transportation & Mobility Planner	
[REDACTED]	Beren	Kevin	POLICE	Police Commander	
[REDACTED]	Betz	Jeff	CAO	Assistant City Attorney II	<i>[Signature]</i>
[REDACTED]	Birk	Erik	FIRE	EMS Battalion Chief	<i>[Signature]</i>
[REDACTED]	Boespflug	Gene	POLICE	Police Commander	<i>[Signature]</i>
[REDACTED]	Booco	Theresa	CMO	Policy & Budget Analyst	<i>[Signature]</i>
[REDACTED]	Booco	Matthew	GS	General Services Director	<i>[Signature]</i>
[REDACTED]	Borgers	Sarah	PWU	Water Resources & Quality Manager	
[REDACTED]	Bowers	Jackie	CMO	Executive Aide	
[REDACTED]	Bowers	Russ	POLICE	Communications Administrator	
[REDACTED]	Burke	John	Eco Devo	Senior Projects Engineer	<i>[Signature]</i>
[REDACTED]	Byerhof	Bob	FIN	Treasury Manager	
[REDACTED]	Cantu	Dave	PWU	Streets Manager	
[REDACTED]	Carlson	Tim	POLICE	Police Chief	
[REDACTED]	Carroll	Jodie	CMO	Communications & Outreach Coordinator	<i>[Signature]</i>
[REDACTED]	Chrisman	Lisa	HR	Human Resources Manager	
[REDACTED]	Clanton	J.R.	PR&L	Library Services Manager	
[REDACTED]	Cline	Candyce	GS	Associate Judge	
[REDACTED]	Cohen	Jodie	HR	Senior Human Resources Analyst	
[REDACTED]	Cutler	Justin	PR&L	PR&L Recreation Services Manager	
[REDACTED]	Decker	Kristen	CAO	Deputy City Attorney	

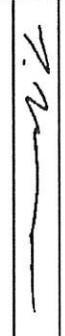
Citywide Management Team Attendance Sheet  
Thursday, January 25, 2018

Employee #	Last Name	First Name	DEPT	Title	Signature
[REDACTED]	Diaz	Donna	HR	Human Resources Administrator	
[REDACTED]	Dolan	Barb	FIN	Sales Tax Manager	
[REDACTED]	Dowling	Bob	POLICE	Police Commander	
[REDACTED]	Downing	Dave	CD	Community Development Director	
[REDACTED]	Elliott	Jeri	POLICE	Senior Management Analyst	
[REDACTED]	Erb	Kodi	CWO	Executive Administrator	
[REDACTED]	Erichson	Martee	HR	Human Resources Manager	
[REDACTED]	Fabisiak	Mary	PWU	Water Resources & Quality Administrator	
[REDACTED]	Frankel	Dave	CAO	City Attorney	
[REDACTED]	Fuselier	Brian	CAO	Lead Prosecuting Attorney	
[REDACTED]	Garcia	Joyce	IT	Executive Assistant	
[REDACTED]	Garlick	Larry	IT	IT Services Administrator	
[REDACTED]	Gay	Stephen	PWU	Utilities Operations Manager	
[REDACTED]	Genck	Jason	PR&L	Director of Parks, Recreation & Libraries	
[REDACTED]	Grafton	Jenni	Eco Devo	Senior Economic Development Officer	
[REDACTED]	Gray	Chris A.	Eco Devo	Economic Development Officer	
[REDACTED]	Gray	Christine	PWU	Business Operations Coordinator	
[REDACTED]	Grooters	Stephen	PWU	Utilities Engineering Manager	
[REDACTED]	Gruclski	Brian	GS	Facilities Manager	
[REDACTED]	Hall	John L.	Eco Devo	Director of Economic Development	
[REDACTED]	Hall	Doug	FIRE	Fire Chief	
[REDACTED]	Harris	Mike	GS	Facilities Supervisor	
[REDACTED]	Haubert	Norm	POLICE	Police Commander	
[REDACTED]	Hegreness	Ryan	PR&L	PR&L Operations Manager	
[REDACTED]	Hendershot	Edna	POLICE	Police Commander	

**Citywide Management Team Attendance Sheet**  
 Thursday, January 25, 2018

Employee #	Last Name	First Name	DEPT	Title	Signature
[REDACTED]	Hitchens	Tammy	FIN	Director of Finance Department	
[REDACTED]	Hogan	Drew	POLICE	Victim Services Coordinator	
[REDACTED]	Holland	Alyssa	CMO	Executive Aide	<i>a to Clerk</i>
[REDACTED]	Hord	Dan	IT	Sr. Telecommunications Administrator	
[REDACTED]	Horras	Dave	CD	Chief Building Official	<i>DR</i>
[REDACTED]	Hose	Bob	FIRE	Fire Marshal	<i>R. J. [Signature]</i>
[REDACTED]	Hunter	Maggie	FIN	Executive Assistant	<i>Maggie Hunter</i>
[REDACTED]	Johnson	Lance	PR&L	Park Services Manager	
[REDACTED]	Joy	Caroline	Eco Devo	Economic Marketing Coordinator	
[REDACTED]	June	Jackie	HR	Employee Development Coordinator	
[REDACTED]	Kayl	Cindy	CD	Executive Assistant	
[REDACTED]	Kellam	Fred	CMO	Policy & Budget Analyst	
[REDACTED]	Kirschbaum	Max	PWU	Public Works & Utilities Director	<i>Max EK</i>
[REDACTED]	Klein	Heath	CD	City Engineer	
[REDACTED]	Kmita	Patricia	GS	Court Administrator	
[REDACTED]	Koehler	Kristen	PR&L	Management Analyst	
[REDACTED]	Korrell	Kiara	PWU	Executive Assistant	<i>Kiara</i>
[REDACTED]	Kyle	Rhoda	POLICE	Records Manager	
[REDACTED]	LaChance	Scott	POLICE	Police Commander	
[REDACTED]	Lachermeier	Joe	FIN	Purchasing Officer	
[REDACTED]	Larsen	Rod	PR&L	Open Space Manager	<i>Rod</i>
[REDACTED]	Layfield	Karen	HR	Human Resources Analyst	
[REDACTED]	Lester	Dave	POLICE	Police Commander	
[REDACTED]	Lindsey	Chris	CMO	Policy & Budget Manager	
[REDACTED]	Loseman	Dave	CD	Development Manager	

**Citywide Management Team Attendance Sheet**  
Thursday, January 25, 2018

Employee #	Last Name	First Name	DEPT	Title	Signature
[REDACTED]	Maikranz	Dave	FIRE	Training Chief	
[REDACTED]	Martin	Dee	HR	Director of Human Resources	
[REDACTED]	Martinez	Marie	HR	Senior Human Resources Analyst	
[REDACTED]	McCabe	Traves	CMO	Information Records Administrator	
[REDACTED]	McConnell	John	CD	Principal Planner	
[REDACTED]	McCuston	Ron	FIRE	Battalion Chief	
[REDACTED]	McDaniel	Kim	FIN	Pension Administrator	
[REDACTED]	Miller	Marina	HR	Senior Human Resources Analyst	
[REDACTED]	Minard	Derik	FIRE	Deputy Chief / Operations	
[REDACTED]	Moser	Greg	FIRE	Emergency Management Coordinator	
[REDACTED]	Nooning	Tami	HR / GS	Executive Assistant	
[REDACTED]	Nurmela	Sarah	Eco Devo	Senior Projects Engineer	
[REDACTED]	Ochtera	Tom	GS	Energy & Capital Projects Coordinator	
[REDACTED]	Opie	Barbara	CMO	Deputy City Manager	
[REDACTED]	Otzelberger	Aric	CD	Business Operations Coordinator	
[REDACTED]	Parker	Michelle	CMO	City Clerk	
[REDACTED]	Pias	Seth	CD	Senior Projects Engineer	
[REDACTED]	Prehn	Jen	GS	Fleet Mgr / Business Operations Coordinator	
[REDACTED]	Priddy	Alexa	CMO	Communications & Outreach Coordinator	
[REDACTED]	Puntenney	David	IT	Director of Information Technology	
[REDACTED]	Rea	Art	IT	Software Engineering Manager	
[REDACTED]	Reeves	Todd	POLICE	Deputy Police Chief	
[REDACTED]	Reid	Joe	CMO	Communications & Outreach Manager	
[REDACTED]	Sanchez	Cherie	FIN	Accounting Manager	
[REDACTED]	Schmiechen	Paul	CMO	Sustainability Coordinator	

Citywide Management Team Attendance Sheet  
Thursday, January 25, 2018

Employee #	Last Name	First Name	DEPT	Title	Signature
[REDACTED]	Schulte	Kelli	FIN	Grant & Contract Coordinator	
[REDACTED]	Schutt	Cassandra	FIRE	Executive Assistant	
[REDACTED]	Schwab	Sandy	POLICE	Executive Assistant	
[REDACTED]	Shires	Phil	IT	Information Systems Manager	
[REDACTED]	Skarbek	Kate	PR&L	Analyst of Special Projects	
[REDACTED]	Smith	Bev	CAO	Legal Administrator	<i>Bev Smith</i>
[REDACTED]	Sorice	Tiffany	GS	Municipal Judge	
[REDACTED]	Spellman	Paul	FIRE	Battalion Chief	
[REDACTED]	Stevens	Karen	CAO	Deputy City Attorney	
[REDACTED]	Takahashi	Scott	POLICE	Police Commander	<i>Scott Takahashi</i>
[REDACTED]	Takata	Jill	HR	Benefits Administrator	<i>Jill Takata</i>
[REDACTED]	Thornton	Jonathan	CMO	Communications & Outreach Coord.	
[REDACTED]	Tripp	Don	CMO	City Manager	
[REDACTED]	Troller	Stephanie	Eco Devo	Senior Economic Development Officer	
[REDACTED]	Varney	Dave	FIRE	Battalion Chief	
[REDACTED]	Villano	Dean	POLICE	Police Commander	
[REDACTED]	Williams	Angie	PR&L	Executive Assistant	<i>Angie Williams</i>
[REDACTED]	Wood	Shelby	Eco Devo	Executive Assistant	
[REDACTED]	Work	Bill	FIRE	Deputy Chief / Administration	
[REDACTED]			CD	Senior-Projects Coordinator	

**Citywide Management Team Attendance Sheet**  
 Thursday, January 25, 2018

Employee #	Last Name	First Name	DEPT	Title	Signature
[REDACTED]	Andrews	Jody	CMO	Deputy City Manager	
[REDACTED]	Annand	Leslie	CAO	Assistant City Attorney II	
[REDACTED]	Arguello	Ron	CAO	Assistant City Attorney	
[REDACTED]	Barron	Kim	POLICE	Deputy Police Chief	
[REDACTED]	Baskett	Debra	CD	Senior Transportation & Mobility Planner	
[REDACTED]	Beren	Kevin	POLICE	Police Commander	
[REDACTED]	Betz	Jeff	CAO	Assistant City Attorney II	
[REDACTED]	Birk	Erik	FIRE	EMS Battalion Chief	
[REDACTED]	Boespflug	Gene	POLICE	Police Commander	
[REDACTED]	Booco	Theresa	CMO	Policy & Budget Analyst	
[REDACTED]	Booco	Matthew	GS	General Services Director	
[REDACTED]	Borgers	Sarah	PWU	Water Resources & Quality Manager	
[REDACTED]	Borgers	Jackie	CMO	Executive Aide	
[REDACTED]	Bowers	Russ	POLICE	Communications Administrator	
[REDACTED]	Burke	John	Eco Devo	Senior Projects Engineer	
[REDACTED]	Byerhof	Bob	FIN	Treasury Manager	
[REDACTED]	Cantu	Dave	PWU	Streets Manager	
[REDACTED]	Carlson	Tim	POLICE	Police Chief	
[REDACTED]	Carroll	Jodie	CMO	Communications & Outreach Coordinator	
[REDACTED]	Chrisman	Lisa	HR	Human Resources Manager	
[REDACTED]	Clanton	J.R.	PR&L	Library Services Manager	
[REDACTED]	Cline	Candyce	GS	Associate Judge	
[REDACTED]	Cohen	Jodie	HR	Senior Human Resources Analyst	
[REDACTED]	Cutler	Justin	PR&L	PR&L Recreation Services Manager	
[REDACTED]	Decker	Kristen	CAO	Deputy City Attorney	

Citywide Management Team Attendance Sheet  
Thursday, January 25, 2018

Employee #	Last Name	First Name	DEPT	Title	Signature
[REDACTED]	Diaz	Donna	HR	Human Resources Administrator	[Signature]
[REDACTED]	Dolan	Barb	FIN	Sales Tax Manager	[Signature]
[REDACTED]	Dowling	Bob	POLICE	Police Commander	[Signature]
[REDACTED]	Downing	Dave	CD	Community Development Director	[Signature]
[REDACTED]	Elliott	Jeri	POLICE	Senior Management Analyst	[Signature]
[REDACTED]	Erb	Kodi	CMO	Executive Administrator	[Signature]
[REDACTED]	Erichson	Martee	HR	Human Resources Manager	[Signature]
[REDACTED]	Fabisiak	Mary	PWU	Water Resources & Quality Administrator	[Signature]
[REDACTED]	Frankel	Dave	CAO	City Attorney	[Signature]
[REDACTED]	Fuselier	Brian	CAO	Lead Prosecuting Attorney	[Signature]
[REDACTED]	Garcia	Joyce	IT	Executive Assistant	[Signature]
[REDACTED]	Garlick	Larry	IT	IT Services Administrator	[Signature]
[REDACTED]	Gay	Stephen	PWU	Utilities Operations Manager	[Signature]
[REDACTED]	Genck	Jason	PR&L	Director of Parks, Recreation & Libraries	[Signature]
[REDACTED]	Grafton	Jenni	Eco Devo	Senior Economic Development Officer	[Signature]
[REDACTED]	Gray	Chris A.	Eco Devo	Economic Development Officer	[Signature]
[REDACTED]	Gray	Christine	PWU	Business Operations Coordinator	[Signature]
[REDACTED]	Grooters	Stephen	PWU	Utilities Engineering Manager	[Signature]
[REDACTED]	Gruelski	Brian	GS	Facilities Manager	[Signature]
[REDACTED]	Hall	John L.	Eco Devo	Director of Economic Development	[Signature]
[REDACTED]	Hall	Doug	FIRE	Fire Chief	[Signature]
[REDACTED]	Harris	Mike	GS	Facilities Supervisor	[Signature]
[REDACTED]	Haubert	Norm	POLICE	Police Commander	[Signature]
[REDACTED]	Hegreness	Ryan	PR&L	PR&L Operations Manager	[Signature]
[REDACTED]	Hendershot	Edna	POLICE	Police Commander	[Signature]

