



**CITY OF BOULDER
CITY COUNCIL AGENDA ITEM**

MEETING DATE: Aug. 20, 2013

AGENDA TITLE: Introduction, first reading, and consideration of a motion to order published, by title only, an ordinance amending floodplain regulations in order to clarify existing regulations and to protect critical facilities and lodging facilities in the 100- and 500-year floodplains, including Chapter 9-3 “Overlay Districts,” Subsection 9-6-1(d) “Use Table,” and Section 9-16-1 “Definitions” B.R.C. 1981.

PRESENTER/S

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EXECUTIVE SUMMARY

As a component of the city’s comprehensive floodplain management program, a Critical Facilities and Lodging Facilities Ordinance (Attachment A) is being proposed to help protect critical infrastructure and the people most vulnerable to flood hazards, including the elderly, children, and visitors who may not be aware of local flood risks.

The proposed ordinance would regulate two categories of facilities within the 500-year floodplain: critical facilities and lodging facilities.

Critical facilities provide essential services, serve at-risk populations or contain hazardous materials. Critical facilities would be required to develop emergency plans and implement flood protection measures when constructing new facilities or undergoing significant renovations. Emergency plans include either an evacuation plan or a shelter-

in-place plan. Flood protection measures include elevating a structure above the flood protection elevation or floodproofing the structure.

Lodging facilities provide temporary accommodations and include hotels, motels, dormitories, bed and breakfasts, and overnight shelters. These facilities would be required to develop emergency plans.

The proposed ordinance also provides clarification of the flood protection requirements for mixed-use structures and lodging facilities within the 100-year floodplain. Under the proposed revisions, mixed-use structures and lodging facilities must be elevated or floodproofed to the flood protection elevation, with all lodging units and residential units elevated above the flood protection elevation.

STAFF RECOMMENDATION

Staff requests City Council consideration of this matter and action in the form of the following motion:

Motion to order published, by title only, an ordinance amending floodplain regulations under Chapter 9-3 “Overlay Districts,” Subsection 9-6-1(d) “Use Table,” and Section 9-16-1 “Definitions” B.R.C. 1981 as proposed in Attachment A.

COMMUNITY SUSTAINABILITY ASSESSMENTS AND IMPACTS

- **Economic** – Protecting critical facilities from being damaged during a flood will allow essential services, and the community as a whole, to more quickly recover and return to pre-flood business operations faster.

The proposed ordinance requires flood protection measures for critical facilities and the development of emergency plans for both critical facilities and lodging facilities. Most flood protection measures will be implemented in association with facility expansions or modifications. Existing buildings would be allowed to remain in operation in their current state, as long as they do not contain significant amounts of hazardous materials, but would be required to develop emergency management plans within 5 years. If a facility is expanding or undergoing a significant modification, then additional flood protection measures would be required for the existing structure. Under this scenario, the cost of compliance will represent an incremental increase in planned permitting and construction costs.

An “Analysis of Economic Impacts” that was completed to determine the associated costs for affected facilities is presented on the [Critical Facilities and Lodging Facilities Ordinance](#) Web page. Costs to develop emergency plans will vary depending on the type of facility and whether or not the plan includes an evacuation plan or a shelter-in-place plan.

Emergency plans that include an evacuation plan are estimated to cost approximately \$3,000. Emergency plans that include a shelter-in-place plan will also require a structural analysis to

ensure that the building can withstand the force of floodwaters. Shelter-in-place plans are estimated to cost approximately \$13,000. It is expected that most facilities will complete evacuation plans. However, shelter-in-place plans could be a better option for facilities within flood-protected buildings or with populations that cannot evacuate quickly.

Flood protection measures are anticipated to cost \$12 per square foot or less for most critical facilities. Flood protection measures typically include either raising the lowest floor elevation of a structure or installing floodproofing measures that allow the structure to resist the force of floodwaters. Costs for raising the floor elevation of buildings are expected to range between \$1.20 per square foot and \$10 per square foot. Costs for installing floodproofing measures range between \$4.50 per square foot and \$85 per square foot.

- **Environmental** – The city’s guiding principles for floodplain management include using a non-structural approach to flood mitigation and seeking to accommodate floods, not control them. Focusing efforts on life safety and protecting critical uses, instead of structural containment of floodwaters, helps preserve natural riparian areas and floodplain functions. Requiring measures to prevent the release of hazardous materials into floodwaters will also reduce the environmental contamination often associated with floods.
- **Social** – Incorporating flood protection measures at critical facilities will help maintain essential services. Requiring critical and lodging facilities to develop emergency plans will better prepare these facilities for a flood emergency and allow them to respond faster. This will help protect the most vulnerable populations from being harmed from a flood.

OTHER IMPACTS

- **Fiscal** – Many of the City of Boulder’s buildings and infrastructure are included in the list of critical facilities because they provide essential services to the community. This includes:
 - public safety facilities such as police stations, fire and rescue stations, and emergency operations centers;
 - public utility facilities;
 - essential government facilities, including where permanent records are stored, courts, jails, building permitting and inspection services, divisions that manage utilities and transportation systems, the Information Technology Department, Finance Department, City Manager’s Office, and maintenance and equipment centers.

The proposed ordinance would not require modifications to existing structures, but new facilities and facilities undergoing expansions or significant renovation work would need to incorporate flood protection measures if they are located within the 500-year floodplain and are not already protected from floods. Many of the city’s existing facilities are already within the 100-year floodplain, have emergency plans, and are subject to the city’s current floodplain regulations; therefore, these existing facilities will not be greatly impacted by the proposed ordinance.

If the Critical Facilities and Lodging Facilities Ordinance is adopted:

- the Facilities and Asset Management Master Plan will be updated to include the essential service facilities definition;
- future facility improvements will incorporate the requirements of the ordinance; and
- the provisions of the ordinance will be incorporated into the Boulder Civic Area Plan, as applicable.

The majority of the Civic Area is within the 100-year floodplain and is already subject to the city's existing floodplain regulations.

- **Staff time** – The time associated with implementing the ordinance and permit requirements will be covered by existing staff or engineering consultants. The 2013 work plan for the flood management program has prioritized staff time for the work leading up to the implementation of this ordinance. Fees consistent with existing 100-year floodplain development permits have already been adopted for the cost recovery of the staff time or consultant costs associated with the implementation of these requirements.

BOARD AND COMMISSION FEEDBACK

The Water Resources Advisory Board (WRAB) voted 4-0 to recommend approval of the ordinance at the Mar. 18, 2013 meeting. The Planning Board voted 6-1 to recommend approval of the ordinance at the Apr. 18, 2013 meeting. The dissenting Planning Board member agreed with the concept of the ordinance, but felt uncomfortable recommending approval because there were still outstanding questions. The Planning Board provided the following feedback:

- develop emergency plan guidelines;
- consider allowing other professionals to develop emergency plans in addition to engineers and architects;
- reduce the emergency plan compliance window from 10 years to 5 years;
- require that emergency plans be periodically reviewed and updated to reflect current conditions;
- update the Boulder Revised Code's Use Table to indicate the critical and lodging facilities requirements;
- clarify the posting requirements for emergency evacuation routes or sheltering locations; and
- review the ordinance periodically and, in the future, consider prohibiting new critical uses in the 500-year floodplain.

The ordinance was revised in response to Planning Board's comments. Staff agrees with the Planning Board recommendation that the ordinance should be reviewed periodically to verify that it is accomplishing the desired goals and intends to include a review of the ordinance in future work plans. There was no public feedback at the WRAB and Planning Board meetings.

PUBLIC FEEDBACK

The draft Critical Facilities and Lodging Facilities Ordinance has been developed through a multi-year public process that began in 2010. Impacted facility managers were notified of the proposed ordinance and invited to attend a project open house and public hearings to provide feedback. In addition, numerous stakeholders were engaged as follows:

- a presentation to the Boulder Chamber Community Affairs Council in October 2010;
- a February 2011 spot on Channel 8's "Controversy and Consensus" show;
- a project Web page detailing the ordinance information and meeting dates;
- email updates to interested members of the public;
- articles in the Boulder Daily Camera;
- an October 2012 presentation to the Planning and Development Services Advisors Group;
- a November 2012 presentation to the Boulder Hotel and Motel Association;
- meetings with representatives of the Regional Transportation District, Boulder Community Hospital, Corden Pharma, Boulder County, Boulder Valley School District, and the University of Colorado; and
- emails, letters, and phone calls to private schools, nursing homes, and day cares.

The feedback received to date has focused on understanding which facilities are included, what the new requirements are, and what the compliance triggers are. Facility managers have generally been supportive of the proposed ordinance; they recognize the importance of protecting critical facilities and think that the proposed regulations are reasonable. The Boulder Community Hospital has incorporated the draft provisions of the ordinance into their recent expansion of the Foothills Hospital facility.

In response to outreach efforts to private schools, nursing homes and day cares, a few day care owners have indicated an interest in attending a workshop to learn more about emergency management plans and how best to prepare for a flash flood event. One day care owner expressed concern that the proposed requirements would duplicate the State of Colorado day care licensing requirements and thinks that the current emergency plans approved by the state are sufficient. The State of Colorado has the following requirement for licensed day care facilities:

"The center must have a written emergency procedure that explains, at a minimum, how the center will be evacuated in case of fire or other disaster requiring evacuation, how to function during a tornado alert, and the reporting of reportable communicable illnesses to the local health department pursuant to regulations of the State Department of Public Health and Environment."

The state licensing requirement does not specifically address emergency preparation for flash floods. Flash flood alerts and evacuation procedures are much different from fire alarms and fire evacuations. Therefore, staff is recommending that the emergency plan requirements for day cares remain in the proposed ordinance.

BACKGROUND

Recent and historical flood events across the globe have demonstrated that flooding of critical facilities (such as fire stations, hospitals and wastewater treatment facilities) disrupts needed services, increases costs and delays economic recovery. These situations have also highlighted the vulnerability of certain populations, including the sick, elderly and children, who pose unique challenges for safe evacuation or shelter-in-place care. Out-of-town visitors are also of special concern because they are likely unaware of the local flash flood risks and therefore are less prepared to react quickly during a flood emergency.

Additional protection standards for critical facilities have been discussed for more than a decade by city officials, advisory boards and City Council. The ideas and intentions behind the Critical Facilities and Lodging Facilities Ordinance have been articulated in several city planning documents, including the Comprehensive Flood and Stormwater Master Plan, the Multi-hazard Mitigation Plan, and the Boulder Valley Comprehensive Plan (BVCP). More specifically, the BVCP states in Section 3.23–Larger Flooding Events:

“The city recognizes that floods larger than the 100-year event will occur resulting in greater risks and flood damage that will affect even improvements constructed with standard flood protection measures. The city will seek to better understand the impact of larger flood events and consider necessary floodplain management strategies including the protection of critical facilities.”

A draft Critical Facilities Ordinance was presented to City Council at a May 29, 2012 flood study session. The council expressed overall support for continuing development of the ordinance and concerns about the following items:

- financial impacts to nonprofits and small businesses;
- conflicts between height restrictions and elevation requirements; and
- the ordinance was not structured to clearly reflect the impacted uses.

Based on City Council’s feedback, staff made the following modifications to the ordinance.

- Impacts to nonprofits and small businesses were reduced by removing restaurants, theaters, and all assembly group uses (previously defined as Mobile Population Facilities) from the ordinance. The subset of Mobile Population Facilities still included in the ordinance has been renamed and now makes up the “Lodging Facilities” category. This subset was kept in the ordinance because staff deemed it was important to include emergency plans for people sheltering in overnight lodging facilities who may be unaware of Boulder’s flash flood risk.
- Potential conflicts between height restrictions and elevation requirements are avoided by allowing floodproofing for all facilities inside the 500-year floodplain but outside the 100-year floodplain. Floodproofing is a series of modifications to a structure that make it more watertight in order to reduce or eliminate water infiltration and damage. Floodproofing does not require the elevation of buildings or additions. Without this amendment, residential facilities would have been required to provide flood protection through building elevations or additions. In some instances, this elevation could have caused a building or addition to exceed the city’s height restrictions, which could have required a reduction in the proposed number of floors.
- The ordinance has been rewritten to more clearly reflect the impacted uses. In addition to clarifications added to Chapter 9-3, notes have been added to Table 6-1: Use Table in Chapter 9-6 to put potentially impacted uses on notice regarding these new regulations.

ANALYSIS

The risk of flash flooding is an important issue for the City of Boulder, primarily due to its location at the mouth of Boulder Canyon and other canyon creeks. The city is affected by 15 drainageways and associated floodplains. A map of the 500- and 100-year floodplains is included as Attachment B. Canyon creek flash floods happen quickly, with minimal warning time, creating a significant risk to life safety and property damage. The proposed ordinance would regulate two categories of facilities within the 500-year floodplain: critical facilities and lodging facilities. Critical facilities include those providing essential services, serving at-risk populations and containing hazardous materials. Examples of critical facilities and lodging facilities are listed below:

Critical Facilities

- Essential services such as police and fire stations, hospitals, and water and wastewater treatment facilities.
- At-risk populations such as nursing homes, schools, and day cares where parents or guardians are not present onsite.
- Hazardous materials facilities with significant amounts of dangerous substances.