Citywide Management Team Attendance Sheet

Thursday, January 25, 2018

Employee #	Last Name	First Name	DEPT	Title	Signature
[REDACTED]	Hitchens	Tammy	FIN	Director of Finance Department	
[REDACTED]	Hogan	Drew	POLICE	Victim Services Coordinator	
[REDACTED]	Holland	Alyssa	CMO	Executive Aide	
[REDACTED]	Hord	Dan	IT	Sr. Telecommunications Administrator	
[REDACTED]	Horras	Dave	CD	Chief Building Official	
[REDACTED]	Hose	Bob	FIRE	Fire Marshal	
[REDACTED]	Hunter	Maggie	FIN	Executive Assistant	
[REDACTED]	Johnson	Lance	PR&L	Park Services Manager	
[REDACTED]	Joy	Caroline	Eco Devo	Economic Marketing Coordinator	
[REDACTED]	June	Jackie	HR	Employee Development Coordinator	
[REDACTED]	Kayl	Cindy	CD	Executive Assistant	
[REDACTED]	Kellam	Fred	CMO	Policy & Budget Analyst	
[REDACTED]	Kirschbaum	Max	PWU	Public Works & Utilities Director	
[REDACTED]	Klein	Heath	CD	City Engineer	
[REDACTED]	Kmitta	Patricia	GS	Court Administrator	
[REDACTED]	Koehler	Kristen	PR&L	Management Analyst	
[REDACTED]	Korrell	Kiara	PWU	Executive Assistant	
[REDACTED]	Kyle	Rhoda	POLICE	Records Manager	
[REDACTED]	LaChance	Scott	POLICE	Police Commander	
[REDACTED]	Lachermeier	Joe	FIN	Purchasing Officer	
[REDACTED]	Larsen	Rod	PR&L	Open Space Manager	
[REDACTED]	Layfield	Karen	HR	Human Resources Analyst	
[REDACTED]	Lester	Dave	POLICE	Police Commander	
[REDACTED]	Lindsey	Chris	CMO	Policy & Budget Manager	
[REDACTED]	Loseman	Dave	CD	Development Manager	

**Citywide Management Team Attendance Sheet**  
 Thursday, January 25, 2018

Employee #	Last Name	First Name	DEPT	Title	Signature
[REDACTED]	Maikranz	Dave	FIRE	Training Chief	
[REDACTED]	Martin	Dee	HR	Director of Human Resources	
[REDACTED]	Martinez	Marie	HR	Senior Human Resources Analyst	
[REDACTED]	McCabe	Traves	CMO	Information Records Administrator	
[REDACTED]	McConnell	John	CD	Principal Planner	
[REDACTED]	McCuiston	Ron	FIRE	Battalion Chief	
[REDACTED]	McDaniel	Kim	FIN	Pension Administrator	
[REDACTED]	Miller	Marina	HR	Senior Human Resources Analyst	
[REDACTED]	Minard	Derik	FIRE	Deputy Chief / Operations	
[REDACTED]	Moser	Greg	FIRE	Emergency Management Coordinator	
[REDACTED]	Nooning	Tami	HR / GS	Executive Assistant	
[REDACTED]	Nurmala	Sarah	Eco Devo	Senior Projects Engineer	
[REDACTED]	Ochtera	Tom	GS	Energy & Capital Projects Coordinator	
[REDACTED]	Opie	Barbara	CMO	Deputy City Manager	
[REDACTED]	Otzelberger	Aric	CD	Business Operations Coordinator	
[REDACTED]	Parker	Michelle	CMO	City Clerk	
[REDACTED]	Plas	Seth	CD	Senior Projects Engineer	
[REDACTED]	Prehn	Jen	GS	Fleet Mgr / Business Operations Coordinator	
[REDACTED]	Priddy	Alexa	CMO	Communications & Outreach Coordinator	
[REDACTED]	Puntenney	David	IT	Director of Information Technology	
[REDACTED]	Rea	Art	IT	Software Engineering Manager	
[REDACTED]	Reeves	Todd	POLICE	Deputy Police Chief	
[REDACTED]	Reid	Joe	CMO	Communications & Outreach Manager	
[REDACTED]	Sanchez	Cherie	FIN	Accounting Manager	
[REDACTED]	Schmiechen	Paul	CMO	Sustainability Coordinator	

Citywide Management Team Attendance Sheet

Thursday, January 25, 2018

Employee #	Last Name	First Name	DEPT	Title	Signature
[REDACTED]	Schulte	Kelli	FIN	Grant & Contract Coordinator	[Signature]
[REDACTED]	Schutt	Cassandra	FIRE	Executive Assistant	[Signature]
[REDACTED]	Schwab	Sandy	POLICE	Executive Assistant	[Signature]
[REDACTED]	Shires	Phil	IT	Information Systems Manager	[Signature]
[REDACTED]	Skarbek	Kate	PR&L	Analyst of Special Projects	[Signature]
[REDACTED]	Smith	Bev	CAO	Legal Administrator	[Signature]
[REDACTED]	Sorice	Tiffany	GS	Municipal Judge	[Signature]
[REDACTED]	Spellman	Paul	FIRE	Battalion Chief	[Signature]
[REDACTED]	Stevens	Karen	CAO	Deputy City Attorney	[Signature]
[REDACTED]	Takahashi	Scott	POLICE	Police Commander	[Signature]
[REDACTED]	Takata	Jill	HR	Benefits Administrator	[Signature]
[REDACTED]	Thornton	Jonathan	CMO	Communications & Outreach Coord.	[Signature]
[REDACTED]	Tripp	Don	CMO	City Manager	[Signature]
[REDACTED]	Troller	Stephanie	Eco Devo	Senior Economic Development Officer	[Signature]
[REDACTED]	Varney	Dave	FIRE	Battalion Chief	[Signature]
[REDACTED]	Villano	Dean	POLICE	Police Commander	[Signature]
[REDACTED]	Williams	Angie	PR&L	Executive Assistant	[Signature]
[REDACTED]	Wood	Shelby	Eco Devo	Executive Assistant	[Signature]
[REDACTED]	Work	Bill	FIRE	Deputy Chief / Administration	[Signature]
[REDACTED]			CD	Senior Projects Coordinator	[Signature]

Boston  
 Masos  
 Caution  
 Wills  
 HR  
 FIRE  
 HR Analyst  
 Volunteer

Caution  
 M. Williams

**From:** Moser, Greg <gmoser@CityofWestminster.us>  
**Sent:** Thursday, February 08, 2018 8:19 AM  
**To:** Borgers, Sarah; Cantu, Dave; Gay, Stephen; Larsen, Rod; Plas, Seth; Rope, Scott; Williams, Sharon  
**Cc:** Brislawn, Jeff P; Thompson - CDPS, Mark  
**Subject:** Draft Risk Assessment Review  
**Attachments:** Risk Scoring Worksheet Jan 2018.pdf

Good Morning All,

It has been a while since we met or discussed the Hazard Mitigation Plan-Update, but I have not been idle. In addition to continuing research and drafting, I have met with about 70 citizens and gotten input from them on risk scoring (thank you to those who attended the October workshop!).

The resulting draft risk assessment is on the P: drive, Emergency Management, Risk Assessment. There are two documents, but the Natural Hazards Risk Assessment is the only one I am asking you to review.

You may notice a discrepancy between the scores on the flame chart and the scores on the specific hazard sheet. The scores on the sheet reflect the community scoring of the specific hazard. The flame chart reflects where I think they are relative to one another.

Please review the community description information and the information I have compiled on the hazards. If you or others in your work area have comments, corrections or edits, please let me know. You are welcome to address only the areas that pertain to your area or review everything.

Attached is the risk scoring worksheet I have been using to document individual input. I would welcome your input (if you have not completed one before). Otherwise, we can go over them at our next meeting.

Please let me know if you have questions or would like to meet one on one or with your division.

I will schedule a meeting at the first available time for us to meet for what I hope will be final review and agreement on the hazard scores.

Please let me know if you spend any time on this before the meeting so I can apply it towards our soft match requirement.

Thanks in advance for your continued support.

Greg Moser  
Emergency Management Coordinator  
City of Westminster  
(303) 658-4550 (office)  
(303) 589-7812 (cell)  
(303) 706-3913 (fax)  
[gmoser@CityofWestminster.us](mailto:gmoser@CityofWestminster.us)



**From:** Moser, Greg <gmoser@CityofWestminster.us>  
**Sent:** Monday, April 09, 2018 5:26 PM  
**To:** Borgers, Sarah; Cantu, Dave; Gay, Stephen; Larsen, Rod; Plas, Seth; Rope, Scott; Williams, Sharon; Grucelski, Brian; Hose, Bob  
**Cc:** Brislawn, Jeff P; Thompson - CDPS, Mark  
**Subject:** Mitigation Plan Update and Schedule  
**Attachments:** Westminster 2010 HMP Chapter 5 excerpt.docx; Westminster 2010 HMP Mitigation Action Status 2018.xlsx

**Importance:** High

Good Afternoon Everyone,

A couple of updates on the Hazard Mitigation Plan-Update;

-Per my previous meeting invitation, we will be **meeting with the consultant on Thursday, April 19<sup>th</sup>**, 9-noon, in the Council Board room. Please plan on attending or send someone in your place.

-I attached two documents: (1) Westminster 2010 HMP Chapter 5 excerpts, and (2) Westminster 2010 HMP Mitigation Action Status 2018 to the schedule invitation. I have also added these into the Mitigation Folder (P: drive/Emergency Management/ Mitigation Plan 2017). **These documents need your review and input** on what has been done since the 2010 plan. The old plan did not have that many actions, so this should be pretty easy. I also know some of you have mentioned a lot more than what was planned has been done. Please review and provide your updates.

-I just completed incorporating DHSEM's and most of Foster-Wheeler's comments/recommendation into the risk assessment. Thank you to those who have reviewed and provided comments. Per our previous discussions, we may not want to include all the listed natural hazards in the HMP-Update. I am Ok with that, but I will maintain a separate document that will include the ones we drop from the HMP and our human-caused hazards. The current version of **the Natural Hazards Risk Assessment is available for final review/comment/correction** on the P:drive/Risk Assessment 2017/Natural Hazards Only Risk Assessment Draft.

Thanks again!

Greg

---

**From:** Brislawn, Jeff P [mailto:jeff.brislawn@woodplc.com]

**Sent:** Monday, April 09, 2018 12:59 PM

**To:** Moser, Greg <gmoser@CityofWestminster.us>

**Subject:** Westminster HMP timeline to complete

**Importance:** High

In response to Mark Thompson's email last week here are the next steps and projected timeline to finalize the plan through adoption:

April 12 – **Previous plan action status input due from HMPC**

April 12 – Draft update to capability assessment provided by AmecFW to City for review

April 19 – **HMPC meeting to address development of new mitigation actions**

April 24 – Final HIRA provided to Amec FW by City for incorporation into draft

April 27 – New mitigation action details to Amec FW for incorporation into draft

May 1 – Amec Foster Wheeler provides HMPC Review Draft to City

May 11 – HMPC Review Draft comments due from HMPC

May 11-17 – Amec FW incorporated HMPC review items, develops Public review Draft

May 17 - Public Review Draft (with completed Plan Review Tool) provided to DHSEM to begin their review

May 17 – City posts Plan on web with comment form link (provided by Amec FW) and advertises with Amec FW provided text

May 17-31 – Public Review Period

June 1-7 – Amec FW revises plan based on public and DHSEM feedback, if applicable, (note this timeline could extend depending on extent of public feedback or if specific deficiencies are found by DHSEM)

June 8 - Amec FW submits plan to FEMA, on behalf of City via DHSEM

June 8-July 23 – FEMA review (assumes 45 days and acceptance) issuance of Approvable Pending Adoption letter

Late July - delivery of final plan by Amec Foster Wheeler for City adoption

Early August - Adoption by City, submission of resolution to DHSEM and FEMA.

Late August – Final approval letter received from FEMA (typically a couple weeks after they receive adoption resolution)

Late August – Final plan deliverable including adoption resolution.

By my interpretation of Mark's email you will need to complete the approval process (based on local adoptions), any outstanding reimbursements, and your state-level closeout by August 29. The above schedule aligns with that but will be cutting it close. Let me know if you have any questions or want to discuss this further. It would be good to know the Council meeting schedule so we can plan on a specific date for the adoption.

Jeff

**Jeff Brislawn**

**Hazard Mitigation Lead/Sr Associate**

**Amec Foster Wheeler's parent company is now owned by Wood plc**

Environment & Infrastructure/Hazard Mitigation and Emergency Management Program

1942 Broadway, Suite 314, Boulder CO, 80302

Direct 303-209-3781, mobile/cell 303-704-5506

[jeff.brislawn@woodplc.com](mailto:jeff.brislawn@woodplc.com)

[www.amecfw.com](http://www.amecfw.com) [www.woodplc.com](http://www.woodplc.com)



---

This message is the property of John Wood Group PLC and/or its subsidiaries and/or affiliates and is intended only for the named recipient(s). Its contents (including any attachments) may be confidential, legally privileged or otherwise protected from disclosure by law. Unauthorized use, copying, distribution or disclosure of any of it may be unlawful and is strictly prohibited. We assume no responsibility to persons other than the intended named recipient(s) and do not accept liability for any errors or omissions which are a result of email transmission. If you have received this message in error, please notify us immediately by reply email to the sender and confirm that the original message and any attachments and copies have been destroyed and deleted from your system.