Lodging Facilities

Examples include hotels, motels, dormitories, bed and breakfasts, emergency shelters, overnight shelters and hostels.

Critical facilities would be required to develop emergency plans and implement flood protection measures. Flood protection measures include elevating a structure above the flood protection elevation or floodproofing the structure. Lodging facilities would be required to develop emergency plans. Emergency plans will detail evacuation routes to locations outside of the 500-year floodplain or methods of sheltering-in-place. Shelter-in-place plans will be required to include a structural analysis to ensure the building can withstand the force of floodwaters.

Under existing city floodplain regulations, all facilities in the 100-year floodplain currently need to be elevated or floodproofed to two feet above the 100-year flood elevation. Under the proposed regulations, critical facilities in the 500-year floodplain would need to be elevated or floodproofed to one foot above the 500-year flood elevation. Within the 500-year floodplain, outside the 100-year floodplain, critical facilities would be required to meet the less restrictive of these requirements. There are no existing requirements for emergency plans in the 500- or 100-year floodplains.

Impacted Facilities

Under the proposed ordinance, approximately 80 critical and lodging facilities (31 public facilities) will be required to develop emergency plans. Of those 80 facilities, approximately 33 critical facilities (14 public facilities) are within the 500-year floodplain and would be subject to new flood protection requirements. A list of impacted facilities is included as Attachment C.

The State of Colorado does not require flood protection for critical facilities in the 500-year floodplain for its agencies such as the University of Colorado. The State of Colorado will have discretion on the enforcement of the proposed ordinance for those facilities, but staff will work with facility managers to seek voluntary compliance. Federal government agencies are required

to either avoid building in the 500-year floodplain or protect federal facilities to the 500-year water surface level.

The tables below summarize the proposed ordinance requirements:

Emergency Plan Requirements in the 500- and 100-year Floodplains

Facility Type	Strategy	Compliance Triggers
<ul style="list-style-type: none"> • Essential service • At-risk population • Hazardous material • Lodging 	Emergency Plan, including a shelter-in-place or evacuation plan	New uses, development requiring a floodplain permit, or compliance within five years

Flood Protection Requirements in the 500-year Floodplain

Facility Type	Protection Method	Compliance Triggers
<ul style="list-style-type: none"> • Essential service • At-risk population 	Floodproof ⁴ or elevate	New uses, new buildings, additions, substantial improvements ¹ or substantial modifications ²
<ul style="list-style-type: none"> • Hazardous material 	Floodproof or elevate or contain chemicals ³	New uses, new buildings, additions, substantial improvements ¹ , substantial modifications ² or compliance within 10 years

1. “Substantial improvements” are improvements that equal or exceed 50 percent of the building’s value.
2. “Substantial modifications” are expansions that equal or exceed 50 percent of the building’s floor area.
3. “Contain chemicals” means securing hazardous materials in a manner that will prevent their release during a flood.
4. Floodproofing of residential structures is not allowed in the 100-year floodplain.

Mixed-Use Structures

The proposed ordinance also provides clarification of the flood protection requirements for mixed-use structures and lodging facilities within the 100-year floodplain. Under the current regulations, there is no definition for “mixed-use structures” and hotels and motels are included in the definition of residential structures. Within the 100-year floodplain, residential structures are required to be elevated to the flood protection elevation and floodproofing is not allowed. The Federal Emergency Management Agency (FEMA) definition of “Non-residential Structure” includes hotels and motels, and FEMA allows these types of structures to be floodproofed and does not require that they be elevated.

The current City of Boulder definition for “Residential structure” was adopted by Ordinance 5199, on June 27, 1989. A definition for “Nonresidential structure” was also introduced in the ordinance as part of major regulatory revisions to emphasize life safety with adoption of the local high-hazard zone and a requirement that floodproofing require no human intervention. The current definitions are as follows:

"'Residential structure' means any structure or any portion of a structure that is used for, or designed as and capable of being used for, the temporary or permanent domicile of persons, including, without limitation, a dwelling, a boarding house, a hotel, a motel, and similarly used structures. (Floodplain)"

"'Nonresidential structure' means any structure or any portion of a structure used exclusively for, or designed as and capable of being used for, office, commercial, industrial, or governmental occupation. (Floodplain)"

The 1989 definitions were developed to protect public safety while maintaining flexibility for future floodplain development. The definitions were intended to ensure that residential applications involving sleeping occupants (such as hotel guest rooms) are elevated and allow non-residential uses in the same structure to be floodproofed. The definitions were intended to provide for mixed-use structures with the added wording "or any portion of a structure" to provide for the combined and separate management for each use. Applications for mixed-use structures are now common in Boulder.

A city council memorandum dated May 11, 1989 (Attachment D) explains the background for the definitions and regulatory application. At least two hotel developments with floodproofed underground parking have been approved under the current regulations, including the Village Marriott at 2660 Canyon Blvd. and the St. Julien Hotel at 9th Street and Canyon Boulevard, as well as several mixed-use projects, such as One Boulder Plaza. These projects included floodproofed underground parking; ground-level, non-residential uses; and elevated residential uses.

The existing regulations are unclear concerning floodproofed underground parking for hotel or mixed-use structures and what constitutes a mixed-use structure. In order to clarify the elevation and floodproofing requirements for hotel structures and mixed-use structures, the proposed ordinance would revise the current definitions for "Residential structure" and "Nonresidential structure," and introduce a new definition for "Mixed-use structure" as follows:

"'Residential structure' means any structure that is used for, or designed as and capable of being used for, the temporary or permanent domicile of persons for periods of six months or more, including, without limitation, a dwelling, a boarding house, a dormitory, a fraternity, a bed and breakfast, and similarly used structures. (Floodplain)"

"'Nonresidential structure' means any structure used exclusively for, or designed as and capable of being used for, office, commercial, industrial, or governmental occupation, or the temporary lodging of persons for periods of less than six months including hotels, motels, emergency shelters, and overnight shelters but excluding dormitories, fraternities, and bed and breakfasts. (Floodplain)"

"'Mixed-use structure' means any structure with both residential uses and nonresidential uses where no less than twenty-five percent of the finished floor area contains nonresidential uses. (Floodplain)"

Under the proposed revisions, hotels and mixed-use structures must be elevated or floodproofed to the flood protection elevation, with all residential units and lodging units elevated above the flood protection elevation. This is consistent with FEMA requirements and the intent of the previous revisions to the floodplain regulations.

Ordinance Effective Date

Staff recommends an effective date of Jan. 1, 2014 to allow time to develop the application processes and continue to explore additional methods to reduce emergency plan development costs for businesses and nonprofits. Some options being considered include grant assistance funding for small businesses and nonprofits or completing multiple emergency plans at one time to get better unit costs.

Summary of Revisions

In response to City Council's feedback in May 2012, Planning Board's feedback in April 2013, and feedback from Planning and Development Services staff, the following amendments have been made to the ordinance.

- Restaurants, theaters, and all assembly group uses have been removed from the ordinance requirements.
- Flexibility in flood protection methods was expanded by allowing structural floodproofing of residential facilities inside the 500-year floodplain but outside the 100-year floodplain, in addition to structural elevation.
- In addition to professional engineers, Certified Facility Managers are authorized to develop emergency plans and architects are no longer authorized to develop emergency plans, as development of emergency plans is outside of the practice of architecture for which professional architects are licensed under state law.
- The emergency plan compliance window was reduced from 10 years to 5 years.
- A requirement to annually review and update emergency plans was added.
- The Boulder Revised Code's Use Table was amended to include the critical and lodging facilities requirements.
- Requirements for posting evacuation routes and sheltering-in-place information were further clarified.
- A clarification for the application of flood protection measures to mixed-use structures and lodging facilities within the 100-year floodplain was added.

Based on Planning Board's feedback and concern over costs, an emergency plan guideline that details evacuation and shelter-in-place plan requirements is being developed. The guidelines are intended to convey the required elements of an emergency plan, streamline the development process, and reduce costs. Additional efforts are being made to reduce the cost of developing emergency plans for small businesses including providing grant assistance funding.

NEXT STEPS

Pending City Council's feedback, the ordinance's second reading and a public hearing are scheduled for Sept. 17, 2013.

ATTACHMENTS

Attachment A: Critical Facilities and Lodging Facilities Ordinance

Attachment B: 500- and 100-year Floodplain Map

Attachment C: List of Existing Critical Facilities and Lodging Facilities

Attachment D: City Council Memorandum dated May 11, 1989

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ORDINANCE NO. _____

AN ORDINANCE AMENDING FLOODPLAIN REGULATIONS IN ORDER TO CLARIFY EXISTING REGULATIONS AND TO PROTECT CRITICAL FACILITIES AND LODGING FACILITIES IN THE ONE HUNDRED-YEAR AND FIVE HUNDRED-YEAR FLOODPLAINS, INCLUDING CHAPTER 9-3, "OVERLAY DISTRICTS," SUBSECTION 9-6-1(d), "USE TABLE," AND SECTION 9-16-1, "GENERAL DEFINITIONS," B.R.C. 1981, AND SETTING FORTH RELATED DETAILS.

BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF BOULDER, COLORADO:

Section 1. Section 9-3-2, B.R.C. 1981, is amended as follows:

9-3-2 Floodplains.

- (a) Legislative Intent: The purpose of this ~~section~~chapter is to regulate certain areas of the city subject to flooding in order to protect the public health, safety, and welfare by:
 - (1) Restricting or prohibiting certain uses that are hazardous to life or property in time of flood;
 - (2) Restricting the location of structures intended for human occupancy and regulating the manner in which such structures may be built in order to minimize danger to human life within and around such structures;
 - (3) Requiring that those structures allowed in the floodplain be expanded or enlarged, and equipment and fixtures be installed or replaced, in a manner designed to prevent their being washed away and to assure their protection from severe damage;
 - (4) Regulating the method of construction and replacement of water supply and sanitation systems in order to prevent disease, contamination, and unsanitary conditions;
 - (5) Maintaining for public inspection available maps delineating areas subject to such provisions in order to protect individuals from purchasing or using lands for purposes that are not suitable;
 - (6) Protecting and preserving the water-carrying and water-retention characteristics and capacities of watercourses used for conveying and retaining floodwaters; and

- 1 (7) Obtaining and maintaining the benefits to the community of participating in the
2 National Flood Insurance Program.
- 3 (b) Flooding May Occur: The degree of flood protection provided by the terms of this ~~section~~
4 chapter has been determined to be reasonable for regulatory purposes. Floods of greater
5 magnitude will occur, and flood heights may be increased as a result of natural or human-
6 made causes. The provisions of this ~~section~~chapter do not imply that areas outside of the
7 floodplain or land uses permitted within the floodplain are free from flooding, flood hazard,
8 or flood damages. A grant or approval by the city under the requirements of this ~~section~~
9 chapter does not constitute a representation, guarantee, or warranty of any kind or nature by
10 the city or any city official or employee of the practicability or safety of any structure or
11 proposed use, and it creates no liability to or cause of action against the city or any city
12 official or employee for any damages from flood or otherwise that may result from such
13 structure or use.
- 14 (c) Scope and Application:
- 15 (1) The requirements of this ~~section~~chapter supplement those imposed on the same lands
16 by any underlying zoning provisions of this code or other ordinance of the city. If
17 there is a conflict between such requirements, the more restrictive controls.
- 18 (2) If a lot or parcel of land lies partly within the high hazard zone, ~~or~~ the conveyance
19 zone, the one hundred-year floodplain, or the five hundred-year floodplain~~flood~~
20 fringe area, the part(s) of such lot or parcel lying within such area or areas shall meet
21 all the standards and requirements of such respective area as prescribed by this
22 ~~section~~chapter. ~~For the purposes of new construction, if~~ any portion of a structure
23 lies partly within the high hazard zone, ~~or~~ the conveyance zone, the one hundred-year
24 floodplain, or the five hundred-year floodplain~~flood fringe area~~, all the standards and
25 requirements of ~~this section~~ such respective area(s) as prescribed by this chapter shall
apply to the entire structure unless stated otherwise.
- (3) If lands located outside the city limits are included within the five hundred-year
floodplain, the one hundred-year floodplain~~flood fringe~~, the conveyance zone, or the
high hazard zone, the requirements of this ~~section~~chapter shall apply to such lands
upon annexation.
- (d) Administration: The city manager shall administer the requirements of this ~~section~~chapter
and shall:
- (1) Determine that the requirements of this ~~section~~chapter have been met before issuing
any permit for development in the floodplain;
- (2) Obtain and maintain for public inspection any certificates of floodproofing required
by this ~~section~~chapter, and any information on the elevation (in relation to mean sea
level) of the ~~level of the~~ lowest floor (including basement) of all new or substantially
improved structures, and information specifying whether ~~or not~~ such structures
contain a basement, and, if the structure has been floodproofed, the elevation (in
relation to mean sea level) to which the structure was floodproofed;