If you do not wish to receive future unsolicited commercial electronic messages from us, please forward this email to: [unsubscribe@woodplc.com](mailto:unsubscribe@woodplc.com) and include "Unsubscribe" in the subject line. If applicable, you will continue to receive invoices, project communications and similar factual, non-commercial electronic communications.

Please click <http://www.woodplc.com/email-disclaimer> for notices and company information in relation to emails originating in the UK, Italy or France.

---

# GIS Meeting Record

March 22, 2018

- Discuss GIS for the HMP-Update

- 10:00 - 10:30

Name	Position
Greg Moser	EMC
Juan Sabogal	GIS Specialist
Seth Plas	Senior Projects Engineer
DAVE MURRAY	GIS COORDINATOR

Discussed methodology for GIS support for assessing the flood hazard. We agreed to base it on:

- by parcel (any touched by the flood plain)
- improved value
- 6 categories

Checking the City Code for Critical Infrastructure definition

Juan will work on gathering the data and coordinate with AMEC.

  
Mar 22, 2018

# Summary of the City of Westminster Multi Hazard Mitigation Plan 2018 Update Mitigation Strategy Meeting

Thursday, April 19, 2018

9:00 a.m. – 12:00 p.m.

Council Board Room

4800 W 92<sup>nd</sup> Avenue, Westminster, CO

## Introduction and Opening Remarks

Jeff Brislawn, project manager with Wood (formerly Amec Foster Wheeler), initiated the meeting with a discussion of the agenda for the afternoon. Jeff asked everyone around the room to introduce themselves; 13 persons from various City Departments State departments were in attendance and documented on a sign in sheet. Participants included Westminster Emergency Management, Fire Department, Public Works, Community Development, GIS, Water Resources and Quality and CO Division of Homeland Security and Emergency Management. Handout materials were provided.

Jeff presented the PowerPoint slide deck that outlined the meeting agenda and topics. The focus of the meeting was on updating the mitigation strategy from the previous plan.

## Review of the Planning Process

Jeff reviewed the planning process that has taken place so far. The process is currently in Phase III – Develop a Mitigation Plan and Step 6 of FEMA's Planning Process – Develop an Mitigation Strategy; this meeting is the last formally facilitated meeting of the Hazard Mitigation Planning Committee (HMPC). Jeff also reviewed the findings of the process up to the point of the meeting, including the draft hazard identification and risk assessment, and public and stakeholder engagement that has been facilitated by the Westminster Emergency Management. Jeff notes that the previous plan action status and draft update to the capability assessment were provided to the City based on input that was provided by the HMPC.

## HIRA Recap

Jeff reviewed the hazards and overall impact summary and notes that new hazards have been added since the pervious plan. Greg Moser, the Westminster Emergency Management Coordinator, has been the lead on updating the HIRA for the City. Greg explained the new hazards were added based on information received from the kickoff meeting and the work he has done in updating the HIRA. Greg noted the new hazards including, climate change, erosion, deposition and turbidity, expansive soils, invasive and noxious species, and solar/geomagnetic storm. Greg noted that these new hazards have been included in the HIRA but it does not mean they should be added to the plan. Jeff mentioned that the flame chart created by the City shows the level of risk of each hazard and may be a good method of determining which hazards should be addressed in the plan, noting each hazard in the plan must have an action item or strategy.

A discussion on current actions the City is taking that may encompass the new hazards and existing hazards in the updated HIRA. The actions include the following:

- The Westminster Drought Mitigation Plan will be updated at the end of the year
- The City currently addresses invasive species in the water supply

- Camera inspection of underground infrastructure planned for an overall condition assessment of underground system infrastructure
- Urban Drainage and Flood Control District (UDFCD) is working with the City to study what the capacity of drainage infrastructure with debris currently is. This will help in prioritizing maintenance of infrastructure.
  - DHSEM noted that maintenance would not qualify for FEMA funding. FEMA will fund actions that are mitigating for current and future trends, i.e. current infrastructure that can't meet flood control needs is updated based on current and future trends. FEMA infrastructure projects typically have a 30-year lifespan.
- The Utility Department is working on an All Hazards Risk Assessment using the J100 Standard for water infrastructure. This assessment will build off the 2003 plan and will look at exposures, and create an emergency operation plan and mitigation strategies. The plan will focus on water infrastructure vulnerability in terms of the watershed and wastewater.
- Westminster Sustainability Plan currently being developed.

Greg noted that the City's water supply comes from outside the city limits and asked the group how do we engage in wildfire mitigation to protect our water supply in areas the city has no control over? DHSEM suggested partnering with Clear Creek and Gilpin Counties in mitigation efforts. Partnership in mitigation actions would also allow for funding to be combined.

The group also noted that development in surrounding jurisdictions may affect Westminster's water supply infrastructure. Jeff noted that development trends will be included in the plan update and will be expanded to outside the city limits that may have an impact on the city's infrastructure. The Candelas development in Arvada was noted as an example.

### **Updating Goals and Objectives**

Jeff reviewed the goals and objectives from the current plan, every update to a plan is an opportunity to also update the plan's goals and objectives. He noted that goals are high level and broad, objectives are the intermediate steps and strategies are what help meet goals and objectives.

The discussion then opened to the group for input on the current goals and objectives. Greg noted that he routinely works on Goal 1 by using social media and community outreach presentations. Jeff asked if the community outreach was part of the CRS program the City participates in. Seth (Floodplain Manager) says yes, a newsletter is sent to homeowners and the UDFCD mails pamphlets to specific residents in the floodplain throughout the entire city annually.

Jeff asks if the word "natural" (from goal 2 *Reduce Vulnerability of People, Property, and the Environment to Natural Hazards*) should be changed to a broader word that encompasses more than just natural hazards as the updated HIRA speaks to more than natural hazards. DHSEM suggests using the words all-hazards instead and to not eliminate the word "natural" completely. The City staff present was okay with keeping the word natural although Greg notes the plan will go beyond just natural hazards.

Dave Cantu (Street Operations Manager) asked about the wording “reduce impacts” in reference to the objectives under goal 2, asking if using “enhanced” would be a better word choice. This leads to a discussion on what should be included in this plan versus other plans in the city. Jeff says that all city plans should reference and point to each other. Greg asks Andrew Spurgin (Long Range Planner) if there is currently crossover in the existing plans. Andrew says the City is looking to hire a consultant to bridge all city plans and include public and interdepartmental feedback. Andrew noted it will be in place to reference next year.

The group determined Goal 3, *Increase Interagency Capabilities and Coordination to Reduce the Impact of Natural Hazards*, should be expanded to be an opportunity also strengthen internal partnerships. Goal 3 will be updated to *Increase Internal and Interagency Capabilities and Coordination to Reduce the Impact of Natural Hazards*.

### **Capability Assessment Update**

Amy Carr, Hazard Mitigation Planner with Wood, went over the capability assessment update handout. The existing capability assessment has been updated and expanded on to include financial capabilities. Jeff noted the new format of the capability assessment was modeled after DHSEM’s model. DHSEM staff noted that the purpose of the capability assessment was to show what resources currently exist in a community that can help in implementing mitigation actions.

A question was asked about where operations staff would fit within this assessment, speaking to the fact that when there is a storm event the City relies on certified operation staff. DHSEM explained this would be beyond the scope of the mitigation plan, as mitigation occurs before the event happens not while the event is happening; this would fit within the response category. DHSEM went on to explain that in the Administrative and Technical category staff capabilities are captured. Jeff asks the group to think on how to expand or what new capabilities could be included and to note them on the handout.

### **Review of possible mitigation activities and alternatives**

Jeff presented on the “four A’s” (Alter, Avert, Adapt, Avoid) to explain alternative mitigation strategies that could be considered. The following examples were given for each alternative strategy:

- **Alter** the Hazard
  - Prescribed burns or fuels management to reduce wildfire intensity and severity
  - Draining lakes behind weakened dams
  - “Seeding” clouds to increase rain or snow
- **Avert** the Hazard
  - Floodwalls
  - Debris basins
  - Drainage improvements
  - Channels and culverts
  - Fire Breaks

- **Adapt** to the Hazard
  - Building codes
  - Construction standards
  - Land-use and development regulations
  - Design standards
  - Monitoring and Warning systems
  - Safe rooms
- **Avoid** the Hazard – Westminster has been active in implementing mitigation strategies to avoid hazards.
  - Acquisition
  - Relocation
  - Open-space
  - Land-use
  - Natural systems protection

Westminster has been active in implementing mitigation strategies to avoid hazards. Greg asks the group, if anyone was participated in these types of actions? He also asks if there are others that should be included in the HMPC that are currently not represented. Andrew (Long Range Planner), noted that the Building Department was not represented. Another suggestion was to include representation from the Public Information Office.

Jeff reviewed ideas for possible mitigation activities and alternatives based on the risk assessment. Jeff outlined potential project criteria and action requirements, including the requirements of the Disaster Mitigation Act of 2000. Each hazard must have at least one true mitigation action (not preparedness) pertaining to them. The group was provided a handout with a matrix of typical mitigation alternatives organized by Community Rating System categories for the hazards identified in the plan. It's noted that credit is given for having members on the HMPC that have expertise in all 6 categories. A matrix could be included in the updated plan that shows which members on the HMPC meet each category. Another reference document titled "Mitigation Ideas" developed by FEMA was shared with the group, it can be found online at: <https://www.fema.gov/media-library/assets/documents/30627>. This reference discusses the common alternatives and best practices for mitigation by hazard.

Jeff reviews mitigation strategies for different types of hazards that may be eligible for FEMA funding. DHSEM noted that Flood Mitigation Assistance grants are offered by FEMA annually. Participating in CRS helps and having projects that reduce losses to NFIP insured structures helps make grant applications more competitive. It was also noted that when the local community shares some of the cost it shows a commitment to mitigation. Wildfire mitigation strategies were also reviewed. Although the WUI does not exist within Westminster, wildfire mitigation strategies could be used to protect the city's watershed, or mitigate risk on the edges of open space property.

Jeff reviewed a relatively new FEMA funding category, 'Climate Resilient' actions, and noted there are sometimes challenges with showing a positive cost-benefit. DHSEM mentioned this is a new category that hasn't been attempted by many communities across the country, there is

currently no best practice. 'Climate Resilient' Actions also may include an opportunity to address mitigation strategies across state lines. The HMPC noted that the City's Water Supply Plan will be incorporating climate change and asked if funding for infrastructure upgrades is possible. DHSEM said federal funding may be able to be incorporated and Jeff noted there are also funding opportunities through the Colorado Water Plan. Greg mentions that water supply is a noted short fall in the HIRA. He suggests water quantity and quality should be the top of the list for mitigation actions, especially in terms of population projections.

HPMC asks if FEMA funding is only for public entities? DHSEM answered generally yes; special districts could apply for funding if they are incorporated into the planning process. The city could also agree to do grant management for the special district, while the district implements the mitigation action.

The group discussed FEMA's Benefit-Cost Analysis tool. DHSEM noted FEMA has a platform that can be downloaded with different hazard scenarios. The user enters data and is given a ratio of benefit-cost. The tool allows for using both past and projected damages, such as if the rain event that took place in Boulder in 2013 happened in Westminster. This is important to Westminster due to the lack of history of repetitive losses. The tool can be found online here: <https://www.fema.gov/benefit-cost-analysis> . Greg noted that these projections could also be used inform policy in the city not just FEMA.

### **Discuss criteria for mitigation action selection and prioritization**

The group was provided with some decision-making tools to consider when prioritizing the actions. This including FEMA's recommended criteria, STAPLE/E (which considers social, technical, administrative, political, legal, economic, and environmental constraints and benefits). Other criteria used to recommend what actions might be more important, more effective, or more likely to be implemented than another included:

- Does action protect lives?
- Does action address hazards or areas with the highest risk?
- Does action protect critical facilities, infrastructure or community assets?
- Does action meet multiple objectives (Multiple Objective Management)?

Actions continuing from the 2010 plan will need to be reviewed for relative priority (high, medium, low). Any new actions developed will also need a relative prioritization based on these criteria.

### **Review of progress on existing mitigation actions in the plan**

Jeff reviewed the mitigation action status matrix handout, which contains actions from the 2010 plan. Several of the actions are 'ongoing' and it was suggested by Wood to have a new table in the plan to show the actions that have been completed since 2010. Greg asked the group to continue to think of mitigation actions that have been completed. Some of the success since the 2010 plan include:

- Improvements to the McKay Drainageway Detention Facility
- Standley Lake bypass for water contamination

- Standley Lake High School was wired with generator hook-ups with FEMA funding
- Documented lessons learned after 2013 floods
- Converted open space for flood control
- Shaw Boulevard stormwater drainage project
- Pilot project for green infrastructure
- Addressing climate change mitigation through investments in solar energy and greenhouse gas reduction program

### **Brainstorming Sessions: Development of new mitigation actions (group process)**

After Jeff passed out 3x5 sticky notes for participants to specify new mitigation actions. The participants placed these on a large flip chart, underneath the hazards noted in the HIRA, for further discussion. Suggested mitigation actions were shared to get the group thinking about new ideas. Some of those suggestions include:

- Become a National Weather Service designated StormReady Community
- Implementation of drainage projects in master plans or capital improvement plan
- Dam failure evacuation planning
- Dam spillway flooding analysis and planning

While the group was thinking of new actions, Jeff informed the group that if FEMA would not fund an action does not make it an unacceptable action, there are other funding options available and it adds to future discussions with city council.