- 1 (3) Notify Boulder County and the Colorado Water Conservation Board before
 2 permitting any change in a watercourse and submit evidence of such notice to FEMA;
- 3 (4) Adopt rules interpreting and implementing the requirements of this ~~section~~chapter,
 4 including, without limitation, application procedures for floodplain development
 5 permits, ~~and~~ specifications for the floodproofing of structures, substantial
 6 improvements, and utilities; and specifications for the content of and application
 7 procedures for emergency management plans;
- 8 (5) Assure that the Boulder Valley Comprehensive Plan is consistent with the floodplain
 9 management objectives of this ~~section~~chapter and the regulations of FEMA;
- 10 (6) Make necessary interpretations of the exact location of the boundaries of the
 11 floodplain, the five hundred-year floodplain, the one hundred-year floodplain~~flood~~
 12 ~~fringe~~, the conveyance zone, and the high hazard zone;
- 13 (7) Amend the boundaries of the high hazard zone and the conveyance zone pursuant to
 14 subsection (f) of this section;
- 15 (8) Determine that all necessary permits have been obtained from state, federal, or local
 16 agencies the approval of which is required before issuing any permit for development
 17 in the floodplain;
- 18 (9) Require that persons changing a watercourse maintain the watercourse so that its
 19 flood carrying capacity is not diminished;
- 20 (10) Require that new and replacement water supply systems in the floodplain be designed
 21 to minimize or eliminate infiltration of floodwaters into the systems;
- 22 (11) Require that new and replacement sanitary sewage systems within the floodplain be
 23 designed to minimize or eliminate infiltration of floodwaters into the systems and
 24 discharges from the systems into floodwaters;
- 25 (12) Require that on-site waste disposal systems be located to avoid impairment to them or
 contamination from them during flooding; and
- (13) Obtain, review, and reasonably utilize any ~~base~~ flood elevation and floodway data
 available from federal, state, and other sources, including data developed pursuant to
~~e~~Chapter 9-12, "Subdivision," B.R.C. 1981, as criteria for requiring that all new
 development meet the requirements of this ~~section~~chapter.
- (e) Appeals: Any person contesting the city manager's interpretation of a boundary location
 under paragraph (d)(6) of this section, or any person aggrieved by the granting or denial of
 a floodplain development permit, may appeal such determination to the planning board
 through the process described in Ssection 9-4-4, "Appeals, Call-Ups and Public Hearings,"
 B.R.C. 1981. The request shall set forth the reason and basis for the appeal and such other
 information as the manager may prescribe by rule.
- (f) Map Amendments: As watercourse or flood channel improvements or mapping corrections
 are made, the city manager may amend the flood regulatory area maps to recognize the
 changed conditions produced by such improvements or corrections, provided that no such
 amendments or corrections may change a FEMA "area of special flood hazard" or

1 "regulatory floodway" unless the City is in receipt of a letter of map amendment or a letter
2 of map revision issued by FEMA.

3 (g) Flood Regulatory Areas:

- 4 (1) The provisions of this ~~section~~ chapter apply to the area shown as floodplain on the
5 most recent maps adopted by the city council, as amended from time to time by the
6 city manager pursuant to subsections (d), (e), and (f) of this section. The regulatory
7 floodplain encompasses the five hundred-year floodplain, the one hundred-year
8 floodplain, ~~the flood fringe~~, the conveyance zone, and the high hazard zone. The
9 following regulations governing each portion of the floodplain are cumulative and not
10 exclusive.
11 (2) In addition to the regulatory areas identified in paragraph (g)(1) of this section, the
12 City has adopted the areas of special flood hazard identified in the Flood Insurance
13 Study for Boulder County, effective December 18, 2012, and delineated on the Flood
14 Insurance Rate Map for Boulder County and the City of Boulder as adopted by the
15 City in compliance with 44 C.F.R. chapter 1. In no event will the regulations
16 contained in this ~~section~~ chapter be interpreted to permit any action not permitted
17 under those regulations promulgated by FEMA for the regulation of areas of special
18 flood hazard and regulatory floodways.

19 (h) Floodproofing: Whenever this chapter requires floodproofing a building or structure or a
20 portion thereof, the following standards shall be met:

- 21 (1) Such building or structure or portion thereof shall be floodproofed in accordance
22 with any rules adopted by the city manager for floodproofing and with current state
23 and federal laws and regulations governing floodproofing;
24 (2) Such building or structure or portion thereof shall be floodproofed to the flood
25 protection elevation in such a manner that the building or structure is watertight with
walls substantially impermeable to the passage of water and in a manner requiring no
human intervention;
(3) Such building or structure or portion thereof shall have structural components capable
of resisting projected hydrostatic and hydrodynamic loads and the effects of
buoyancy; and
(4) Such floodproofing shall be certified by a Colorado registered professional engineer
or registered architect to comply with this paragraph. Such certifications shall be
provided to the city manager as set forth in Paragraph 9-3-2(d)(2), B.R.C. 1981.

26 (i) Standards for Critical Facilities and Lodging Facilities in the Five Hundred-Year
27 Floodplain:

- 28 (1) Floodplain Development Permit: In the five hundred-year floodplain, no person shall
29 construct or establish a new critical facility or make any development to a structure
30 housing an existing critical facility prior to issuance of a floodplain development
31 permit pursuant to Section 9-3-6, "Floodplain Development Permits," B.R.C. 1981.

1 unless the activity is exempt under Subsection 9-3-6(a), “Activities Exempt from
2 Floodplain Development Permit Requirement,” B.R.C. 1981.

3 (2) Requirements Apply to Entire Building: If any portion of a structure housing a
4 critical facility or lodging facility lies partially within the five hundred-year
5 floodplain, the requirements of this section shall apply to that entire ~~critical facility or~~
6 lodging facility structure.

7 (3) Emergency Management Plans:

8 (A) Emergency Management Plan Required: No owner or operator of a critical
9 facility or lodging facility in the five hundred-year floodplain shall fail to
10 develop and have approved an emergency management plan meeting the
11 requirements of this subsection prior to issuance of any floodplain
12 development permit for any development requiring a floodplain development
13 permit but no later than January 1, 2019, or five years after the effective date
14 of a map change that placed the facility into the five hundred-year floodplain,
15 if that date is later than January 1, 2019,

16 (B) Floodplain Development Permit: To obtain the required approval of an
17 emergency management plan, an owner or operator of a critical facility or
18 lodging facility in the five hundred-year floodplain shall file an application for
19 floodplain development permit pursuant to Section 9-3-6, Floodplain
20 Development Permits, B.R.C. 1981.

21 (C) Purpose: The purpose of the emergency management plan requirements set
22 forth in this section is:

23 (i) To protect the health, safety, and welfare of the public and of
24 employees, visitors, residents, guests, contractors, and others at risk
25 from hazards at the facility;

(ii) To minimize interruptions or disruptions of operations of critical
facilities;

(iii) To protect buildings, physical assets, and electronic information; and

(iv) To prevent environmental contamination.

(D) Emergency Management Plan Requirements: With the exception of
requirements the city manager finds inapplicable to a particular facility, all
emergency management plans shall contain, without limitation:

(i) An assessment by a Colorado registered professional engineer or an
International Facility Management Association Certified Facilities
Manager of the risks to persons at the facility and others at risk from
hazards at the facility, to the facility itself, its physical assets, and its
operation, and to the environment during flood events;

- 1 (ii) An assessment of the resources needed for responding to the risk of
2 flood events and for continuing business operations and for
3 communicating during and after an incident;
- 4 (iii) A plan for obtaining and maintaining the resources identified as
5 needed in subsection (i)(3)(C)(ii) above;
- 6 (iv) A plan to protect employees, visitors, residents, guests, contractors,
7 and others at risk from hazards at the facility during flood events.
8 Such plan shall include an evacuation plan or a shelter in place plan,
9 unless both are necessary to protect the health, safety and welfare of
10 the persons at risk at the facility.
- 11 a. Evacuation plans shall be certified by a Colorado registered
12 professional engineer or an International Facility Management
13 Association Certified Facilities Manager and shall provide a means
14 for safely evacuating occupants to a location outside of the five
15 hundred-year floodplain or to an approved shelter in place location.
- 16 b. Shelter--in--place plans shall be certified by a Colorado registered
17 professional engineer, shall demonstrate that the structure will be
18 safe to occupy during a five hundred-year flood event, and shall
19 designate a safe shelter--in--place location within the building and
20 safe routes to such location.
- 21 (v) A system and strategies to communicate with employees, customers,
22 residents, guests, contractors, and others at risk at the facility during a
23 flood event;
- 24 (vi) Strategies to minimize and quickly overcome any disruption or
25 interruption of operations of the facility during a flood event;
- (vii) An incident management system that defines responsibilities and
 coordinates activities before, during, and after a flood event;
- (viii) A program to train persons with defined roles in the management plan
 to do their assigned tasks and to train all employees and other regular
 occupants of the facility so they can take appropriate protective actions
 during a flood event; and
- (ix) Any other strategies, techniques, systems, programs, or plans the city
 manager determines are necessary to serve the health, safety, and
 welfare of the public and any persons at or near the facility.

23 (E) —Posting of Evaluation Routes and Routes to Shelter--In--Place Locations: The
24 approved evacuation routes and routes to shelter--in--place locations shall be
25 posted on the inside of each doorway leading to a separate unit in a lodging
 facility and be displayed in a prominent location or a location designed to

1 provide information to persons within the critical facility that is approved by
2 the city manager.

3 (F) Implementation of Emergency Management Plans: No owner or operator of a
4 critical facility or lodging facility in the five hundred-year floodplain shall fail
5 to implement and to annually review and update, if necessary, an approved
6 emergency management plan and shall make the plan available to the city
7 manager for review upon request.

8 (4) Construction Requirements for Critical Facilities in the Five Hundred-Year
9 Floodplain. The following standards apply to critical facilities located in the five
10 hundred-year floodplain:

11 (A) No owner or operator of a critical facility shall construct, modify, or establish,
12 or cause to be constructed, modified, or established a critical facility within
13 the five hundred-year floodplain except in compliance with the requirements
14 of this subsection.

15 (B) Any person making an expansion or an enlargement to a structure housing an
16 existing at-risk population facility or essential service facility shall floodproof
17 or elevate the lowest floor, including the basement, of the expanded or
18 enlarged portion to or above the flood protection elevation.

19 (C) Any person making a substantial modification or a substantial improvement to
20 a structure housing an existing at-risk population facility or essential service
21 facility shall floodproof or elevate the lowest floor, including the basement, of
22 the substantially modified or improved portion to or above the flood
23 protection elevation and shall floodproof or elevate the remainder of the
24 existing structure to or above the flood protection elevation.

25 (D) Any person constructing or establishing a new at-risk population facility or
essential service facility shall floodproof or elevate the lowest floor, including
the basement, to or above the flood protection elevation.

(E) Any person constructing or establishing a new hazardous material facility
shall secure all hazardous materials from flooding and from being released
during a five hundred-year flood event or shall floodproof the facility. Any
person making a substantial modification or a substantial improvement to a
structure housing an existing hazardous material shall secure the hazardous
materials from flooding or otherwise being released during a five hundred-
year flood event. The owner or operator shall demonstrate compliance with
this standard by providing a certification from a Colorado registered
professional engineer that documents that hazardous material will not be
released at or from the facility during a five hundred-year flood event.

(F) No person owning, operating, or otherwise using a hazardous material facility
shall fail to, or fail to, cause to secure all hazardous materials from flooding
and from being released during five hundred-year flood events or to

1 floodproof the facility before January 2024 or five years after the effective
 2 date of a map change that placed the facility into the five hundred-year
 3 floodplain, whichever date is later.

4 (G) Whenever any construction, modification, improvement or other activity
 5 related to a critical facility triggers any floodproofing or elevation
 6 requirements of this subsection (4), the construction standards described in
 7 Subsections (a)(3), "Construction Materials and Methods," (a)(4), "Utilities,"
 8 (a)(18), "Enclosures," and (a)(19), "Below Grade Crawl Space Construction,"
 9 of Section 9-3-3, "Regulations Governing the One Hundred-Year Floodplain,"
 10 B.R.C. 1981, shall also be complied with.

11 (H) Existing Uses: The use of any land or structure that was lawful before the
 12 application of this subsection (i)(4), Construction Requirements for Critical
 13 Facilities in the Five Hundred-Year Floodplain, or any amendment thereto but
 14 that does not conform to the requirements of this subsection may be continued
 15 subject to the requirements of this subsection. If such a use not conforming to
 16 the requirements of this subsection is discontinued for twelve consecutive
 17 months, no person shall use the land or structure thereafter unless such use
 18 conforms to the requirements of this subsection.

19 (5) Exemption for Critical Facilities Protected by Levee System: Critical facilities
 20 protected by a levee system within the five hundred-year floodplain are exempt from
 21 the requirements of subsection (i)(4) of this section 9-3-2, provided that the following
 22 requirements are satisfied:

23 (A) The owner or operator of a new or existing critical facility located landward of
 24 a levee system; outside of the one hundred-year floodplain, but within the five
 25 hundred-year floodplain, demonstrates that the levee system provides
 26 protection against a five hundred-year flood event by:

27 (i) meeting the riverine levee design criteria of 44 C.F.R. § 65.10, as
 28 amended from time to time, except that the minimum riverine levee
 29 freeboard shall be one foot above the water surface elevation of a five
 30 hundred-year flood, rather than three; and

31 (ii) providing an operating and maintenance manual for the levee that
 32 incorporates all operating and maintenance requirements of 44 C.F.R.
 33 § 65.10 and Rule 10 of the Colorado Rules and Regulations for
 34 Regulatory Floodplains in Colorado (2 C.C.R. 408-1:10, Criteria for
 35 Determining Effects of Levees on Regulatory Floodplains), as
 36 amended from time to time, to ensure continuing proper function of
 37 the structure.

38 (B) The owner or operator of a new or existing critical facility located landward of
 39 an accredited levee or a provisionally accredited levee within areas mapped
 40 Zone X (shaded) shall demonstrate that the levee system meets the riverine

1 levee design, operation, and maintenance criteria of 44 C.F.R. § 65.10 and
 2 Rule 10 of the Colorado Rules and Regulations for Regulatory Floodplains in
 3 Colorado (2 C.C.R. 408-1:10, Criteria for Determining Effects of Levees on
 4 Regulatory Floodplains).

5 (C) If the levee is owned by a person other than the owner or operator of the
 6 critical facility, the owner or operator, respectively, must demonstrate that a
 7 fully executed agreement exists between the levee owner and the owner or
 8 operator of the critical facility ensuring that the requirements of subsections 9-
 9 3-2(i)(5)(A) or (B) and (F) for continued operation and maintenance of the
 10 levee system will be met.

11 (D) The exemptions under this subsection (i)(5) for critical facilities located
 12 landward of an levee system were approved by the city manager through the
 13 issuance of a floodplain development permit pursuant to Subsection 9-3-6,
 14 “Floodplain Development Permits,” B.R.C. 1981, after finding that all
 15 requirements of this subsection (i)(5) have been met.

16 (E) If a levee system protecting an existing critical facility in the five hundred-
 17 year floodplain fails to meet the freeboard requirement of subsection (i)(5)(A)
 18 of this section solely because FEMA revises a FIRM, maintenance and use of
 19 that critical facility may occur for two years after the revision before having to
 20 meet the requirements of subsections (i)(3) and (i)(4) of this section.

21 (F) No person shall fail to construct, operate, or maintain or fail to cause the
 22 construction, operation, or maintenance of a levee system protecting a critical
 23 facility and approved by the city manager in a floodplain development permit
 24 as an exemption to the requirements of subsections (i)(3) and (i)(4) of this
 25 section in accordance with a design and an operating and maintenance manual
meeting the requirements of this subsection (i)(5).

(6) As the one hundred-year floodplain, conveyance zone, and high hazard zone are all
located within of the five hundred-year floodplain, the requirements of this subsection
9-3-2(i), “Standards for Critical Facilities and Lodging Facilities in the Five Hundred-
Year Floodplain,” also apply to critical facilities and lodging facilities in the one
hundred-year floodplain, conveyance zone, and high hazard zone unless stricter
requirements apply in the one hundred-year floodplain, conveyance zone, or high
hazard zone, as applicable.

Section 2. Section 9-3-3, B.R.C. 1981, is amended as follows:

9-3-3 Regulations Governing the One Hundred-Year Floodplain.

(a) General Provisions: In the ~~entire~~ one hundred-year floodplain, the following standards
apply:

- 1 (1) Floodplain Development Permit: Except as specified in paragraph
 2 ~~(a)(1)(A)~~ Subsection 9-3-6(a), "Activities Exempt from Floodplain Development
 3 Permit Requirement," B.R.C. 1981, no development in the one hundred-year
 4 floodplain may occur prior to the issuance of a floodplain development permit
 5 pursuant to section 9-3-6, "Floodplain Development Permits," B.R.C. 1981.

6 ~~(A) Activities exempt from a floodplain development permit: The following~~
 7 ~~activities are allowed within the flood regulatory area and do not require a floodplain~~
 8 ~~development permit:~~

9 (i) ~~"Maintenance" as defined in chapter 9-16 "Definitions" that does not~~
 10 ~~constitute a substantial improvement and does not affect the efficiency or~~
 11 ~~capacity of the conveyance zone or high hazard zone.~~

12 (ii) ~~Sidewalks, concrete, asphalt or stone flatwork that does not result in the~~
 13 ~~establishment or expansion of parking area and does not modify existing~~
 14 ~~grade by more than six inches.~~

15 (iii) ~~Underground utilities that do not modify existing grade.~~

16 (iv) ~~Poles, lines, cables, sign posts, landscaping and artwork that do not affect~~
 17 ~~the efficiency or capacity of the conveyance zone or high hazard zone.~~

18 (v) ~~Temporary facilities that are not permanently attached to the ground such~~
 19 ~~as tents, traffic control devices and lawn furniture provided that they will~~
 20 ~~not affect the efficiency or capacity of the conveyance zone or high hazard~~
 21 ~~zone, or they will remain in place for no more than thirty days.~~

- 22 (2) Anchoring:

23 (A) All new construction and substantial improvements or substantial modifications
 24 shall be anchored to prevent flotation, collapse, or lateral movement of the
 25 structure and be capable of resisting the hydrostatic and hydrodynamic loads.

(B) All manufactured homes must be elevated and anchored to resist flotation,
 collapse, or lateral movement and capable of resisting the hydrostatic and
 hydrodynamic loads. Methods of anchoring may include, but are not limited to,
 use of over-the-top or frame ties connecting to permanent ground anchors, in
 addition to any anchoring requirements for resisting wind forces and any tie-
 down requirements of chapter 10-12, "Mobile Homes," B.R.C. 1981.

Requirements shall include, without limitation, the following:

(i) Over-the-top ties shall be provided at each of the four corners of the
 manufactured homes. For manufactured homes fifty feet or longer, two
 additional ties per side are required at intermediate locations. For
 manufactured homes less than fifty feet long, one additional tie per side is
 required;

(ii) Frame ties shall be provided at each of the four corners of the
 manufactured homes. For manufactured homes fifty feet or longer, five

1 additional ties per side are required at intermediate points. For
2 manufactured homes less than fifty feet long, four additional ties per side
are required;

3 (iii) All components of the anchoring system shall be capable of carrying a
4 force of four thousand eight hundred pounds; and

(iv) Any additions to manufactured homes shall be similarly anchored.

5 (3) Construction Materials and Methods:

6 (A) All new construction, substantial improvements, and substantial modifications
7 shall be constructed with materials and utility equipment resistant to flood
8 damage as outlined in the most current FEMA Technical Document on 2-93,
9 Flood-Resistant Materials Requirements.

10 (B) All new construction, substantial improvements, and substantial modifications
11 shall be constructed using methods and practices that minimize flood damage.

12 (C) All new construction, substantial improvements and substantial modifications
13 shall be constructed with electrical, heating, ventilation, plumbing, and air
14 conditioning equipment and other service facilities that are designed and located
15 (by elevating or floodproofing the components) so as to prevent water from
16 entering or accumulating within the components during flooding conditions.

17 (4) Utilities:

18 (A) All new and replacement water supply systems shall be designed to minimize or
19 eliminate infiltration of floodwaters into the systems.

20 (B) All new and replacement sanitary sewage systems shall be designed to minimize
21 or eliminate infiltration of floodwaters into the systems and discharge from the
22 systems into floodwaters.

23 (C) On-site waste disposal systems shall be located to avoid impairment or
24 contamination during flooding.

25 (5) Subdivision Proposals:

(A) All subdivision proposals shall demonstrate efforts to minimize flood damage.

(B) All subdivision proposals shall have public utilities and facilities such as sewer,
gas, electrical, and water systems located and constructed to minimize flood
damage.

(C) All subdivision proposals shall have adequate drainage provided to reduce
exposure to flood damage.

(D) Base flood elevation data shall be provided for subdivision proposals and other
proposed development.

(E) No subdivision proposal shall create a lot which is unbuildable pursuant to this
section.

- 1 (6) Floodproofing: Whenever this section requires a building or structure to be
 2 floodproofed, the following standards in Subsection 9-3-2(h), "Floodproofing,"
B.R.C. 1981, shall be met.:
- 3 ~~(A) Such building or structure shall be floodproofed in accordance with any rules for~~
 4 ~~floodproofing promulgated by the city manager pursuant to chapter 1-4,~~
~~"Rulemaking," B.R.C. 1981, and with current FEMA National Flood Insurance~~
 5 ~~Program (NFIP) Technical Bulletins;~~
- 6 ~~(B) Such building or structure shall be floodproofed to the flood protection elevation in~~
 7 ~~such a manner that the building or structure is watertight with walls substantially~~
 8 ~~impermeable to the passage of water and in a manner requiring no human~~
 9 ~~intervention;~~
- 10 ~~(C) Such building or structure shall have structural components capable of resisting~~
 11 ~~projected hydrostatic and hydrodynamic loads and the effects of buoyancy; and~~
- 12 ~~(D) Such floodproofing shall be certified by a Colorado registered professional engineer~~
 13 ~~or registered architect to comply with this paragraph. Such certifications shall be~~
 14 ~~provided to the city manager as set forth in paragraph 9-3-2(d)(2), B.R.C. 1981.~~
- 15 (7) Hazardous ~~Materials~~Substances: No person shall store a hazardous substance at or
 16 below the flood protection elevation for the area of the floodplain in which it is
 17 located, except for the storage of gasoline-fuel in existing and replacement
 18 underground tanks in existing gasoline-fueling service stations and service garages,
 19 which tanks are designed to prevent infiltration and discharge into floodwaters and
 20 which are adequately anchored and shielded against rupture. For purposes of this
 21 paragraph, "existing" means in place and in use on January 1, 1989.
- 22 (8) Automobile Parking: Notwithstanding other provisions of this title, no person shall
 23 establish an area for automobile parking in any portion of the floodplain where flood
 24 depths exceed eighteen inches.
- 25 (9) Flood Warning System: No owner of a hotel, a motel, a dormitory, a rooming house,
 a hostel, a school, a bed and breakfast, a daycare center, a group home, or a
 residential or congregate care facility located in the Boulder Creek one hundred-year
 floodplain shall fail to provide a flood warning system approved by the city manager
 that is connected to a point of central communication in the building with twenty-
 four-hour monitoring. No such person shall fail to maintain such a flood warning
 system.
- (10) Rental Property: No owner of property that is located in a one hundred-year floodplain
 and subject to a city rental license under chapter 10-3, "Rental Licenses," B.R.C.
 1981, shall fail to post on the exterior of the premises at the entrance a sign approved
 by the city manager stating that the property is subject to flood hazard and containing
 such further information and posted at such other locations inside the building as the
 city manager may require.
- (11) Manufactured Housing: All manufactured homes placed in the City after July 1, 1989,
 and all manufactured homes which are substantially improved or substantially
 modified shall be elevated on a permanent foundation so that the lowest floor of the
 manufactured home is at or above the flood protection elevation and is securely

1 anchored to an adequately anchored foundation system, and shall meet the anchorage
2 and tie-down requirements of paragraph (a)(2) of this section.

3 (12) Recreational Vehicles: In order to reduce debris and hazard potential, recreational
4 vehicles shall either: a) be in the one hundred-year floodplain for fewer than one
5 hundred eighty consecutive days, b) be fully licensed and ready for highway use, or c)
6 meet the permit requirements and elevation and anchoring requirements for
7 manufactured homes.

8 (13) Structure Orientation: In order to minimize the obstruction to flow caused by
9 buildings, to the extent consistent with other city policies regarding solar access, new
10 structures shall be placed with their longitudinal axes parallel to the predicted
11 direction of flow of floodwaters or be placed so that their longitudinal axes are on
12 lines parallel to those of adjoining structures.