### **Prioritize mitigation actions (group process)**

After the group had thought of new mitigation actions, four green sticky dots were given to each participant. The group was asked to use the dots to select which new mitigation actions they think should be included in the updated plan. The new mitigation actions were collected by Wood to be transcribed and shared with the group. Jeff provided a 'new mitigation action' worksheet to the group and asked to be returned to Jeff by April 27<sup>th</sup>. The ideas taken from the returned worksheet will be compiled into a new mitigation action table and share with the committee for further refinement and prioritization. The results will be incorporated into the update.

### **Discuss plan implementation and maintenance**

Jeff noted that Chapter 7 of the 2010 plan will need to be updated to include how the plan will be updated and implemented over time including who would be responsible for the review and what time of year it would take place. The committee agreed that the plan should be reviewed on an annual basis.

Wood will be sending the committee a draft of Chapter 7 and highlight areas where input is needed from the committee or need to be paid attention to.

### **Discuss next steps/Questions and Answers**

Jeff reviewed the project schedule and next steps:

- New Mitigation Action worksheet due back to Wood on April 27<sup>th</sup>
- The draft plan sent to the HMPC for review - May 1<sup>st</sup>
- HMPC comments on the draft due May 11<sup>th</sup>
- Public review draft developed - May 11<sup>th</sup> – 17<sup>th</sup>
- Public review draft provided to DHSEM - May 17<sup>th</sup>
- Public review period - May 17<sup>th</sup> -31<sup>st</sup>
- Plan revised based on feedback - June 1<sup>st</sup> -7<sup>th</sup>
- Plan submitted to FEMA - June 8<sup>th</sup>
- FEMA review - June 8<sup>th</sup> – July 23<sup>rd</sup>
- Adoption by City - Early August
- Final approval letter from FEMA - Late August

The meeting adjourned at 12:00 PM.

# **CITY OF WESTMINSTER MULTI HAZARD MITIGATION PLAN**

## **2018 UPDATE**

### ***MITIGATION STRATEGY MEETING***

**Thursday, April 19<sup>th</sup>, 2018**

**9:00 a.m. to 12:00 p.m.**

**Council Board Room**

**4800 W 92<sup>nd</sup> Avenue**

**Westminster, CO**

- ❖ **Introductions**
  
- ❖ **Review of the Planning Process**
  
- ❖ **HIRA Recap**
  
- ❖ **Updating Goals and Objectives**
  
- ❖ **Capability Assessment Update**
  
- ❖ **Review of possible mitigation activities and alternatives**
  
- ❖ **Discuss criteria for mitigation action selection and prioritization**
  
- ❖ **Review of progress on existing mitigation actions in the plan**
  
- ❖ **Brainstorming Session: Development of new mitigation actions (group process)**
  
- ❖ **Prioritize mitigation actions (group process)**
  
- ❖ **Discuss plan implementation and maintenance**
  
- ❖ **Discuss next steps/Questions and Answers/Adjourn**

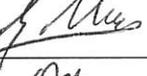
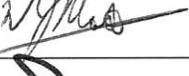
## Natural Hazard Mitigation Plan-Update 2017 Meeting Record

Meeting Date: Apr 19, 2018

Meeting Time: 09:00 to Noon

Location: City Council Meeting Rm

### Attendance: HMP-Update Committee

Name	Position	Department	Email	Signature
Sarah Borgers	Water Resources & Quality Manager	Public Works and Utilities	sborgers@CityofWestminster.us	
Jeff Brislawn	Hazard Mitigation Lead/Sr Associate	AMEC Foster & Wheeler/Wood	Jeff.brislawn@woodplc.com	
Dave Cantu	Street Operations Manager	Public Works and Utilities	DCantu@CityofWestminster.us	
Stephen Gay	Utilities Operations Manager	Public Works and Utilities	sgay@CityofWestminster.us	
Brian Grucelski	Facilities Manager	General Services	BGrucels@CityofWestminster.us	
Bob Hose	Fire Marshall	Fire Department	bhose@CityofWestminster.us	
Rod Larsen	Open Space Manager	Parks, Rec and Libraries	RLarsen@CityofWestminster.us	
Greg Moser	EM Coordinator	Fire Department	<a href="mailto:gmoser@cityofwestminster.us">gmoser@cityofwestminster.us</a>	
Will Moser	EM Intern	Fire Department	Wjmoser35@gmail	
Seth Plas	Senior Projects Engineer	Community Development	splas@CityofWestminster.us	
Scott Rope	IT Security Manager	Information Technology	srope@CityofWestminster.us	

Juan Sabogal	GIS Specialist	Community Development	jsabogal@CityofWestminster.us	<i>Juan Sabogal.</i>
Paul Schmiechen	Sustainability Coordinator	City Manager's Office	pschmiec@CityofWestminster.us	<i>Paul Schmiechen</i>
Andrew Spurgin	Principal Planner	Community Development	aspurgin@CityofWestminster.us	<i>Andrew Spurgin</i>
Mark Thompson	Mitigation Planning Specialist	DHSEM	markw.thompson@state.co.us	<i>Mark Thompson</i>
Sharon Williams	Senior Projects Engineer	Community Development	siwillia@CityofWestminster.us	<i>Sharon Williams</i>
<i>Amy Carr</i>	<i>Amec Foster Wheeler Wood</i>	<i>Planner</i>	<i>amy.carr@amecfw.com</i>	
<i>Matt Arsensault</i>	<i>Mitigation Specialist</i>	<i>CO DHSEM</i>	<i>MATT.ARSENSAULT@STATE.CO</i>	<i>Matt Arsensault</i>

**From:** Moser, Greg <gmoser@CityofWestminster.us>  
**Sent:** Wednesday, June 06, 2018 2:48 PM  
**To:** 'Brislawn, Jeff P'  
**Subject:** Westminster HMP  
**Attachments:** HMP-Update Background Paper.pdf

Jeff,  
Can you upload a word version of the HMP onto Google docs? There are some minor edits that I can have William make.

FYI, the presentation for the City Council went very well. I have the agenda if we need it for the process documentation. Attached is the talking paper I reviewed with them. They also have the plan and have been invited to review and comment.

So far, 3 folks have signed up for the workshop and over 500 people have seen the Facebook post.

Talk to you soon.

Greg Moser  
Emergency Management Coordinator  
City of Westminster  
(303) 658-4550 (office)  
(303) 589-7812 (cell)  
(303) 706-3913 (fax)  
[gmoser@CityofWestminster.us](mailto:gmoser@CityofWestminster.us)



## Background Paper On Hazard Mitigation Plan-Update

**Summary:** The Disaster Mitigation Act of 2000 requires jurisdictions that wish to be eligible for pre- and post-disaster federal funds to maintain a Hazard Mitigation Plan (HMP). These plans require periodic updates to review the community’s natural hazards, identify mitigation strategies and projects, and set mitigation priorities. The City’s previous plan expired in 2015. This update will re-establish our grant eligibility and provide guidance for natural hazard mitigation activities for the next five years. This project has been supported by a \$37,500 grant from the Federal Emergency Management Agency (FEMA) and the Colorado Division of Homeland Security and Emergency Management (DHSEM).

**Natural Hazards Risk Assessment:** The Emergency Management Coordinator (EMC) has been working with City staff and community stakeholders to update our community risk assessment. The following flame chart summarizes our natural hazards and the relative risk they pose for the City.

Natural Hazard Relative Risk Rating					
Likelihood	Consequences				
	1 Lowest	2	3	4	5 Highest
Most E	• Windstorm	• Lightning • Hail	• Severe Winter Storm	• Invasive & Noxious Species	• Climate Change • Drought
D	• Open Space Fire		• Extreme Cold	• Drainage Flooding • Erosion, Deposition and Trubidity	
C				• Street Flooding	
B		• Extreme Heat		• Tornado	• Pandemic
Least A			• Earthquake		• Geomagnetic Storm

**Mitigation Activities and Priorities:** During the past year, City staff have been working with DHSEM, community stakeholders and a grant funded consultant to identify opportunities to mitigate the natural hazards identified in the risk assessment. The draft plan identifies three potential structural project that focus on mitigating potential flooding and water quality issues. Fifteen non-structural activities to promote whole-community hazard awareness, preparedness and resilience have also been identified.

Prepared by: Greg Moser, Emergency Management Coordinator, X4550

Hazard Being Mitigated	Non-Structural Project	Structural Project
Multi-hazard	Information and public presentations	
Multi-hazard	Public information on social media	
Multi-hazard	Public notification system upgrade	
Multi-hazard	Multi-language outreach and information	
Multi-hazards	Climate change awareness for the public	
Flood	Continued land acquisition	
Flood	Continued compliance with NFIP and potential improved CRS rating	
Flood		Address areas needing storm sewer upgrades
Drought	Update Drought Management Plan	
Invasive Species	Promote water wise and infestation resistant tree programs	
Invasive Species	Continue invasive species awareness and inspection programs	
Open Space Fire/Wildfire	Clear Creek watershed protection and wildfire mitigation	
Open Space Fire	Open Space fuels reduction/fire mitigation	
Wildfire/Erosion and Turbidity		Filter waste to Semper Water Treatment Plant
Winter Storms		Protect water storage tanks from winter storms
Weather Extremes	Become a National Weather Service StormReady community	
Weather Extremes	Provide information to businesses on extreme weather, mitigation, and preparedness	
Weather Extremes	Grid resilience	

## City of Westminster Hazard Mitigation Plan-Update Public Comment Activities

**Summary:** On June 15<sup>th</sup>, the Emergency Management Coordinator hosted a public review and comment session to gather comments from the general public on the draft Hazard Mitigation Plan-Update. The event was attended by 8 residents as well as one stakeholder from a neighboring community. The EMC reviewed:



HMP-Update Community Comment Session, June 15, 2018

- Results of the community risk assessment
- Four “A’s” of mitigation
- STAPLEE principles
- Draft list of proposed mitigation projects.

**Summary of comments, feedback and recommendations:** The group reviewed the Natural Hazards Relative Risk Rating flame chart and recommended that “Extreme Heat” be raised to the same ranking as “Extreme Cold.” The consensus of the group was that extreme weather at either end of the heat spectrum was a growing concern. The group also recommended that “Open Space Fire” should be moved to the right to reflect the potential consequences of an

		Natural Hazards Relative Risk Rating					
		1	2	3	4	5	
Likelihood	Most	E	<ul style="list-style-type: none"> <li>• Windstorm</li> </ul>	<ul style="list-style-type: none"> <li>• Lightning</li> <li>• Hail</li> <li>• Swelling Soils</li> <li>• Radon</li> </ul>	<ul style="list-style-type: none"> <li>• Severe Winter Storm</li> </ul>	<ul style="list-style-type: none"> <li>• Invasive &amp; Noxious Species</li> </ul>	<ul style="list-style-type: none"> <li>• Climate Change</li> <li>• Drought</li> </ul>
	D		<ul style="list-style-type: none"> <li>• Open Space Fire</li> </ul>	<ul style="list-style-type: none"> <li>• Extreme Cold</li> <li>• Extreme Heat</li> </ul>	<ul style="list-style-type: none"> <li>• Drainage Flooding</li> <li>• Erosion &amp; Turbidity</li> </ul>		
	C				<ul style="list-style-type: none"> <li>• Street Flooding</li> </ul>		
	B				<ul style="list-style-type: none"> <li>• Tornado</li> </ul>	<ul style="list-style-type: none"> <li>• Pandemic</li> </ul>	
	Least	A			<ul style="list-style-type: none"> <li>• Earthquake</li> </ul>		<ul style="list-style-type: none"> <li>• Geomagnetic Storm</li> </ul>
		1	2	3	4	5	
		Lowest	Consequences			Highest	

Revised flame chart based on public comment June 15, 2018

open space fire (possibly exacerbated by drought and wind) spreading to adjacent development.

- The EMC reviewed the basic mitigation practices of “the four A’s,” structural and non-structural projects, and STAPLEE. The focus of the discussion during this part of the event was on the shared public/private responsibility for hazard mitigation, the importance of public support for mitigation activities, the limits of the government’s role, and the importance of cost effective mitigation.
- The final portion of the discussion was based on a review of the mitigation projects that have been proposed by the Hazard Mitigation Planning Committee (HMPC). Participants were provided a worksheet that summarized the proposed projects. Each project was briefly discussed and participants were asked to prioritize each project. Some participants chose not to score all projects. The following graphic roles up the participants’ responses and provides a comparison with the priority given each project by the HMPC.

Hazard Being Mitigated	Non-Structural Project	Structural Project	Priority			HMPC Priority
			High	Medium	Low	
Multi-hazard	Information and public presentations		7	1	1	High
Multi-hazard	Public information on social media		5	4		High
Multi-hazard	Public notification system upgrade		5	4		High
Multi-hazard	Multi-language outreach and information		4	2	2	Medium
Multi-hazards	Climate change awareness for the public		3	5		
Climate Change	Greenhouse emissions inventory, Sustainability Plan, public education, CC4CA participation, improve energy efficiency/use, develop Reduced Energy District, transition to electric vehicles where appropriate		2	3		High
Flood	Continued land acquisition		1	5	1	High
Flood	Continued compliance with NFIP and potential improved CRS rating		3	4		Low
Flood		Address areas needing storm sewer upgrades	6	2		Medium
Flood	Obtain Elevation Certificates					Low
Drought	Update Drought Management Plan		9			Medium
Invasive Species	Promote water wise and infestation resistant tree programs		6	3		Low
Invasive Species	Continue invasive species awareness and inspection programs		8	1		Low
Open Space Fire/Wildfire	Clear Creek watershed protection and wildfire mitigation		6	3		High
Open Space Fire	Open Space fuels reduction/fire mitigation		4	2	2	Low
Wildfire/Erosion and Turbidity		Filter waste to Semper Water Treatment Plant	4	3	1	Medium
Winter Storms		Protect water storage tanks from winter storms	2	2	4	Medium
Weather Extremes	Become a National Weather Service StormReady community		3	3	3	Low
Weather Extremes	Provide information to businesses on extreme weather, mitigation, and preparedness		1	5	3	Low
Weather Extremes	Grid resilience		4	4		Medium

Public prioritization of proposed mitigation projects compared to the HMPC priorities.