13 (14) Existing Uses: The use of any land or structure that was lawful before the application
14 of this section or any amendment thereto but that does not conform to the
15 requirements of this section may be continued subject to the requirements of this
16 section. If such a use not conforming to the requirements of this section is
17 discontinued for twelve consecutive months, no person shall use the land or structure
18 thereafter unless such use conforms to the requirements of this section.

19 (15) New Uses: All uses allowed by the underlying zoning district may be established,
20 subject to the requirements of this section, except for the outdoor or uncontained
21 storage of moveable objects below the flood protection elevation.

22 (16) Existing Structures: Any structure in existence before the enactment of this section or
23 any amendment thereto that does not conform to the requirements of this section may
24 remain or may undergo rehabilitation subject to the requirements of this section.
25 Further, any such structure may be otherwise improved as follows:

(A) Any person making an expansion or an enlargement to an existing residential
structure shall elevate the lowest floor, including the basement, of the expanded
or enlarged portion to or above the flood protection elevation.

(B) Any person making an expansion or an enlargement to an existing
nonresidential structure shall floodproof or elevate the lowest floor, including
the basement, of the expanded or enlarged portion to or above the flood
protection elevation except that any lodging units within the expanded or
enlarged portion of such structure shall be elevated to or above the flood
protection elevation.

(C) Any person making an expansion or an enlargement to an existing mixed-use
structure shall floodproof or elevate the lowest floor, including the basement, of
the expanded or enlarged portion to or above the flood protection elevation and
shall elevate the residential lodging units within the expanded or enlarged
portion to or above the flood protection elevation.

(D) Any person making a substantial modification or a substantial improvement to
any existing nonresidential structure shall floodproof or elevate the lowest floor,
including the basement, of the ~~substantially modified or improved portion~~entire

1 structure to or above the flood protection elevation and shall floodproof the
 2 remainder of the existing structure except that any lodging units within the
 3 expanded or enlarged portion of such structure shall be elevated to or above the
 4 flood protection elevation.

5 (DE) Any person making a substantial modification or a substantial improvement to
 6 any existing residential structure shall elevate the lowest floor, including the
 7 basement, of the entire residential structure to or above the flood protection
 8 elevation.

9 (F) Any person making a substantial modification or a substantial improvement to
 10 an existing mixed-use structure shall floodproof or elevate the lowest floor,
 11 including the basement, of the entire structure and shall elevate all residential
 12 and lodging units within the structure to or above the flood protection elevation.

13 (17) New Structures: Construction of new structures shall meet the following
 14 requirements:

15 (A) Any person constructing a new residential structure shall elevate the lowest
 16 floor, including the basement, to or above the flood protection elevation;

17 (B) Any person constructing a new mixed-use structure shall floodproof or elevate
 18 the lowest floor, including the basement, of the entire structure and shall elevate
 19 all residential and lodging units within the structure to or above the flood
 20 protection elevation;

21 (C) Any person constructing a new nonresidential structure shall elevate all lodging
 22 units within the structure to or above the flood protection elevation and shall
 23 floodproof in a manner requiring no human intervention or elevate the lowest
 24 floor, including the basement, to or above the flood protection elevation with
 25 the following exceptions:

(i) Open air carwashes;

(ii) Unheated pavilions;

(iii) Unfinished or flood resistant building entryways or access areas;

(iv) Garden storage sheds;

(v) Sidewalks, paving, or asphalt, concrete, or stone flatwork;

(vi) Fences; and

(vii) Poles, lines, cables, or other transmission or distribution facilities of public
 utilities.

(ED) Any person constructing a new structure on a property removed from the one
 hundred-year floodplain through a FEMA Letter of Map Revision Based on Fill
 (LOMR-F) shall protect the lowest floor, including the basement, to or above
 the flood protection elevation that existed before placement of fill, as follows:

(i) Residential structures: by elevating the structure; or

1 (ii) Nonresidential structures: by elevating or floodproofing the structure.

2 Solely for the purposes of this subparagraph (a)(17)(C), previously designated
3 floodplain areas that have been removed from the one hundred-year floodplain
4 through a LOMR-F shall be considered to be within the floodplain. No person shall
5 construct a new structure subject to this subparagraph (a)(17)(C) prior to the issuance
6 of a floodplain development permit pursuant to Section 9-3-6, "Floodplain
7 Development Permits," B.R.C. 1981.

8 (18) Enclosures: Enclosures below the lowest floor that are unfinished or flood resistant,
9 usable solely for parking of vehicles, crawl spaces, building access or storage, in an
10 area that is not a basement, and that are not floodproofed as set forth in this section
11 shall meet the following requirements:

12 (A) Compliance with the provisions of paragraphs (a)(2), (a)(3), and (a)(4) of this
13 section; and

14 (B) Design and construction that automatically equalizes hydrostatic flood forces on
15 exterior walls by allowing for the entry and exit of floodwaters.

16 (i) Designs for meeting this requirement shall meet or exceed the following
17 minimum criteria: a minimum of two openings having a total net area of
18 not less than one square inch for every square foot of enclosed area subject
19 to flooding shall be provided. The bottom of all openings shall be no
20 higher than one foot above grade. Openings may be equipped with
21 screens, louvers, valves, or other coverings or devices provided that they
22 permit the automatic entry and exit of floodwaters.

23 (ii) Any designs not in conformance with subparagraph (a)(18)(B)(i) above,
24 shall be certified by a registered professional engineer or licensed architect
25 and shall conform with the most current FEMA Technical Bulletin on~~4-~~
~~93~~, Openings in Foundation Walls.

(C) Fully enclosed areas below the lowest floor subject to this provision include the
following:

(i) Residential garages placed at or above grade;

(ii) Enclosures or vestibules that are attached to structures and that are utilized
for storage or entryways;

(iii) Crawl spaces; and

(iv) Outdoor pavilions and patio enclosures with removable walls not located
in the high hazard zone.

(19) Below Grade Crawl Space Construction: New construction, expansion or
enlargement, substantial improvement and substantial modification of any below
grade crawl space shall meet the following requirements:

(A) Interior grade elevation that is below the base flood elevation shall be no lower
than two feet below the lowest adjacent grade;

- 1 (B) The height of the below grade crawl space measured from the interior grade of
2 the crawl space to the top of the foundation wall shall not exceed four feet at
3 any point;
- 3 (C) Adequate drainage systems shall allow floodwaters to drain from the interior
4 area of the crawl space following a flood; and
- 5 (D) The provisions of paragraphs (a)(2), (a)(3), (a)(4) and (a)(18) of this section
6 shall be complied with.

6 (20) Critical Facilities and Lodging Facilities: The requirements of Subsection 9-3-2(i),
7 “Standards for Critical Facilities and Lodging Facilities in the Five Hundred-Year
8 Floodplain,” B.R.C. 1981, apply to critical facilities and lodging facilities in the one
9 hundred-year floodplain. Where a conflict exist between the requirements of this
10 section and the provision of Subsection 9-3-2(i), B.R.C. 1981, the most restrictive
11 requirements apply.

10 Section 3. Section 9-3-4, B.R.C. 1981, is amended as follows:

11 **9-3-4 Regulations Governing the Conveyance Zone.**

12 In the conveyance zone, the following standards apply:

- 13 (a) The provisions of section 9-3-3, "Regulations Governing the One Hundred-Year
14 Floodplain," B.R.C. 1981.
- 15 (b) The provisions of section 9-3-5, "Regulations Governing the High Hazard Zone," B.R.C.
16 1981, if the land is also located in the high hazard zone.
- 17 (c) All uses allowed under the provisions of section 9-3-3, "Regulations Governing the
18 Floodplain," B.R.C. 1981, if they are not prohibited by the underlying zoning district or
19 any ordinance of this City, may be established except that no person shall establish or
20 change any use that results in any rise in the elevation of the one hundred-year flood.
- 21 (d) All structures allowed under section 9-3-3, "Regulations Governing the One Hundred-Year
22 Floodplain," B.R.C. 1981, may be established except that no person shall:
- 23 (1) Place any structure in the conveyance zone that will result in any rise in the elevation
24 of the one hundred-year flood; or
- 25 (2) Place any obstruction in the conveyance zone, except a device reasonably necessary
for flood management if the device is designed and constructed to minimize the
potential hazards to life and property.
- (e) No person shall carry out any other development that results in any rise in the elevation of
the one hundred-year flood.

- 1 (f) Localized rises within flood channels or on a specific parcel that is being developed are
 2 permissible if there is no adverse impact on nearby properties and there is no increase in
 the average water surface elevations along the cross sections of the floodplain.
- 3 (g) Localized rises on land owned or controlled by a government or government subdivision or
 4 agency, or within public drainage or flood control easements, are permissible if the
 following requirements have been satisfied:
- 5 (1) The applicant has necessary property interests or permission to use land to allow the
 increase in any water sur-face elevation or there is no adverse impact to such land;
- 6 (2) There are no insurable structures under the FEMA National Flood Insurance Program
 7 affected by the localized rise;
- 8 (3) The applicant minimizes the amount of the localized rise in a flood elevation; and
- 9 (4) The applicant complies with all necessary FEMA requirements, including, without
 10 limitation, obtaining a Condi-tional Letter of Map Revision (CLOMR) prior to
 development and a Letter of Map Revision (LOMR) upon completion of a project
 causing a localized rise in flood elevation.

11 Section 4. Section 9-3-5, B.R.C. 1981, is amended as follows:

12 **9-3-5 Regulations Governing the High Hazard Zone.**

13 In the high hazard zone of the floodplain, the following standards apply:

- 14 (a) The provisions of section 9-3-3, "Regulations Governing the One Hundred-Year
 15 Floodplain," B.R.C. 1981.
- 16 (b) The provisions of section 9-3-4, "Regulations Governing the Conveyance Zone," B.R.C.
 17 1981, if the land is also located in the conveyance zone.
- 18 (c) All uses allowed under the provisions of section 9-3-3, "Regulations Governing the One
 19 Hundred-Year Floodplain," B.R.C. 1981, if they are not prohibited by the underlying
 zoning district or any other ordinance of the City, may be established, except that no person
 shall:
- 20 (1) Change the use of an existing structure intended for human occupancy from a
 21 nonresidential use to a residential use or use as a school, daycare center, group home,
 residential care facility, or congregate care facility.
- 22 (2) Establish any new parking lot for motor vehicles.
- 23 (3) Establish any campground.
- 24 (d) All structures allowed under the provisions of Section 9-3-3, "Regulations Governing the
 25 One Hundred-Year Floodplain," B.R.C. 1981, may be established, except that no person
 shall:

- 1 (1) Construct or place any new structure intended for human occupancy.
- 2 (2) Expand, enlarge, or make a substantial modification or substantial improvement to
- 3 any existing structure intended for human occupancy. Notwithstanding this provision,
- 4 a person may reconstruct a non-flood-damaged structure or portion thereof, which
- 5 otherwise does constitute a substantial improvement, under the provisions of
- 6 Ssubparagraphs 9-3-3(a)(16)(C) and (a)(16)(D), B.R.C. 1981.
- 7 (e) Unconditioned, unenclosed building elements such as balconies, awnings and roof
- 8 overhangs may extend up to four feet into the high hazard zone if completely located above
- 9 the flood protection elevation and the remainder of the structure complies with this chapter.