- The HMPC and public comment session agreed on a “high” priority for six of the proposed projects.
- The public comment session ranked nine of the projects higher than the ranking provided by the HMPC.
- The public comment session ranked 3 projects lower than the ranking provided by the HMPC.

- The public comment session did not recommend the deletion or addition of any mitigation projects.
- The public comment session provided the following recommendations:
  - Provide more presentations to home owners associations and civic groups
  - Provide presentations as part of the libraries lecture series
  - Prohibit shake shingle roofs
  - Encourage hail resistant roofs
  - Use more goats to reduce fuels in open space
  - Involve volunteers in stenciling warnings about dumping oil etc. in storm water culverts
  - Change the title of the plan to Natural Hazard Mitigation (since it only addresses natural hazards)
  - Proofread more carefully.

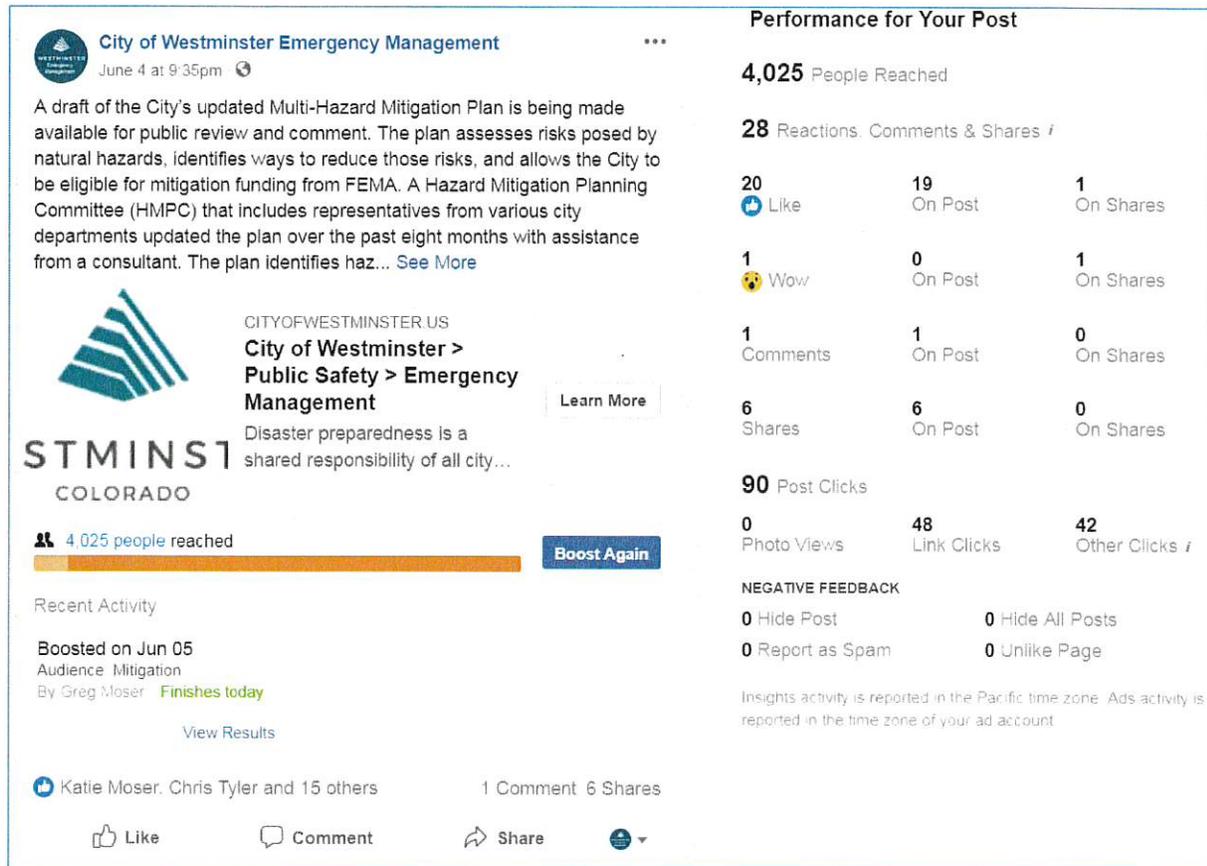
**Conclusions:** The public review and comment session provided a valuable opportunity to gather feedback and recommendations from our residents and neighboring stakeholders. As a result of this session, the relative risk rating flame chart has been modified to reflect a greater concern about the hazards presented by extreme cold and open space fire events. The public comments session ranked 16 of 19 proposed projects as a “high” priority. While this lack of differentiation does not provide a clear set of priorities, it does reflect an overall concern about the hazards and support for the proposed mitigation projects. Several of the comments provided by the participants provided additional good ideas that can be integrated into the proposed mitigation projects.

Attachments:

1. Efforts to Promote Public Review and Comment
2. Participant Sign-in Sheet
3. Information Paper on the HMP-Update
4. Event Presentation
5. Participant Worksheets

Prepared by: Greg Moser, Emergency Management Coordinator, June 19, 2018,  
[gmoser@cityofwestminster.us](mailto:gmoser@cityofwestminster.us), 303 658-4550

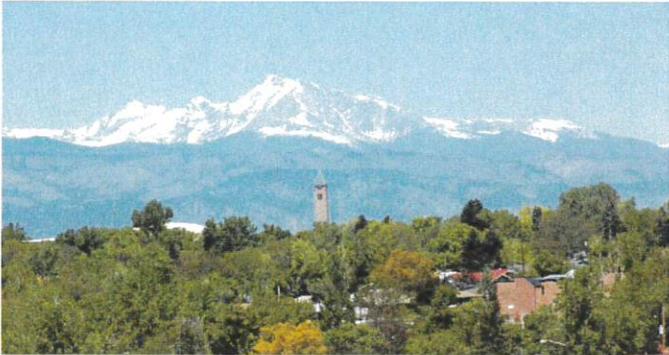
**Efforts to Promote Public Review and Comment:** The following is an overview of the efforts of the City of Westminster to invite public review and comment on the draft 2018 Hazard Mitigation Plan (HMP)-Update. Upon receipt of the draft plan from our contracted consultant (Wood), the Emergency Management Coordinator (EMC), posted it and links to a short survey on the Westminster Emergency Management web page at <https://www.cityofwestminster.us/EmergencyManagement>. Awareness of this post was promoted on the Emergency Management Facebook page at <https://www.facebook.com/Cityofwestminsteremergencymanagement/>. The results of this public outreach are summarized in the following graphic:



In addition to inviting online review and comment, the EMC also used Facebook to invite community participation in a public event which was held from 6-8pm, on June 15<sup>th</sup>, at the city's Public Safety Center. All Hazard Mitigation Planning Committee (HMPC) and participants in earlier outreach events were also invited to the public review and comment meeting.

**City of Westminster Emergency Management** added an event  
 June 5 at 2:32pm

Hazard mitigation plans help us create a safer and more resilient community. Westminster has been updating its plan and would like to invite public review, input, and comment. This event will be held in the Public Safety Center training room. Food will be provided. Please visit <https://www.cityofwestminster.us/EmergencyManagement> to review the draft plan. Space is limited, so please RSVP.



**Performance for Your Post**

**191** People Reached

**3** Likes, Comments & Shares

<b>3</b> Likes	<b>3</b> On Post	<b>0</b> On Shares
<b>0</b> Comments	<b>0</b> On Post	<b>0</b> On Shares
<b>0</b> Shares	<b>0</b> On Post	<b>0</b> On Shares

**0** Post Clicks

<b>0</b> Photo Views	<b>0</b> Link Clicks	<b>0</b> Other Clicks
----------------------	----------------------	-----------------------

**NEGATIVE FEEDBACK**

<b>0</b> Hide Post	<b>0</b> Hide All Posts
<b>0</b> Report as Spam	<b>0</b> Unlike Page

Reported stats may be delayed from what appears on posts

**FRI, JUN 15**  
**Hazard Mitigation Plan Review**  
 City of Westminster Emergency Management  
 You like City of Westminster Emergency Management

**191** people reached

**3** Likes

Like Comment

Public comment was also invited through a post on the city’s web page “news,” at <https://www.cityofwestminster.us/> on June 4<sup>th</sup> on the city’s Facebook page <https://www.facebook.com/cityofwestminstercolorado/> and Twitter feed. The results of the Facebook post are summarized in the following graphic.

The Twitter feed resulted in 910 impressions and 7 engagements.

**Feedback needed on city’s updated Multi-Hazard Mitigation Plan**

Monday, June 4, 2018 10:15 AM MDT

A draft of the city’s updated Multi-Hazard Mitigation Plan is being made available for public review and comment.

The plan assesses risks posed by natural hazards, identifies ways to reduce those risks and allows the city to be eligible for mitigation funding from FEMA.

A Hazard Mitigation Planning Committee, which includes representatives from various city departments, updated the plan over the past eight months with assistance from a consultant. The plan identifies hazard mitigation goals and a variety of mitigation projects with the intent of reducing losses from hazard events before they occur again.

The planning committee is now soliciting public comment on the plan before it is finalized and submitted for FEMA review and approval.

**Please provide comments through the online survey by Monday, June 18.**

Hardcopies of the plan are available for review upon request through Westminster Emergency Management. For more information, contact Greg Moser, emergency management coordinator, at 303.658-4550 or [gmoser@cityofwestminster.us](mailto:gmoser@cityofwestminster.us).

[View the Mitigation Plan](#)

[Take the survey](#)

Number of Views: 190 | Comments: 0

**CATEGORIES**

- Main News (177)
- Parks & Recreation (2)
- Library (1)
- Police (44)
- Downtown Westminster (1)
- Sustainability (27)
- Closures & Delays (3)

**RECENT**

- City experiencing we...
- Generation Wild coa...
- year of stewardship a...
- City offers four recyc...
- locations
- Donate old cell pho...

City of Westminster Hazard Mitigation Plan-Update  
 Public Review and Comment Sign-in  
 June 15, 2018  
 6-8pm, Public Safety Center

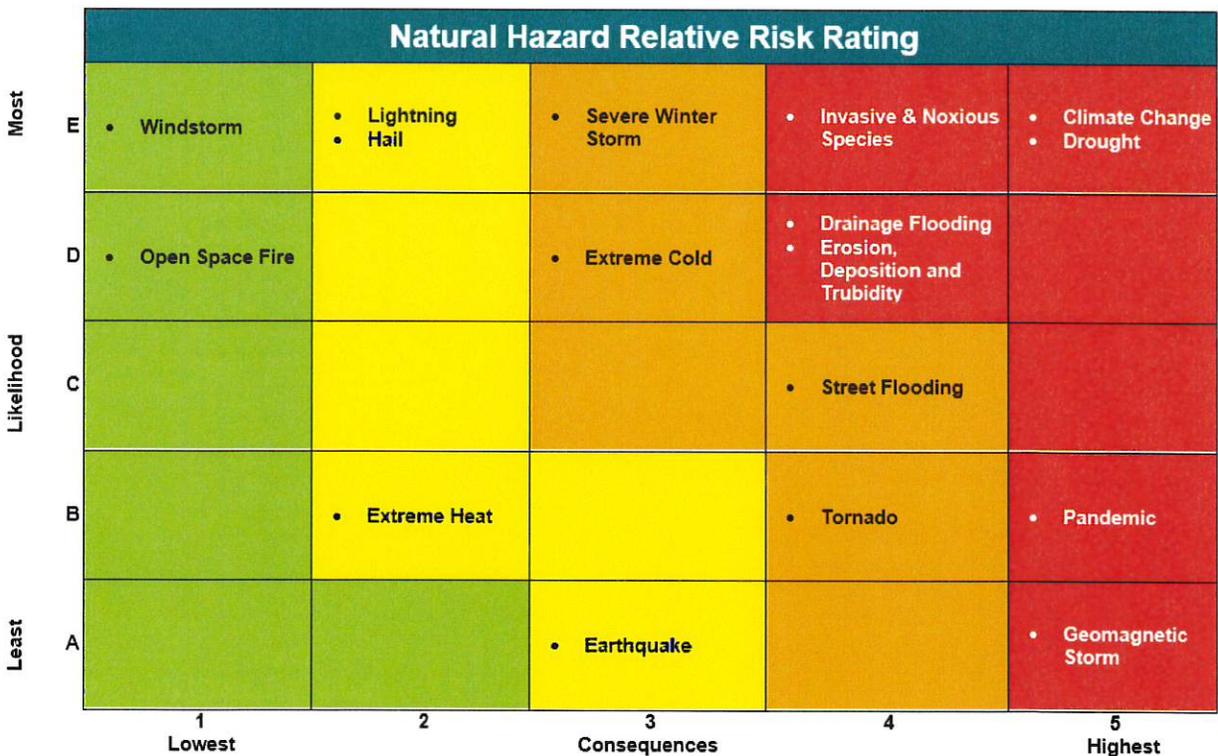


Name	E-mail	Role
Greg Moser	gmoser@cityofwestminster.us	Emergency Management
Will Moser	wjmoser35@gmail.com	OEM
Glenn Wierczorek	SAFETYGLENN@YAHOO.COM	Citizen
MARTIN POSTMA	martin.postma@cityofthornton.net	Long Range Planning
KEVIN STEWART	kstewart@edfcd.org	Citizen & WDFCU
Leo Su	leosun64@yahoo.com	
Shannon Mayes	Shannon.M.Mayes@gmail.com	Citizen
Rick Letz	writingman@comcast.net	citizen skeptic
Gloria Fisher	gloriafisher527@msn.com	citizen
Anna Neidig	annaneidig@yahoo.com	citizen

## Background Paper On Hazard Mitigation Plan-Update

**Summary:** The Disaster Mitigation Act of 2000 requires jurisdictions that wish to be eligible for pre- and post-disaster federal funds to maintain a Hazard Mitigation Plan (HMP). These plans require periodic updates to review the community's natural hazards, identify mitigation strategies and projects, and set mitigation priorities. The City's previous plan expired in 2015. This update will re-establish our grant eligibility and provide guidance for natural hazard mitigation activities for the next five years. This project has been supported by a \$37,500 grant from the Federal Emergency Management Agency (FEMA) and the Colorado Division of Homeland Security and Emergency Management (DHSEM).

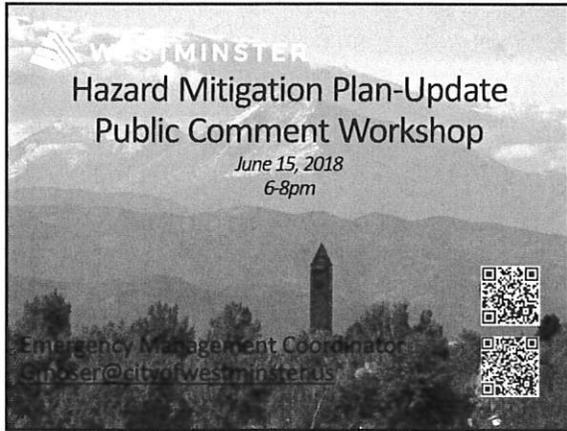
**Natural Hazards Risk Assessment:** The Emergency Management Coordinator (EMC) has been working with City staff and community stakeholders to update our community risk assessment. The following flame chart summarizes our natural hazards and the relative risk they pose for the City.



**Mitigation Activities and Priorities:** During the past year, City staff have been working with DHSEM, community stakeholders and a grant funded consultant to identify opportunities to mitigate the natural hazards identified in the risk assessment. The draft plan identifies three potential structural project that focus on mitigating potential flooding and water quality issues. Twenty-two non-structural activities to address climate change and promote whole-community hazard awareness, preparedness and resilience have also been identified.

Prepared by: Greg Moser, Emergency Management Coordinator, X4550

Hazard Being Mitigated	Non-Structural Project	Structural Project
Multi-hazard	Information and public presentations	
Multi-hazard	Public information on social media	
Multi-hazard	Public notification system upgrade	
Multi-hazard	Multi-language outreach and information	
Multi-hazards	Climate change awareness for the public	
Climate Change	Greenhouse emissions inventory, Sustainability Plan, public education, CC4CA participation, improve energy efficiency/use, develop Reduced Energy District, transition to electric vehicles where appropriate	
Flood	Continued land acquisition	
Flood	Continued compliance with NFIP and potential improved CRS rating	
Flood		Address areas needing storm sewer upgrades
Drought	Update Drought Management Plan	
Invasive Species	Promote water wise and infestation resistant tree programs	
Invasive Species	Continue invasive species awareness and inspection programs	
Open Space Fire/Wildfire	Clear Creek watershed protection and wildfire mitigation	
Open Space Fire	Open Space fuels reduction/fire mitigation	
Wildfire/Erosion and Turbidity		Filter waste to Semper Water Treatment Plant
Winter Storms		Protect water storage tanks from winter storms
Weather Extremes	Become a National Weather Service StormReady community	
Weather Extremes	Provide information to businesses on extreme weather, mitigation, and preparedness	
Weather Extremes	Grid resilience	



---

---

---

---

---

---

---

---

**Agenda**

- 6:00 - Welcome, introductions, dinner, risk assessment review/comments
- 6:45 - Overview of mitigation
- 7:00 - Review/comments on mitigation projects, group activity
- 8:00 - Conclusion

---

---

---

---

---

---

---

---

**Objectives**

- Review risk assessment results
- Familiarize participants with mitigation basics
- Review city staff proposed mitigation projects
- Solicit public comment and recommendations

---

---

---

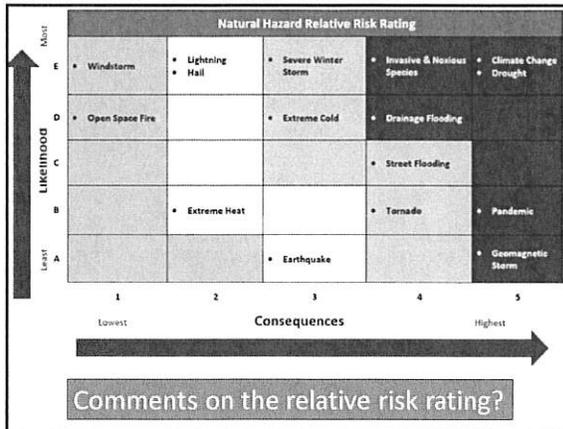
---

---

---

---

---




---

---

---

---

---

---

---

---

---

---

### Mitigation

- Activities that prevent or reduce the likelihood or consequences of a hazard.
- Four "A's" of mitigation:
  - Avoid the hazard (don't build in the floodplain)
  - Adapt to the hazard (use hail resistant roofing)
  - Alter the hazard (improve drainage)
  - Accept the hazard (don't do anything)
- Structural: an engineering and construction project
- Non-structural: building codes, zoning, public education, preparedness

---

---

---

---

---

---

---

---

---

---

### STAPLEE Method of Assessing Options

- Social-does the community support it?
- Technical-is it technologically feasible?
- Administrative-is staffing, funding & expertise available?
- Political-is it politically feasible?
- Legal-do we have legal authority?
- Economic-is it cost effective?
- Environmental-how does it effect the environment?

---

---

---

---

---

---

---

---

---

---



### Activity

- ☛ Review the proposed projects listed on the worksheet
- ☛ Rate them, High, Medium, or Low
- ☛ Identify any additional projects for consideration

---

---

---

---

---

---

---

---

### Conclusions

- ☛ Make changes to the draft based on comments and recommendations
- ☛ Forward the plan to DHSEM and FEMA for review
- ☛ Respond to DHSEM and FEMA comments
- ☛ August 13<sup>th</sup>, City Council adoption
- ☛ Periodic review and update
- ☛ Next formal update due in 2023.

---

---

---

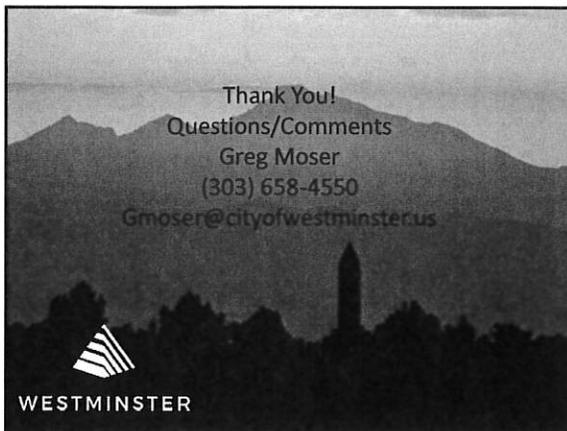
---

---

---

---

---



---

---

---

---

---

---

---

---

**City of Westminster Hazard Mitigation Plan-Update  
Public Review and Comment Project Rating Sheet**

**June 15, 2018**

*Please rate the priority of the proposed projects. Additional project recommendations may be identified in the comments and recommendations.*

Hazard Being Mitigated	Non-Structural Project	Structural Project	Priority		
			High	Medium	Low
Multi-hazard	Information and public presentations		X		
Multi-hazard	Public information on social media		X		
Multi-hazard	Public notification system upgrade		X		
Multi-hazard	Multi-language outreach and information			X	
Multi-hazards	Climate change awareness for the public			X	
Climate Change	Greenhouse emissions inventory, Sustainability Plan, public education, CC4CA participation, improve energy efficiency/use, develop Reduced Energy District, transition to electric vehicles where appropriate				X
Flood	Continued land acquisition		X		
Flood	Continued compliance with NFIP and potential improved CRS rating		X		
Flood		Address areas needing storm sewer upgrades			X
Drought	Update Drought Management Plan		X		
Invasive Species	Promote water wise and infestation resistant tree programs		X		
Invasive Species	Continue invasive species awareness and inspection programs		X		
Open Space Fire/Wildfire	Clear Creek watershed protection and wildfire mitigation				X
Open Space Fire	Open Space fuels reduction/fire mitigation				X
Wildfire/Erosion and Turbidity		Filter waste to Semper Water Treatment Plant			X
Winter Storms		Protect water storage tanks from winter storms			X
Weather Extremes	Become a National Weather Service StormReady community		X		
Weather Extremes	Provide information to businesses on extreme weather, mitigation, and preparedness				X
Weather Extremes	E-Grid resilience <i>Electrical</i>		X		

Comments/Recommendations: (Please us the back if needed or schedule a follow-on meeting with Greg Moser, [gmoser@cityofwestminster.us](mailto:gmoser@cityofwestminster.us))

**City of Westminster Hazard Mitigation Plan-Update  
Public Review and Comment Project Rating Sheet**

**June 15, 2018**

*Please rate the priority of the proposed projects. Additional project recommendations may be identified in the comments and recommendations.*

Hazard Being Mitigated	Non-Structural Project	Structural Project		Priority	
		High	Medium	Low	Low
Multi-hazard	Information and public presentations	✓			
Multi-hazard	Public information on social media	✓			
Multi-hazard	Public notification system upgrade	✓			
Multi-hazard	Multi-language outreach and information	✓			
Multi-hazards	Climate change awareness for the public			✓	
Climate Change	Greenhouse emissions inventory, Sustainability Plan, public education, CC4CA participation, improve energy efficiency/use, develop Reduced Energy District, transition to electric vehicles where appropriate				
Flood	Continued land acquisition				
Flood	Continued compliance with NFIP and potential improved CRS rating				
Flood		✓			
Drought	Update Drought Management Plan	✓			
Invasive Species	Promote water wise and infestation resistant tree programs	✓			
Invasive Species	Continue invasive species awareness and inspection programs	✓			
Open Space Fire/Wildfire	Clear Creek watershed protection and wildfire mitigation	✓			
Open Space Fire	Open Space fuels reduction/fire mitigation	✓			
Wildfire/Erosion and Turbidity		✓			
Winter Storms		✓			
Weather Extremes	Become a National Weather Service StormReady community			✓	
Weather Extremes	Provide information to businesses on extreme weather, mitigation, and preparedness			✓	
Weather Extremes	Grid resilience	✓			

Comments/Recommendations: (Please us the back if needed or schedule a follow-on meeting with Greg Moser, [gmoser@cityofwestminster.us](mailto:gmoser@cityofwestminster.us))

## City of Westminster Hazard Mitigation Plan-Update Public Review and Comment Project Rating Sheet

**June 15, 2018**

*Please rate the priority of the proposed projects. Additional project recommendations may be identified in the comments and recommendations.*

Hazard Being Mitigated	Non-Structural Project	Structural Project	Priority		
			High	Medium	Low
Multi-hazard	Information and public presentations		X		
Multi-hazard	Public information on social media			X	
Multi-hazard	Public notification system upgrade			X	
Multi-hazard	Multi-language outreach and information			X	
Multi-hazards	Climate change awareness for the public			X	
Climate Change	Greenhouse emissions inventory, Sustainability Plan, public education, CC4CA participation, improve energy efficiency/use, develop Reduced Energy District, transition to electric vehicles where appropriate			X	
Flood	Continued land acquisition			X	
Flood	Continued compliance with NFIP and potential improved CRS rating			X	
Flood		Address areas needing storm sewer upgrades		X	
Drought	Update Drought Management Plan		X		
Invasive Species	Promote water wise and infestation resistant tree programs		X		
Invasive Species	Continue invasive species awareness and inspection programs		X		
Open Space Fire/Wildfire	Clear Creek watershed protection and wildfire mitigation			X	
Open Space Fire	Open Space fuels reduction/fire mitigation			X	
Wildfire/Erosion and Turbidity		Filter waste to Semper Water Treatment Plant			X
Winter Storms		Protect water storage tanks from winter storms		X	
Weather Extremes	Become a National Weather Service StormReady community				X
Weather Extremes	Provide information to businesses on extreme weather, mitigation, and preparedness			X	
Weather Extremes	Grid resilience			X	

Comments/Recommendations: (Please us the back if needed or schedule a follow-on meeting with Greg Moser, [gmoser@cityofwestminster.us](mailto:gmoser@cityofwestminster.us))



**City of Westminster Hazard Mitigation Plan-Update  
Public Review and Comment Project Rating Sheet**

**June 15, 2018**

*Please rate the priority of the proposed projects. Additional project recommendations may be identified in the comments and recommendations.*

Hazard Being Mitigated	Non-Structural Project	Structural Project	Priority		
			High	Medium	Low
Multi-hazard	Information and public presentations		X		
Multi-hazard	Public information on social media		X		
Multi-hazard	Public notification system upgrade			X	
Multi-hazard	Multi-language outreach and information		X		
Multi-hazards	Climate change awareness for the public		X		
Climate Change	Greenhouse emissions inventory, Sustainability Plan, public education, CC4CA participation, improve energy efficiency/use, develop Reduced Energy District, transition to electric vehicles where appropriate				
Flood	Continued land acquisition			X	
Flood	Continued compliance with NFIP and potential improved CRS rating			X	
Flood		Address areas needing storm sewer upgrades	X		
Drought	Update Drought Management Plan		X		
Invasive Species	Promote water wise and infestation resistant tree programs		X		
Invasive Species	Continue invasive species awareness and inspection programs		X		
Open Space Fire/Wildfire	Clear Creek watershed protection and wildfire mitigation		<del>X</del>	X	
Open Space Fire	Open Space fuels reduction/fire mitigation				
Wildfire/Erosion and Turbidity		Filter waste to Semper Water Treatment Plant			?
Winter Storms		Protect water storage tanks from winter storms			?
Weather Extremes	Become a National Weather Service StormReady community				X
Weather Extremes	Provide information to businesses on extreme weather, mitigation, and preparedness			X	
Weather Extremes	Grid resilience			X	