10 Section 5. Section 9-3-6, B.R.C. 1981, is amended as follows:

11 **9-3-6 Floodplain Development Permits.**

- 12 (a) Activities Exempt from Floodplain Development Permit Requirement: The following
- 13 activities are allowed within the one hundred-year floodplain and in the five hundred-year
- 14 floodplain and do not require a floodplain development permit:
- 15 (i) "Maintenance" as defined in Section 9-16-1, "General Definitions," B.R.C.
- 16 1981, that does not affect the efficiency or capacity of the conveyance
- 17 zone or high hazard zone.
- 18 (ii) Sidewalks, concrete, asphalt or stone flatwork that does not result in the
- 19 establishment or expansion of parking area and does not modify existing
- 20 grade by more than six inches.
- 21 (iii) Underground utilities that do not modify existing grade.
- 22 (iv) Poles, lines, cables, sign posts, landscaping and artwork that do not affect
- 23 the efficiency or capacity of the conveyance zone or high hazard zone.
- 24 (v) Temporary facilities that are not permanently attached to the ground such
- 25 as tents, traffic control devices and lawn furniture provided that they will
- not affect the efficiency or capacity of the conveyance zone or high hazard
- zone, or they will remain in place for no more than thirty days.
- (b) An applicant for a floodplain development permit shall pay the fee prescribed by Ssection
- 4-20-44, "Floodplain Development Permits and Flood Control Variance Fees," B.R.C.
- 1981, and shall complete an application form provided by the city manager that shall
- include, without limitation, the following:
- (1) The written consent of the owners of all property subject to the development request;
- (2) A written statement addressing the criteria for approval;
- (3) Information on the location of hazardous material and how it will be secured to
- prevent its release during a five hundred-year flood event, if the floodplain
- development permit application is for a critical facility which will contain hazardous

- 1 material ~~A surface view plan showing elevations and contours of the ground; pertinent~~
 2 ~~structures, fill, and storage elevations; sizes, locations, and spatial arrangements of all~~
 3 ~~proposed, anticipated, and existing structures on the site; location and elevations of~~
 4 ~~streets, water supplies and sanitary facilities; and soil types; and~~
- 5 (4) A copy of the emergency management plan, if the floodplain development permit
 6 application is for a critical facility or lodging facility; and ~~Specifications for building~~
 7 ~~construction and materials, filling, dredging, grading, channel improvements and~~
 8 ~~changes, storage of materials, water supply, and sanitary facilities.~~
- 9 (5) A written statement by a Colorado registered professional engineer certifying that the
 10 proposed levee design and operating and maintenance manual meet the requirements
 11 of Subsection 9-3-2(i)(5), "Exemption for Critical Facilities Protected by Levee
 12 System," B.R.C. 1981, if the flood development permit application is for a critical
 13 facility or lodging facility for which an exemption is sought under Subsection 9-3-
 14 2(i)(5).
- 15 (bc) The manager may require the applicant to furnish additional information and details
 16 deemed necessary to evaluate the effects of the proposed construction upon the floodplain
 17 or to determine whether the requirements of this chapter have been met, including, without
 18 limitation:
- 19 (1) A surface view plan showing elevations and contours of the ground; pertinent
 20 structures, fill, and storage elevations; sizes, locations, and spatial arrangements of all
 21 proposed, anticipated, and existing structures on the site; location and elevations of
 22 streets, water supplies, and sanitary facilities; and soil types;
- 23 (2) Specifications for building construction and materials, filling, dredging, grading,
 24 channel improvements and changes, storage of materials, water supply, and sanitary
 25 facilities.;
- (3) Valley cross sections showing the floodplain surrounding the watercourse, cross
sections of the area to be occupied by the proposed development, and one hundred-
year flood maximum water surface elevation information, and, for critical facilities
and lodging facilities, five hundred-year flood maximum water surface elevation
information;
- (24) A profile showing the slope of the bottom of the channel or thalweg of the
 watercourse;
- (35) A floodplain analysis by a Colorado registered professional engineer of the flood
 profile, elevation, and velocity, using methodology acceptable to FEMA, including
 existing and anticipated uses and making a determination that the proposed
 construction or development will not cause a rise in the elevation of the water surface
 of a one hundred-year flood; and
- (46) A structural analysis by a Colorado registered professional engineer showing that any
 proposed structures will be adequately designed and constructed to prevent flotation,
 collapse, or lateral movement of the structure resulting from hydrodynamic and
 hydrostatic loads, including the effects of buoyancy and scouring.

1 (ed) When reviewing an application for a permit, the city manager shall determine which
2 portion or portions of the floodplain are affected by the particular development request and
3 shall then apply the provisions of Sections 9-3-2, "Floodplains," 9-3-3, "Regulations
4 Governing the One Hundred-Year Floodplain," 9-3-4, "Regulations Governing the
5 Conveyance Zone," and 9-3-5, "Regulations Governing the High Hazard Zone," B.R.C.
6 1981, as applicable. The manager also shall determine whether the application meets the
7 intent of this chapter prescribed by subsection 9-3-2(a), B.R.C. 1981, after considering the
8 following factors:

- 9 (1) The effects upon the efficiency or capacity of the conveyance zone and high hazard
10 zone;
- 11 (2) The effects upon lands upstream, downstream, and in the immediate vicinity;
- 12 (3) The effects upon the one hundred-year flood profile;
- 13 (4) The effects upon any tributaries to the main stream, drainage ditches, and any other
14 drainage facilities or systems;
- 15 (5) Whether additional public expenditures for flood protection or prevention will be
16 required;
- 17 (6) Whether the proposed use is for human occupancy;
- 18 (7) The potential danger to persons upstream, downstream, and in the immediate vicinity;
- 19 (8) Whether any proposed changes in a watercourse will have an adverse environmental
20 effect on the watercourse, including, without limitation, stream banks and streamside
21 trees and vegetation;
- 22 (9) Whether any proposed water supply and sanitation systems and other utility systems
23 can prevent disease, contamination, and unsanitary or hazardous conditions during a
24 flood;
- 25 (10) Whether any proposed facility and its contents will be susceptible to flood damage
and the effect of such damage;
- (11) The relationship of the proposed development to the Boulder Valley Comprehensive
Plan and any applicable floodplain management programs;
- (12) Whether safe access is available to the property in times of flood for ordinary and
emergency vehicles;
- (13) Whether the applicant will provide flood warning systems to notify floodplain
occupants of impending floods;
- (14) Whether the cumulative effect of the proposed development with other existing and
anticipated uses will increase flood heights; and
- (15) Whether the expected heights, velocities, duration, rate of rise, and sediment transport
of the floodwaters expected at the site will adversely affect the development or
surrounding property.

- 1 (~~e~~) If the city manager determines that the applicant meets the purposes and requirements of
 2 this chapter, the manager shall issue the permit and may attach such conditions as deemed
 necessary to further the purposes of this chapter.
- 3 (~~e~~) ~~A~~ Every permit issued on or after April 7, 1985, shall become invalid ~~expires three years~~
 4 ~~after its date of issuance, if the permittee has not commenced construction under the~~
 5 ~~permit. if the work authorized by such permit is not completed and approved by the city~~
 6 ~~manager within three years from the date such permit was issued. Upon receipt of a~~
 7 ~~request in writing that demonstrates justifiable cause and is received prior to expiration of~~
 8 ~~the permit, the city manager may grant in writing one or more extensions of time for~~
 9 ~~periods not more than 180 days each. As part of an approval of extension of a permit, the~~
 10 ~~city manager may impose additional conditions on the applicant in order to ensure~~
 11 ~~compliance with any amendments to this chapter or the floodplain mapping effective after~~
 12 ~~the date of the original permit approval. The term "commenced construction" shall mean~~
 13 ~~the first placement of permanent construction of a structure on a site, such as the pouring of~~
 14 ~~slabs or footings, the installation of piles, the construction of columns, or any work beyond~~
 15 ~~the stage of excavation; or the placement of a manufactured home on a foundation; but~~
 16 ~~does not include land preparation, grading and filling, or installation of streets or sidewalks.~~
- 12 (~~f~~) No person who has obtained a permit shall fail to construct in accordance with their
 approved application and design.
- 13 (~~g~~) Floodplain development permits that allow for development in the conveyance zone or the
 14 high hazard zone, or which will involve a change of watercourse, shall be decided by the
 15 city manager. The decision of the city manager shall be subject to call-up by the planning
 16 board, or appeal by any aggrieved party to the planning board, subject to the call-up and
 appeal procedure of Section 9-4-4, "Appeals, Call-Ups and Public Hearings," B.R.C.
 1981.
- 17 (~~h~~) A floodplain development permit for any of the following items is effective upon the date
 18 of its issuance:
- 19 (1) Sidewalks, parking lots, or other concrete, asphalt, or stone flatwork that do not
 modify existing grade;
 - 20 (2) Uninhabited overhead structural projections, no portion of which extends below the
 flood protection elevation; or
 - 21 (3) Rehabilitation of an existing structure in accordance with the definitions in ~~e~~Chapter
 22 9-16, "Definitions," B.R.C. 1981. In addition, for properties in the high hazard zone,
 the rehabilitation shall not result in a prohibited change in use as set forth in
 23 Subsection 9-3-5(c), B.R.C. 1981.
- 24 (~~i~~) No person shall initiate any use after obtaining a permit under this section without first
 25 submitting to the city manager a certification by a Colorado registered professional
 engineer that the development has been completed in compliance with the approved permit
 application and that all conditions have been fulfilled.

1 (j)k) At least once every three years, the owner or operator of a critical facility protected by a
 2 levee for which the city manager approved an exemption under Paragraph 9-3-2(i)(5),
 3 “Exemption for Critical Facilities Protected by Levee System,” B.R.C. 1981, in a
 4 floodplain development permit, shall file with the city manager a written certification from
 5 a Colorado registered professional engineer that the levee meets the minimum freeboard
 6 requirements set forth in Subsection 9-3-2(i)(5) and that the levee appears, on visual
 7 inspection, to be structurally sound and adequately maintained. The city manager may
 8 require the owner or operator to submit such certification more frequently than once every
 9 three years if warranted by recent flood conditions or circumstances that may lead to
 10 changes in the levee system at the critical facility. The permit expires if the certification
 11 required pursuant to this subsection is not filed with the city manager. Once a floodplain
 12 development permit has been issued granting an exemption under Paragraph 9-3-2(i)(5),
 13 “Exemption for Critical Facilities Protected by Levee System,” B.R.C. 1981, for a critical
 14 facility protected by a levee system, future development on the land protected by the levee
 15 system that does not in any way affect the levee system or its operation and maintenance
 16 shall not require a floodplain development permit so long as the requirements of this
 17 subsection (k) and Paragraph 9-3-2(i)(5), B.R.C. 1981, are met.

18 Section 6. Section 9-3-7, B.R.C. 1981, is amended as follows:

19 **9-3-7 Variances.**

- 20 (a) ~~A person wishing to expand or enlarge an existing structure that does not conform to the~~
 21 ~~requirements of this chapter and cannot be made to conform without unreasonable expense~~
 22 ~~or unreasonable impact on the existing structure may apply to the city manager for a~~
 23 ~~variance from the requirements of subparagraphs 9-3-3(a)(16)(C) and (a)(16)(D). The city~~
 24 ~~manager may grant a variance from the requirements of Subsection 9-3-2(i) and Sections,~~
 25 ~~9-3-3, 9-3-4, and 9-3-5, B.R.C. 1981, except that no variance shall be granted for expansion~~
 or enlargement of any structure constructed after July 12, 1978, unless such expansion or
 enlargement conforms to the flood protection elevation requirement in effect at the time of
 the original construction.
- (b) The city manager shall not grant a variance under this section unless the manager
 determines that:
- (1) Considering the flood hazard, the variance is the minimum necessary to afford relief;
 - (2) To do so would not result in additional threats to public safety, extraordinary public
 expense, nuisance, fraud, victimization of the public, or for variances in the
 conveyance zone a rise in the elevation of the water surface of a one hundred-year
 flood, or be in conflict with existing provisions of this code, ~~or~~ any ordinance of the
 City, or any other applicable laws; and

- 1 (3) Failure to grant the variance would result in exceptional hardship to the applicant,
2 except that a hardship need not be shown for a variance sought to the requirements of
3 Paragraph (i)(4) of 9-3-2, B.R.C. 1981, for a public essential services facility in the
4 five hundred-year floodplain if the applicant demonstrates to the satisfaction of the
5 city manager that the facility is an element of a redundant system for which services
6 will not be interrupted during a flood. At a minimum, the applicant shall
7 demonstrate that one or more redundant facilities are available, either owned by the
8 same public entity or available through an intergovernmental agreement or other
9 contract, and are connected; that the alternative facilities are either located outside of
10 the five hundred-year floodplain or are compliant with the requirements of this
11 chapter; and that an operations plan is in effect that states how redundant systems
12 will provide service to the affected area in the event of a flood. Evidence of ongoing
13 redundancy shall be provided to the city manager by the owner or operator of the
14 facility upon request by the city manager.
- 15 (c) The manager shall examine the following factors in determining whether or not to grant a
16 variance under this section:
- 17 (1) The danger to life and property due to flooding or erosion damage;
 - 18 (2) The likelihood that the proposed development, in conjunction with existing and
19 anticipated development, may increase flood hazards;
 - 20 (3) The relationship of the proposed development to the Boulder Valley Comprehensive
21 Plan and any applicable floodplain management programs; and
 - 22 (4) The cost and ability of providing essential services such as maintaining and protecting
23 public utility systems, roads, and bridges and of restoring normal operations for the
24 community during and after floods.
- 25 (d) The city manager shall not grant a cumulative total of variances that increases a structure's
floor area by more than ten percent of the structure throughout the life of the structure.
- (e) An applicant for a variance shall apply on forms provided by the city manager and pay the
fee prescribed by Section 4-20-44, "Floodplain Development Permits and Flood Control
Variance Fees," B.R.C. 1981, unless a floodplain development permit is required as well,
in which case no fee is required for the variance.
- (f) Any decision by the city manager to approve a variance is subject to call-up by the
planning board or appeal by any aggrieved party to the planning board as described by
Section 9-4-4, "Appeals, Call-Ups and Public Hearings," B.R.C. 1981.
- (g) When granting any variance that allows for construction below FEMA's one hundred-year
flood protection elevation, the city manager shall provide to the recipient of the variance
written notice that the proposed construction does not conform with FEMA guidelines and
that the proposed construction and the original structure may be subject to increased flood
insurance premiums.