Comments/Recommendations: (Please us the back if needed or schedule a follow-on meeting with Greg Moser, [gmoser@cityofwestminster.us](mailto:gmoser@cityofwestminster.us))



**City of Westminster Hazard Mitigation Plan-Update  
Public Review and Comment Project Rating Sheet**

**June 15, 2018**

*Please rate the priority of the proposed projects. Additional project recommendations may be identified in the comments and recommendations.*

Hazard Being Mitigated	Non-Structural Project	Structural Project	Priority		
			High	Medium	Low
Multi-hazard	Information and public presentations		✓		
Multi-hazard	Public information on social media		✓		
Multi-hazard	Public notification system upgrade		✓		
Multi-hazard	Multi-language outreach and information		✓		
Multi-hazards	Climate change awareness for the public		✓		
Climate Change	Greenhouse emissions inventory, Sustainability Plan, public education, CC4CA participation, improve energy efficiency/use, develop Reduced Energy District, transition to electric vehicles where appropriate		✓		
Flood	Continued land acquisition		✓		
Flood	Continued compliance with NFIP and potential improved CRS rating		✓		
Flood		Address areas needing storm sewer upgrades	✓		
Drought	Update Drought Management Plan		✓		
Invasive Species	Promote water wise and infestation resistant tree programs		✓		
Invasive Species	Continue invasive species awareness and inspection programs		✓		
Open Space Fire/Wildfire	Clear Creek watershed protection and wildfire mitigation		✓		
Open Space Fire	Open Space fuels reduction/fire mitigation		✓		
Wildfire/Erosion and Turbidity		Filter waste to Semper Water Treatment Plant	✓		
Winter Storms		Protect water storage tanks from winter storms	✓		
Weather Extremes	Become a National Weather Service StormReady community		✓		
Weather Extremes	Provide information to businesses on extreme weather, mitigation, and preparedness		✓		
Weather Extremes	Grid resilience		✓		

Comments/Recommendations: (Please us the back if needed or schedule a follow-on meeting with Greg Moser, [gmoser@cityofwestminster.us](mailto:gmoser@cityofwestminster.us))

**NOT SURE HOW ANY OF THIS COULD NOT BE HIGH PRIORITY**



**City of Westminster Hazard Mitigation Plan-Update  
Public Review and Comment Project Rating Sheet**

**June 15, 2018**

*Please rate the priority of the proposed projects. Additional project recommendations may be identified in the comments and recommendations.*

Hazard Being Mitigated	Non-Structural Project	Structural Project	Priority		
			High	Medium	Low
Multi-hazard	Information and public presentations		✓		
Multi-hazard	Public information on social media	<i>I know the groups are small but they are powerful</i>		✓	
Multi-hazard	Public notification system upgrade			✓	
Multi-hazard	Multi-language outreach and information				
Multi-hazards	Climate change awareness for the public				
Climate Change	Greenhouse emissions inventory, Sustainability Plan, public education, CC4CA participation, improve energy efficiency/use, develop Reduced Energy District, transition to electric vehicles where appropriate				
Flood	Continued land acquisition			✓	
Flood	Continued compliance with NFIP and potential improved CRS rating				
Flood		Address areas needing storm sewer upgrades			
Drought	Update Drought Management Plan		✓		
Invasive Species	Promote water wise and infestation resistant tree programs		✓		
Invasive Species	Continue invasive species awareness and inspection programs		✓		
Open Space Fire/Wildfire	Clear Creek watershed protection and wildfire mitigation		✓		
Open Space Fire	Open Space fuels reduction/fire mitigation				✓
Wildfire/Erosion and Turbidity		Filter waste to Semper Water Treatment Plant	✓		
Winter Storms		Protect water storage tanks from winter storms			✓
Weather Extremes	Become a National Weather Service StormReady community		✓		
Weather Extremes	Provide information to businesses on extreme weather, mitigation, and preparedness				
Weather Extremes	Grid resilience				

Comments/Recommendations: (Please us the back if needed or schedule a follow-on meeting with Greg Moser, [gmoser@cityofwestminster.us](mailto:gmoser@cityofwestminster.us))

*Your skills of facilitating this mixed group was very impressive and your mannerism of speech was very engaging. Thank you.*



**City of Westminster Hazard Mitigation Plan-Update  
Public Review and Comment Project Rating Sheet**

**June 15, 2018**

*Please rate the priority of the proposed projects. Additional project recommendations may be identified in the comments and recommendations.*

Hazard Being Mitigated	Non-Structural Project	Structural Project	Priority		
			High	Medium	Low
Multi-hazard	Information and public presentations				X
Multi-hazard	Public information on social media			X	
Multi-hazard	Public notification system upgrade			X	
Multi-hazard	Multi-language outreach and information				X
Multi-hazards	Climate change awareness for the public			X	
Climate Change	Greenhouse emissions inventory, Sustainability Plan, public education, CC4CA participation, improve energy efficiency/use, develop Reduced Energy District, transition to electric vehicles where appropriate		X		
Flood	Continued land acquisition			X	
Flood	Continued compliance with NFIP and potential improved CRS rating			X	
Flood		Address areas needing storm sewer upgrades	X		
Drought	Update Drought Management Plan		X		
Invasive Species	Promote water wise and infestation resistant tree programs			X	
Invasive Species	Continue invasive species awareness and inspection programs			X	
Open Space Fire/Wildfire	Clear Creek watershed protection and wildfire mitigation		X		
Open Space Fire	Open Space fuels reduction/fire mitigation		X		
Wildfire/Erosion and Turbidity		Filter waste to Semper Water Treatment Plant		X	
Winter Storms		Protect water storage tanks from winter storms		X	
Weather Extremes	Become a National Weather Service StormReady community				X
Weather Extremes	Provide information to businesses on extreme weather, mitigation, and preparedness			X	
Weather Extremes	Grid resilience			X	

Comments/Recommendations: (Please us the back if needed or schedule a follow-on meeting with Greg Moser, [gmoser@cityofwestminster.us](mailto:gmoser@cityofwestminster.us))



**City of Westminster Hazard Mitigation Plan-Update  
Public Review and Comment Project Rating Sheet**

**June 15, 2018**

*Please rate the priority of the proposed projects. Additional project recommendations may be identified in the comments and recommendations.*

Hazard Being Mitigated	Non-Structural Project	Structural Project	Priority		
			High	Medium	Low
Multi-hazard	Information and public presentations		1	10	
Multi-hazard	Public information on social media			1	
Multi-hazard	Public notification system upgrade		1		
Multi-hazard	Multi-language outreach and information				1
Multi-hazards	Climate change awareness for the public			1	
Climate Change	Greenhouse emissions inventory, Sustainability Plan, public education, CC4CA participation, improve energy efficiency/use, develop Reduced Energy District, transition to electric vehicles where appropriate			1	
Flood	Continued land acquisition			1	
Flood	Continued compliance with NFIP and potential improved CRS rating			1	
Flood		Address areas needing storm sewer upgrades	1		
Drought	Update Drought Management Plan		1		
Invasive Species	Promote water wise and infestation resistant tree programs		1		
Invasive Species	Continue invasive species awareness and inspection programs		1		
Open Space Fire/Wildfire	Clear Creek watershed protection and wildfire mitigation		1		
Open Space Fire	Open Space fuels reduction/fire mitigation	More Grants!		1	
Wildfire/Erosion and Turbidity		Filter waste to Semper Water Treatment Plant \$3M		1	
Winter Storms		Protect water storage tanks from winter storms		1	1
Weather Extremes	Become a National Weather Service StormReady community			1	
Weather Extremes	Provide information to businesses on extreme weather, mitigation, and preparedness				1
Weather Extremes	Grid resilience				1

Comments/Recommendations: (Please us the back if needed or schedule a follow-on meeting with Greg Moser, [gmoser@cityofwestminster.us](mailto:gmoser@cityofwestminster.us))



**City of Westminster Hazard Mitigation Plan-Update  
Public Review and Comment Project Rating Sheet**

**June 15, 2018**

*Please rate the priority of the proposed projects. Additional project recommendations may be identified in the comments and recommendations.*

Hazard Being Mitigated	Non-Structural Project	Structural Project	Priority		
			High	Medium	Low
Multi-hazard	Information and public presentations	<i>Library Lecture Series</i>		<input checked="" type="checkbox"/>	
Multi-hazard	Public information on social media		<input checked="" type="checkbox"/>		
Multi-hazard	Public notification system upgrade		<input checked="" type="checkbox"/>		
Multi-hazard	Multi-language outreach and information		<input checked="" type="checkbox"/>		
Multi-hazards	Climate change awareness for the public		<input checked="" type="checkbox"/>		
Climate Change	Greenhouse emissions inventory, Sustainability Plan, public education, CC4CA participation, improve energy efficiency/use, develop Reduced Energy District, transition to electric vehicles where appropriate		<input checked="" type="checkbox"/>		
Flood	Continued land acquisition			<input checked="" type="checkbox"/>	
Flood	Continued compliance with NFIP and potential improved CRS rating		<input checked="" type="checkbox"/>		
Flood		Address areas needing storm sewer upgrades	<input checked="" type="checkbox"/>		
Drought	Update Drought Management Plan		<input checked="" type="checkbox"/>		
Invasive Species	Promote water wise and infestation resistant tree programs			<input checked="" type="checkbox"/>	
Invasive Species	Continue invasive species awareness and inspection programs		<input checked="" type="checkbox"/>		
Open Space Fire/Wildfire	Clear Creek watershed protection and wildfire mitigation		<input checked="" type="checkbox"/>		
Open Space Fire	Open Space fuels reduction/fire mitigation		<input checked="" type="checkbox"/>		
Wildfire/Erosion and Turbidity		Filter waste to Semper Water Treatment Plant	<input checked="" type="checkbox"/>		
Winter Storms		Protect water storage tanks from winter storms		<input checked="" type="checkbox"/>	
Weather Extremes	Become a National Weather Service StormReady community			<input checked="" type="checkbox"/>	
Weather Extremes	Provide information to businesses on extreme weather, mitigation, and preparedness			<input checked="" type="checkbox"/>	
Weather Extremes	Grid resilience		<input checked="" type="checkbox"/>		

Comments/Recommendations: (Please us the back if needed or schedule a follow-on meeting with Greg Moser, [gmoser@cityofwestminster.us](mailto:gmoser@cityofwestminster.us))



WESTMINSTER

# Hazard Mitigation Plan-Update Public Comment Workshop

*June 15, 2018  
6-8pm*



Emergency Management Coordinator  
[Gmoser@cityofwestminster.us](mailto:Gmoser@cityofwestminster.us)

# Agenda

- 6:00 - Welcome, introductions, dinner, risk assessment review/comments
- 6:45 - Overview of mitigation
- 7:00 – Review/comments on mitigation projects, group activity
- 8:00 – Conclusion

# Objectives

- Review risk assessment results
- Familiarize participants with mitigation basics
- Review city staff proposed mitigation projects
- Solicit public comment and recommendations

Natural Hazard Relative Risk Rating						
Likelihood ↑ Most Least	E	<ul style="list-style-type: none"> <li>• Windstorm</li> </ul>	<ul style="list-style-type: none"> <li>• Lightning</li> <li>• Hail</li> </ul>	<ul style="list-style-type: none"> <li>• Severe Winter Storm</li> </ul>	<ul style="list-style-type: none"> <li>• Invasive &amp; Noxious Species</li> <li>• Climate Change</li> <li>• Drought</li> </ul>	
	D	<ul style="list-style-type: none"> <li>• Open Space Fire</li> </ul>		<ul style="list-style-type: none"> <li>• Extreme Cold</li> </ul>	<ul style="list-style-type: none"> <li>• Drainage Flooding</li> </ul>	
	C				<ul style="list-style-type: none"> <li>• Street Flooding</li> </ul>	
	B		<ul style="list-style-type: none"> <li>• Extreme Heat</li> </ul>		<ul style="list-style-type: none"> <li>• Tornado</li> <li>• Pandemic</li> </ul>	
	A			<ul style="list-style-type: none"> <li>• Earthquake</li> </ul>	<ul style="list-style-type: none"> <li>• Geomagnetic Storm</li> </ul>	
		1	2	3	4	5
		Lowest	Consequences			Highest

Comments on the relative risk rating?

# Mitigation

- Activities that prevent or reduce the likelihood or consequences of a hazard.
- Four “A’s” of mitigation:
  - Avoid the hazard (don’t build in the floodplain)
  - Adapt to the hazard (use hail resistant roofing)
  - Alter the hazard (improve drainage)
  - Accept the hazard (don’t do anything)
- Structural: an engineering and construction project
- Non-structural: building codes, zoning, public education, preparedness

# STAPLEE Method of Assessing Options

- Social-does the community support it?
- Technical-is it technologically feasible?
- Administrative-is staffing, funding & expertise available?
- Political-is it politically feasible?
- Legal-do we have legal authority?
- Economic-is it cost effective?
- Environmental-how does it effect the environment?

# City Staff Mitigation Proposals

Hazard Being Mitigated	Non-Structural Project	Structural Project
Multi-hazard	Information and public presentations	
Multi-hazard	Public information on social media	
Multi-hazard	Public notification system upgrade	
Multi-hazard	Multi-language outreach and information	
Multi-hazards	Climate change awareness for the public	

Multi-hazard includes:

- Climate change
- Drought
- Dam failure
- Earthquake
- Floods
- Pandemic
- Severe weather
- Swelling soils
- Extreme heat/cold
- Hailstorms
- Heavy rain/storms
- Lightning
- Windstorms
- Winter storms
- Wildland fire
- Tornadoes
- Geomagnetic storms

Comments and recommendations on proposed mitigation actions?

# City Staff Mitigation Proposals

Hazard Being Mitigated	Non-Structural Project	Structural Project
Climate Change	Greenhouse emissions inventory, Sustainability Plan, public education, CC4CA participation, improve energy efficiency/use, develop Reduced Energy District, transition to electric vehicles where appropriate	
Flood	Continued land acquisition	
Flood	Continued compliance with NFIP and potential improved CRS rating	
Flood		Address areas needing storm sewer upgrades
Drought	Update Drought Management Plan	
Invasive Species	Promote water wise and infestation resistant tree programs	
Invasive Species	Continue invasive species awareness and inspection programs	
Open Space Fire/Wildfire	Clear Creek watershed protection and wildfire mitigation	

Comments and recommendations on proposed mitigation actions?

# City Staff Mitigation Proposals

Hazard Being Mitigated	Non-Structural Project	Structural Project
Open Space Fire	Open Space fuels reduction/fire mitigation	
Wildfire/Erosion and Turbidity		Filter waste to Semper Water Treatment Plant
Winter Storms		Protect water storage tanks from winter storms
Weather Extremes	Become a National Weather Service StormReady community	
Weather Extremes	Provide information to businesses on extreme weather, mitigation, and preparedness	
Weather Extremes	Grid resilience	

Comments and recommendations on proposed mitigation actions?

# Activity

- Write down your ideas for hazard mitigation on the provided sticky notes
- Place your notes on the posted hazards/projects

# Conclusions

- Make changes to the draft based on comments and recommendations
- Forward the plan to DHSEM and FEMA for review
- Respond to DHSEM and FEMA comments
- August 13<sup>th</sup>, City Council adoption
- Periodic review and update
- Next formal update due in 2023.

Thank You!  
Questions/Comments  
Greg Moser  
(303) 658-4550  
[Gmoser@cityofwestminster.us](mailto:Gmoser@cityofwestminster.us)



**WESTMINSTER**

## **APPENDIX C ADOPTION RESOLUTION**

---

# APPENDIX C ADOPTION RESOLUTION

---

Placeholder for resolution adopting plan in 2018.

**APPENDIX D MITIGATION CATEGORIES,  
ALTERNATIVES, AND SELECTION CRITERIA**

---

# APPENDIX D MITIGATION CATEGORIES, ALTERNATIVES, AND SELECTION CRITERIA

---

## D.1 Categories of Mitigation Measures Considered

---

The following categories are based on the Community Rating System.

- Prevention
- Emergency Services
- Property Protection
- Natural Resource Protection
- Structural Projects
- Public Information

## D.2 Alternative Mitigation Measures per Category

---

### Prevention

Preventive measures are designed to keep the problem from occurring or getting worse. Their objective is to ensure that future development is not exposed to damage and does not increase damage to other properties.

- Planning
- Zoning
- Open space preservation
- Land development regulations
- Subdivision regulations
- Floodplain development regulations
- Stormwater management
- Fuels management, fire breaks
- Building codes
  - Firewise construction
- (also see Property Protection)

### Emergency Services

Emergency services protect people during and after a disaster. A good emergency services program addresses all hazards. Measures include:

- Warning (floods, tornadoes, ice storms, hail storms, dam failures)
  - NOAA weather radio all hazards
  - Sirens
  - Reverse 911
- Evacuation and sheltering
- Communications
- Emergency planning
  - Activating the emergency operations room (emergency management)

- Closing streets or bridges (police or public works)
- Shutting off power to threatened areas (utility company)
- Holding children at school/releasing children from school (school district)
- Passing out sand and sandbags (public works)
- Ordering an evacuation (mayor)
- Opening evacuation shelters (red cross)
- Monitoring water levels (engineering)
- Security and other protection measures (police)
- Monitoring of conditions (dams)
- Critical facilities protection (buildings or locations vital to the response and recovery effort, such as police/fire stations, hospitals, sewage treatment plants/lift stations, power substations)
  - Buildings or locations that, if damaged, would create secondary disasters, such as hazardous materials facilities and nursing homes
  - Lifeline utilities protection
  - Health and safety maintenance

## Property Protection

Property protection measures are used to modify buildings subject to damage rather than to keep the hazard away. A community may find these to be inexpensive measures because often they are implemented by or cost-shared with property owners. Many of the measures do not affect the appearance or use of a building, which makes them particularly appropriate for historical sites and landmarks.

- Retrofitting/disaster proofing
  - Floods
    - Wet/dry floodproofing (barriers, shields, backflow valves)
    - Relocation
    - Acquisition
  - Tornadoes
    - Safe rooms
    - Securing roofs and foundations with fasteners and tie-downs
    - Strengthening garage doors and other large openings
  - Drought
    - Improve water supply (transport/storage/conservation)
    - Remove moisture competitive plants (tamarisk/salt cedar)
    - Water restrictions/water saver sprinklers/appliances
    - Grazing on CRP lands (no overgrazing-see noxious weeds)
    - Create incentives to consolidate/connect water services
    - Recycled wastewater on golf courses
  - Earthquakes
    - Removing masonry overhangs, bracing, and other parts
    - Tying down appliances, water heaters, bookcases, and fragile furniture so they will not fall over during a quake.
    - Installing flexible utility connections that will not break during shaking (pipelines, too)
  - Wildland fire
    - Replacing building components with fireproof materials (roofing, screening)
    - Creating "defensible space"
    - Installing spark arrestors

- Fuels modification
- Noxious weeds/insects
  - Mowing
  - Spraying
  - Replacement planting
  - Stop overgrazing
  - Introduce natural predators
- Insurance

## Natural Resource Protection

Natural resource protection activities are generally aimed at preserving (or in some cases restoring) natural areas. In so doing, these activities enable the naturally beneficial functions of floodplains and watersheds to be better realized. These natural and beneficial floodplain functions include the following:

- Storage of floodwaters
- Absorption of flood energy
- Reduction in flood scour
- Infiltration that absorbs overland flood flow
- Groundwater recharge
- Removal/filtering of excess nutrients, pollutants, and sediments from floodwaters
- Habitat for flora and fauna
- Recreational and aesthetic opportunities

Methods of protecting natural resources include:

- Erosion and sediment control
- Wetlands protection
- Riparian area/habitat protection
- Threatened and endangered species protection
- Fuels management
- Set-back regulations/buffers
- Best management practices-Best management practices ("BMPs") are measures that reduce nonpoint source pollutants that enter the waterways. Nonpoint source pollutants come from non-specific locations. Examples of nonpoint source pollutants are lawn fertilizers, pesticides, and other farm chemicals, animal wastes, oils from street surfaces and industrial areas and sediment from agriculture, construction, mining and forestry. These pollutants are washed off the ground's surface by stormwater and flushed into receiving storm sewers, ditches and streams. BMPs can be implemented during construction and as part of a project's design to permanently address nonpoint source pollutants. There are three general categories of BMPs:
  - Avoidance-Setting construction projects back from the stream.
  - Reduction-Preventing runoff that conveys sediment and other water-borne pollutants, such as planting proper vegetation and conservation tillage.
  - Cleanse-Stopping pollutants after they are en route to a stream, such as using grass drainageways that filter the water and retention and detention basins that let pollutants settle to the bottom before they are drained
- Dumping regulations
- Water use restrictions

- Weather modification
- Landscape management

## **Structural Projects**

Structural projects have traditionally been used by communities to control flows and water surface elevations. Structural projects keep flood waters away from an area. They are usually designed by engineers and managed or maintained by public works staff. These measures are popular with many because they "stop" flooding problems. However, structural projects have several important shortcomings that need to be kept in mind when considering them for flood hazard mitigation:

They are expensive, sometimes requiring capital bond issues and/or cost sharing with Federal agencies, such as the U.S. Army Corps of Engineers or the Natural Resources Conservation Service.

- They disturb the land and disrupt natural water flows, often destroying habitats.
- They are built to a certain flood protection level that can be exceeded by a larger flood, causing extensive damage.
- They can create a false sense of security when people protected by a structure believe that no flood can ever reach them.
- They require regular maintenance to ensure that they continue to provide their design protection level.

Structural measures include:

- Detention/retention structures
- Erosion and sediment control
- Basins/low-head weirs
- Channel modifications
- Culvert resizing/replacement/maintenance
- Levees and floodwalls
- Fencing (for snow, sand, wind)
- Drainage system maintenance
- Reservoirs (for flood control, water storage, recreation, agriculture)
- Diversions
- Storm sewers

## **Public Information**

A successful hazard mitigation program involves both the public and private sectors. Public information activities advise property owners, renters, businesses, and local officials about hazards and ways to protect people and property from these hazards. These activities can motivate people to take protection

- Hazard maps and data
- Outreach projects (mailings, media, web, speaker's bureau)
- Library resources
- Real estate disclosure
- Environmental education
- Technical assistance

## D.3 Mitigation Alternative Selection Criteria

---

The following criteria were used to select and prioritize proposed mitigation measures:

### STAPLE/E

- Social-Does the measure treat people fairly? (different groups, different generations)
- Technical-Will it work? (Does it solve the problem? Is it feasible?)
- Administrative-Do you have the capacity to implement and manage project?
- Political-Who are the stakeholders? Did they get to participate? Is there public support? Is political leadership willing to support?
- Legal-Does your organization have the authority to implement? Is it legal? Are there liability implications?
- Economic-Is it cost-beneficial? Is there funding? Does it contribute to the local economy or economic development?
- Environmental-Does it comply with environmental regulations?

### Other

- Does the proposed action protect lives?
- Does the proposed action address hazards or areas with the highest risk?
- Does the proposed action protect critical facilities, infrastructure, or community assets?
- Does the proposed action meet multiple objectives (multi-objective management)?

**Table D.1 Example Mitigation Actions Items by Category and Hazard**

Alternative Mitigation Actions	Human Health hazards (Pan flu, West Nile)	Dam Failure	Floods	Soil Hazards (erosion, deposition, and expansive soils)	Severe Weather (hail, lightning, wind, temps, fog, drought)	Tornadoes and Earthquake	Wildfire/ Grassland Fire	Winter Weather
<b>PREVENTION</b>								
Building codes and enforcement			■	■	■	■	■	■
Comprehensive Watershed Tax			■					
Density controls		■	■	■			■	
Design review standards			■	■		■	■	
Easements			■	■			■	
Environmental review standards			■	■		■	■	
Floodplain development regulations		■	■					
Hazard mapping		■	■	■			■	
Floodplain zoning		■	■					
Forest fire fuel reduction							■	
Housing/landlord codes					■			
Slide-prone area/grading/hillside development regulations				■			■	
Manufactured home guidelines/regulations		■	■		■	■		
Multi-Jurisdiction Cooperation within watershed		■	■					
Open space preservation		■	■	■			■	
Performance standards		■	■	■	■	■	■	■
Special use permits		■	■	■			■	
Stormwater management regulations			■					
Subdivision and development regulations		■	■	■		■	■	
Surge protectors and lightning protection					■			
Tree Management					■		■	■
Transfer of development rights			■	■			■	
Utility location				■	■			■
<b>PROPERTY PROTECTION</b>								

Alternative Mitigation Actions	Human Health hazards (Pan flu, West Nile)	Dam Failure	Floods	Soil Hazards (erosion, deposition, and expansive soils)	Severe Weather (hail, lightning, wind, temps, fog, drought)	Tornadoes and Earthquake	Wildfire/ Grassland Fire	Winter Weather
Acquisition of hazard prone structures		■	■	■			■	
Construction of barriers around structures		■	■					
Elevation of structures		■	■					
Relocation out of hazard areas		■	■	■			■	
Non structural improvements (safety film on windows, bookshelf anchoring, critical equipment bracing etc.)					■	■		
Structural retrofits (e.g., reinforcement, floodproofing, bracing, etc.)			■		■	■	■	■
<b>PUBLIC EDUCATION AND AWARENESS</b>								
Debris Control			■					
Flood Insurance		■	■					
Hazard information centers	■	■	■	■	■	■	■	■
Public education and outreach programs	■	■	■	■	■	■	■	■
Real estate disclosure		■	■	■	■	■	■	■
Crop Insurance					■	■		
<b>NATURAL RESOURCE PROTECTION</b>								
Best Management Practices (BMPs)	■		■	■	■		■	
Forest and vegetation management	■	■	■	■	■		■	■
Hydrological Monitoring	■	■	■	■	■			
Sediment and erosion control regulations		■	■	■				
Stream corridor restoration			■	■				
Stream dumping regulations			■					
Urban forestry and landscape management		■	■	■	■		■	■
Wetlands development regulations			■	■			■	
<b>EMERGENCY SERVICES</b>								
Critical facilities protection		■	■	■	■	■	■	■
Emergency response services		■	■	■	■	■	■	■

Alternative Mitigation Actions	Human Health hazards (Pan flu, West Nile)	Dam Failure	Floods	Soil Hazards (erosion, deposition, and expansive soils)	Severe Weather (hail, lightning, wind, temps, fog, drought)	Tornadoes and Earthquake	Wildfire/ Grassland Fire	Winter Weather
Hazard threat recognition	■	■	■	■	■	■	■	■
Hazard warning systems (community sirens, NOAA weather radio)		■	■	■	■	■	■	■
Health and safety maintenance	■	■	■	■	■	■	■	■
Evacuation planning	■	■	■	■			■	
<b>STRUCTURAL PROJECTS</b>								
Channel maintenance			■					
Dams/reservoirs (including maintenance)		■	■					
Levees and floodwalls (including maintenance)			■					
Safe room/shelter					■	■		■
Snow fences								■
Water supply augmentation					■			
Post-disaster mitigation	■	■	■	■	■	■	■	■