Section 7. Table 6-1: USE TABLE of Subsection 9-6-1(d), B.R.C. is amended as

follows:

9-6-1 Schedule of Permitted Land Uses

...

(d) Use Table:

TABLE 6-1: USE TABLE

Use Modules	R1	R2	R3	R4	R5	R6	R7	R8	MH	M1	M2	M3	M4	B1	B2	B3	B4	B5	D1	D2	D3	I1	I2	I3	I4	P	A	Specific Use Standard
Residential Uses																												
Detached dwelling units	A	A	A	A	C	A	A	*	*	A	U	U	A	A	A	A	*	A	A	A	A	*	U	U	*	U	U	9-8-4
Detached dwelling unit with two kitchens	C	C	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	C	C	9-6-3(c)
Duplexes	*	A	A	A	C	A	A	*	*	A	A	A	A	A	A	A	*	A	A	A	A	G	U	U	N	U	*	9-8-4
Attached dwellings	*	A	A	A	C	A	A	C	*	A	A	A	A	A	A	A	*	A	A	A	A	G	U	U	N	U	*	9-8-4
Mobile home parks	*	U	U	*	U	U	*	*	A	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Townhouses	*	A	A	A	C	A	A	A	*	A	A	A	A	A	A	A	*	A	A	A	A	G	U	U	N	U	*	9-8-4
Live-work	*	*	*	*	*	*	*	*	*	*	*	*	A	*	*	*	*	*	*	*	*	U	U	U	A	*	*	
Cooperative housing units	C	C	C	C	C	C	C	*	*	C	C	C	*	*	*	*	*	*	*	*	*	*	U	U	*	*	*	9-6-3(b)
Efficiency living units:																												
A. If <20% of total units	*	*	*	*	U	A	A	*	*	M	A	A	A	A	G	A	*	A	A	A	A	G	U	U	N	U	*	
B. If ≥20% of total units	*	*	*	*	U	A	*	*	U	A	A	U	U	U	U	U	*	U	U	U	U	U	U	U	U	U	*	
Accessory units:																												
A. Accessory dwelling unit	C	C	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	C	C	9-6-3(a)
B. Owner's accessory unit	C	*	*	C	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	9-6-3(a)
C. Limited accessory unit	C	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	9-6-3(a)
Caretaker dwelling unit	*	*	*	*	*	*	*	*	*	**	*	*	*	*	*	*	*	*	*	*	*	A	A	A	A	A		
Group quarters:																												
A. Congregate care facilities	*	*	<u>AC</u>	<u>CA</u>	<u>CA</u>	<u>AC</u>	<u>AC</u>	<u>AC</u>	*	<u>AC</u>	<u>AC</u>	<u>AC</u>	C	<u>AC</u>	C	<u>AC</u>	*	<u>AC</u>	C	C	C	*	U	U	*	U	*	9-6-3(f) 9-3-2(l)

ATTACHMENT A

1	B. Custodial care	*	*	U	U	U	U	U	U	*	U	U	U	*	U	*	U	*	U	U	*	U	U	*	*	*			
2	C. Group homes	C	C	C	C	C	C	C	C	*	C	C	C	C	C	C	*	C	C	C	C	*	*	*	*	*	*	9-6-3(d) 9-3-2(i)	
3	D. Residential care facilities	*	*	C	C	C	C	C	C	*	C	C	C	C	C	C	*	C	C	C	C	*	U	U	*	*	*	9-6-3(f) 9-3-2(i)	
4	E. Fraternities, sororities, and dormitories	*	*	*	*	*	AC	AC	*	*	U	*	*	*	AC	G	AC	*	AC	*	*	AC	*	U	U	*	*	*	9-3-2(i)
5	F. Boarding houses	*	*	U	U	A	A	A	*	*	U	A	A	G	A	G	A	*	A	*	*	A	*	U	U	*	*	*	
6	Home occupation	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	*	C	C	C	C	C	C	C	C	C	C	9-6-3(e)	
6	Transitional housing	C	C	C	C	C	C	C	C	*	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	9-6-3(h)	
7	Dining and Entertainment																												
8	Art or craft studio space ≤2,000 square feet	*	U	U	U	U	U	U	U	*	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A		
9	Art or craft studio space >2,001 square feet	*	U	U	U	U	U	U	*	*	M	U	U	A	A	A	A	A	A	A	A	A	A	A	A	A	A		
11	Breweries, distilleries or wineries <15,000 square feet and with a restaurant	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	9-6-5(b)(3.5)	
13	Breweries, distilleries or wineries <15,000 square feet and without a restaurant	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	9-6-5(b)(3.5)	
15	Breweries, distilleries or wineries with or without a restaurant >15,000 square feet	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	9-6-5(b)(3.5)		
17	Commercial kitchens and catering	*	*	*	*	*	*	*	*	*	*	*	*	A	*	*	*	U	U	U	U	U	U	A	A	A	A	*	*
19	Indoor amusement establishment	*	*	*	*	*	*	*	*	*	*	*	U	*	U	U	U	A	U	U	U	*	*	*	*	*	*		
20	Mobile Food Vehicle on Private Property	*	*	*	*	*	*	*	*	*	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	9-6-5(d)	
21	Mobile Food Vehicle on Public Right of Way	C	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	C	C	C	C	9-6-5(d)	
22	Museums	*	*	*	*	*	*	*	*	*	*	*	A	U	A	A	A	A	A	A	A	U	U	U	U	*	*		
23	Restaurants (general)	n/a	C	C	C	C	n/a	n/a	9-6-5(b)																				

ATTACHMENT A

1	Parks and Recreation Uses																												
2	Campgrounds	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	U	U	U	*	*	U		
3	Outdoor entertainment	*	*	*	*	*	*	*	*	*	*	*	*	U	*	U	U	U	U	U	U	*	*	*	*	U	*		
4	Park and recreation uses	A	A	A	A	A	A	*	A	A	A	A	*	A	A	A	A	A	A	A	A	A	A	A	A	A			
5	Indoor recreational or athletic facilities	*	*	*	*	*	U	U	*	*	U	U	A	A	A	A	A	A	A	A	A	A	U	U	A	*	*		
6	Commercial, Retail and Industrial Uses																												
7	Service Uses:																												
8	Animal hospital or veterinary clinic	*	*	*	*	*	*	*	*	*	*	*	U	U	U	A	U	A	*	*	U	A	A	A	U	*	*		
9	Animal kennel	*	*	*	*	*	*	*	*	*	*	C	*	U	U	A	U	*	*	*	A	A	U	A	*	*			
10	Antennas for wireless telecommunications services	*	*	*	C	C	C	C	*	*	C	C	C	A	C	C	C	C	C	C	C	C	C	C	C	C	C	9-6-9(a)	
11	Broadcasting and recording facilities	*	U	U	U	U	U	*	*	M	M	M	<u>AC</u>	<u>AC</u>	G	<u>AC</u>	9-3-2(i)												
12	Business support services <10,000 square feet	*	*	*	*	*	*	*	*	*	*	*	A	*	A	A	A	A	A	A	A	A	U	U	A	*	*		
13	Business support services ≥10,000 square feet	*	*	*	*	*	*	*	*	*	*	*	U	*	U	A	A	A	A	A	A	U	U	U	U	*	*		
14	Industrial service center	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	C	C	*	*	*	*	*	*	*	*	*		
15	Non-vehicular repair and rental services without outdoor storage	*	*	*	*	*	*	*	*	*	*	*	*	*	*	U	A	U	U	U	U	A	U	*	A	*	*		
16	Neighborhood business center	*	U	U	*	*	U	U	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	9-6-9(f)	
17	Personal service uses	*	U	U	U	*	U	A	U	U	A	A	A	A	A	A	A	A	A	A	A	*	*	*	*	*	*		
18	Retail Sales Uses:																												
19	Accessory sales	*	*	*	*	*	A	A	*	*	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	*	9-16	
20	Convenience retail sales ≤2,000 square feet	*	U	U	U	*	U	A	*	*	A	*	A	A	U	A	A	U	U	*	A	A	C	C	*	C	*	*	
21	Convenience retail sales >2,000 square feet	*	*	*	*	*	U	U	*	*	M	M	*	A	U	A	A	A	U	A	A	A	*	C	*	C	*	*	
22	Retail fuel sales (not including service stations)	*	U	U	U	*	U	U	*	*	U	U	U	C	U	C	C	U	C	*	U	U	C	C	*	U	*	*	9-6-9(d)
23	Retail sales ≤5,000 square feet	*	*	*	*	*	*	*	*	*	U	*	U	A	*	A	A	A	A	A	A	A	*	*	*	*	*	*	
24																													
25																													

ATTACHMENT A

1	Retail sales >5,000 square feet but ≤20,000 square feet	*	*	*	*	*	*	*	*	*	*	*	*	A	*	A	A	A	A	A	A	A	A	A	*	*	*	*	*	*	*		
2																																	
3	Retail sales >20,000 square feet	*	*	*	*	*	*	*	*	*	*	*	*	U	*	U	U	A	A	A	A	U	*	*	*	*	*	*	*	*	*		
4	Building material sales ≤15,000 square feet of floor area	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	U	*	*	*	A	A	A	A	*	*	*	*				
5																																	
6	Building material sales >15,000 square feet of floor area	*	*	*	*	*	*	*	*	*	*	*	*	*	*	U	*	U	*	*	*	U	U	U	U	*	*	*	*				
7	Temporary sales	*	*	*	*	*	*	*	*	*	*	*	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	9-6-5(c)	
8	Vehicle-Related Uses:																																
9	Automobile parking lots, garages, or car pool lots as a principal use	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	A	U	U	*	U	U	A	A	A	U	U	*			9-6-9(b)		
10	Car washes	*	*	*	*	*	*	*	*	*	*	*	*	*	*	U	A	U	U	U	U	*	*	*	*	*	*	*	*	*	*		
11	Drive-thru uses	*	*	*	*	*	*	*	*	*	*	*	*	*	*	U	U	U	*	U	U	*	*	*	*	*	*	*	*	*	*		9-6-9(c)
12	Fuel service stations or retail fuel sales	*	*	*	*	*	*	*	*	*	*	*	U	U	U	C	C	C	*	U	C	C	C	*	U	*	*	*	*		9-6-9(d)		
13	Sales and rental of vehicles	*	*	*	*	*	*	*	*	*	*	*	*	*	*	U	A	U	*	*	*	A	A	*	*	*	*	*	*	*			
14	Sales and rental of vehicles within 500 feet of a residential use module	*	*	*	*	*	*	*	*	*	*	*	*	*	*	U	C	C	*	*	*	C	C	*	*	*	*	*	*	*		9-6-9(i)	
15																																	
16	Service of vehicles with no outdoor storage	*	*	*	*	*	*	*	*	*	*	*	U	*	U	U	A	U	*	*	*	A	A	A	A	*	*	*	*				
17	Service of vehicles with limited outdoor storage	*	*	*	*	*	*	*	*	*	*	*	*	*	*	U	U	U	*	*	*	A	A	*	A	*	*	*	*				
18	Industrial Uses:																																
19	Building and landscaping contractors	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	A	*	*	*	*	A	A	A	A	*	*	*	*			
20	Cleaning and laundry plants	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	A	A	A	A	*	*	*	*				
21	Cold storage lockers	*	*	*	*	*	*	*	*	*	*	*	*	*	*	U	U	U	U	U	A	A	A	A	*	*	*	*					
22	Computer design and development facilities	*	*	*	*	*	*	*	*	*	*	*	A	A	G	A	C	A	G	A	A	*	A	A	A	*	*	*	*		9-6-7(a)		
23	Equipment repair and rental with outdoor storage	*	*	*	*	*	*	*	*	*	*	*	*	*	*	U	A	U	U	U	U	A	A	A	A	*	*	*	*				
24	Lumber yards	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	A	A	*	*	*	*	*	*	*			
25																																	

ATTACHMENT A

1	Manufacturing uses ≤15,000 square feet	*	*	*	*	*	*	*	*	*	*	*	*	A	*	*	*	*	A	*	*	*	*	A	A	A	A	*	*	
2	Manufacturing uses >15,000 square feet	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	U	A	A	A	*	*	
3	Manufacturing uses with potential off-site impacts	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	U	U	*	*	*	9-6-9(e)	
4	Outdoor storage	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	A	U	A	*	*	*		
5	Outdoor storage of merchandise	*	*	*	*	*	*	*	*	*	*	*	*	*	C	*	C	*	*	*	*	*	C	C	C	C	*	*	9-6-9(g)	
6	Printers and binders	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	A	A	A	A	*	*		
7	Recycling centers	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	U	U	U	U	*	*		
8	Recycling collection facilities - large	*	*	*	*	*	*	*	*	*	*	*	*	*	U	U	U	*	*	*	*	U	U	U	U	U	*	9-6-9(h)		
9	Recycling collection facilities - small	*	*	*	*	*	*	*	*	*	*	*	*	C	*	C	C	C	U	U	U	U	C	C	C	C	C	*	9-6-9(h)	
10	Recycling processing facilities	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	U	U	U	*	U	*	9-6-9(h)	
11	Self-service storage facilities	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	A	U	*	*	*	*		
12	Telecommunications use	*	*	*	*	*	*	*	*	*	*	*	G	A	G	A	U	A	G	A	A	*	A	A	A	*	*			
13	Warehouse or distributions facilities	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	A	A	A	A	*	*		
13	Wholesale business	*	*	*	*	*	*	*	*	*	*	*	A	*	*	*	*	*	*	*	*	*	A	A	A	A	*	*		
14	Agriculture and Natural Resource Uses																													
15	Open space, grazing and pastures	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	A	A	
16	Community gardens	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	9-6-4(a)
17	Crop production	A	A	A	A	A	A	A	A	A	A	A	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	A	A	
18	Mining industries	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	U	*	*	U		
18	Firewood operations	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	A	A	A	*	*	*		
19	Greenhouse and plant nurseries	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	A	A	A	A	A	A		
20	Accessory																													
21	Accessory buildings and uses	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	9-16

- 22 **A:** Allowed use.
- 22 **C:** Conditional use. See Section 9-2-2 for administrative review procedures.
- 23 *****: Use prohibited.
- 23 **U:** Use review. See Section 9-2-15 for use review procedures.
- 24 **G:** Allowed use provided that it is located above or below the ground floor.
- 24 **M:** Allowed use provided at least 50% of the floor area is for residential use and the nonresidential use is less than 7,000 square feet per building, otherwise use review.
- 25

1 N: Allowed use provided at least 50% of the floor area is for nonresidential use, otherwise by use review.
n/a: Not applicable; more specific use applications apply.

2 Section 8. Section 9-16-1, B.R.C. 1981, is amended as follows:

3 **9-16-1 General Definitions.**

4 (a) The definitions contained in chapter 1-2, "Definitions," B.R.C. 1981, apply to this title
5 unless a term is defined differently in this chapter.

6 (b) Terms identified with the references shown below after the definition are limited to those
7 specific sections or chapters of this title:

- 8 (1) Airport influence zone (AIZ).
- 9 (2) Floodplain regulations (Floodplain).
- 10 (3) Historic preservation (Historic).
- 11 (4) Inclusionary housing (Inclusionary Housing).
- 12 (5) Residential growth management system (RGMS).
- 13 (6) Solar access (Solar).
- 14 (7) Wetlands Protection (Wetlands).
- 15 (8) Signs (Signs).

16 (c) The following terms as used in this title have the following meanings unless the context
17 clearly indicates otherwise:

18 ...

19 “Accredited levee or provisionally accredited levee” means a system of artificial embankment(s)
20 or flood control structure(s) used for property protection, flood control, and flood hazard
21 mitigation that is accredited or provisionally accredited and mapped Zone X (shaded) by the
22 Federal Emergency Management Agency (FEMA) under the National Flood Insurance Program
23 (NFIP). (Floodplain)

24 ...

25 "Area of special flood hazard" means the land in the floodplain subject to a one percent or
greater chance of flooding in any given year. Such areas may be designated as Zones A, AO,
AH, AE and A1-30 on the FIRM for the City of Boulder. (Floodplain)

...
“At-risk population facility” means a pre-school, public or private primary or secondary school,
before and after school care center with twelve or more students, daycare center with twelve or
more children the parents or guardians of which do not remain in the same building of the
facility, group home, or residential or congregate care facility with twelve or more residents.
(Floodplain)

1 ...

2 “Base flood elevation” means the computed elevation to which floodwater is anticipated to rise
 3 during the one hundred-year flood. (Floodplain)

4 "Basement" means any enclosed area of a building having its lowest floor a minimum of two feet
 5 below grade level on all sides. (Floodplain)

6 ...

7 "Change in a watercourse" means any change in an existing thalweg, bed, or bank of a
 8 watercourse. (Floodplain)

9 ...

10 "Conveyance zone" means those portions of the floodplain required for the passage or
 11 conveyance of the one-hundred-year flood. The conveyance zone is delineated based on an equal
 12 encroachment methodology (measured in volume of water), which is applied to the floodplain
 13 from the edges of the flood channel to a point where the one-hundred-year flood profile will be
 14 raised no more than six inches, after considering a reasonable expectation of blockage at bridges
 15 and other obstructions by flood-borne debris. The City may, in its discretion, delineate the
 16 conveyance zone on city owned land or right of way based on unequal encroachment to
 17 minimize delineation on other properties. The conveyance zone is equivalent to a floodway
 18 delineation based on a six-inch rise. (Floodplain)

19 ...

20 "Crawl space" means the enclosed area contained inside the foundation walls and below the
 21 habitable floor of a structure. Crawl spaces having the lowest floor a minimum of two feet below
 22 grade level on all sides shall be considered a basement, and not a crawl space. (Floodplain)

23 “Critical facility” means any structure or related infrastructure, the loss of which may result in
 24 severe hazards to public health and safety or may interrupt essential services and operations for
 25 the community at any time before, during, and after a flood. Critical facilities are classified as
 26 follows: (1) essential services facility, (2) hazardous material facility, and (3) at-risk population
 27 facility. (Floodplain)

28 ...

29 "Daycare center" means a facility:

- 30 (1) Licensed by the state, if applicable;
- 31 (2) Providing care for children or adults who do not reside in the facility, are present
 32 primarily during daytime hours, and do not regularly stay overnight; and
- 33 (3) Which may include some instruction.
- 34 (4) Which is not located within a dwelling unit.

1 "Daycare home" means a facility:

- 2 (1) Licensed by the state, if applicable;
- 3 (2) Which is located within a dwelling unit;
- 4 (3) Providing care for twelve or fewer children or adults who (except for family
5 members) do not reside in the facility, are present primarily during daytime hours,
6 and do not regularly stay overnight. Family members who receive care in the facility
7 are included in the total.

6 ...

7 "Development" means any change to improved or unimproved real estate, including, without
8 limitation, constructing, relocating, rehabilitating, reconstructing or expanding or enlarging (but
9 not maintaining) a building or other structure or portion thereof, or establishing or changing a
10 use, or mining, dredging, filling, grading, paving, or excavation. (Floodplain)

11 "Essential service facility" means any facility providing an essential service that, if flooded, may
12 result in severe hazards to public health and safety or interrupt essential services and operations
13 for the community at any time before, during, or after a flood. Examples of essential service
14 facilities include without limitation the following:

- 12 (1) Public safety facilities such as police stations, fire and rescue stations, and
13 emergency operation centers;
- 14 (2) Emergency response facilities, such as emergency vehicle and equipment storage,
15 and essential governmental work centers for continuity of government operations;
- 16 (3) Emergency medical facilities, such as hospitals, emergency care, urgent care, and
17 ambulance services, but excluding clinics, doctors offices, and non-urgent care
18 medical facilities;
- 19 (4) Shelters designated by the city manager that will be used during or after a flood
20 for displaced persons;
- 21 (5) Communication facilities, such as main hubs for telephone systems, main
22 broadcasting equipment for television systems, radio and other emergency
23 warning systems, but excluding towers, poles, lines, cables, and conduits;
- 24 (6) Public utility plant facilities and essential equipment for treatment, generation,
25 storage, pumping, and distribution, such as hubs for water, wastewater, power,
and gas, but excluding hydro electric facilities, towers, poles, power lines, buried
pipelines, transmission lines, distribution lines, and service lines;
- (7) Essential governmental facilities, including, without limitation, facilities where
permanent records, as defined by an agency's data retention policy, are stored;;
courts; and jails;; building permitting and inspection services;; departments that
manage utilities and transportation systems;; information technology departments,

finance departments, and health departments; the county commissioner’s office, the city manager’s office, and maintenance and equipment centers; and

(8) Air transportation lifelines, such as an airport or heliport, and structures serving emergency functions, and associated infrastructure, such as aviation control towers, air traffic control centers, and emergency equipment aircraft hangars.

(Floodplain)

...

"Exceptional hardship" means a substantially disproportionate burden in relationship to the benefit to be derived from conformance with the requirements of this title. (Floodplain)

...

"Expansion or enlargement of a structure" means any addition of an exterior wall to the structure or any addition to the floor area of the structure, whether under, at, or above grade, and whether or not the external dimensions of the structure are changed, or the reconstruction of a flood-damaged portion of a structure, so long as such expansion, enlargement or reconstruction does not constitute a "substantial modification" or a "substantial improvement." (Floodplain)

...

"FEMA" means the Federal Emergency Management Agency. (Floodplain)

...

“Five hundred-year flood” means a flood having a 0.2 percent chance of occurring in any year.
(Floodplain)

"Flood" or "flooding" means a general or temporary condition of partial or complete inundation of normally dry land areas from a watercourse that temporarily overflows the boundaries within which it is ordinarily confined or from the rapid accumulation of runoff of surface water caused by rain, snow melt, flow blockage, or any other source. (Floodplain)

"Flood channel" means a natural or artificial watercourse with a definite bed and banks which periodically or continuously conducts flowing water and is shown on the Flood Channel Inventory Map prepared by the City's Utility Division of the Public Works Department. (Floodplain)

~~"Flood fringe" means those portions of the floodplain that are not in the conveyance zone or in the high hazard zone. (Floodplain)~~

1 "Flood Insurance Rate Map (FIRM)" means the official map on which FEMA has delineated
 2 both the areas of special flood hazard and the risk premium zones applicable to the community.
 (Floodplain)

3 "Flood insurance study (FIS)" means the official report provided by the Federal Emergency
 4 Management Agency that included flood profiles, the Flood Boundary-Floodway Map, and the
 water surface elevations of the base flood. (Floodplain)

5 "Flood profile" means a graph showing the elevations of the floodwater surface and the
 6 elevations of the underlying land as a function of distance along a path of flow. (Floodplain)

7 "Flood protection elevation" means ~~an elevation of:~~

8 (1) In the one hundred-year floodplain, an elevation of:

9 (A) ~~Two~~ two feet above the elevation of the water surface of a one-hundred-year
 10 flood as determined pursuant to ~~s~~Sections 9-3-2 through 9-3-8, B.R.C. 1981, or, if
 no such elevation is determined, two feet above the highest grade adjacent to a
 structure; or

11 (B) ~~Two~~ two feet above the base flood elevation in AE zones or two feet above the
 12 flood depth number indicated for AO zones on the FIRM for the City of Boulder;
 13 whichever is higher.

14 (2) In the five hundred-year floodplain, the lower of the following elevations:

15 (A) One foot above the water surface of a five hundred-year flood under the
 16 standards in Sections 9-3-2 through 9-3-8, B.R.C. 1981; or

17 (B) The one hundred-year flood protection elevation.

18 (Floodplain)

19 "Floodplain" means the area that is susceptible to being inundated by a flood. (Floodplain)

20 "Floodplain development permit" means any permit granted under the terms and conditions of
 21 Ssections 9-3-2 through 9-3-8, B.R.C. 1981, for development on land in a floodplain.
 (Floodplain)

22 "Floodplain, five hundred-year" means the area of the floodplain ~~inundated by a flood~~ having a
 23 0.2 percent or greater chance of ~~occurring flooding~~ in any given year. (Floodplain)

24 "Floodplain, one hundred-year" means the area of the floodplain ~~inundated by a flood~~ having a
 25 one percent or greater chance of ~~occurring flooding~~ in any given year. (Floodplain)

"Floodproofing" means any combination of structural and nonstructural changes, modifications,
 or adjustments to structures or real property which reduce or eliminate flood damage to improved

1 or unimproved real property, water and sanitary facilities, structures and their contents.
(Floodplain)

2 "Floodway, FEMA regulatory" means the channels of watercourses and the adjacent land areas
3 that must be reserved in order to discharge the base flood without cumulatively increasing the
4 water surface elevation more than one foot. (Floodplain)

5 ...

6 "Hazardous material" means any material used, generated, or stored at a facility of a type and in
a quantity that would classify the facility as a hazardous materials facility. (Floodplain)

7 "Hazardous material facility" means a structure (or group of structures) that is:

- 8 (1) Subject to Section 303 of the Emergency Planning and Community Right-to-
9 Know Act, 42 U.S.C. §11003, as amended from time to time, because it has an
10 "Extremely Hazardous Substance" on site in quantities that meet or exceed the
11 "Threshold Planning Quantities" established by the United States Environmental
12 Protection Agency and listed at 40 C.F.R. Part 355, Appendix A and Appendix B,
13 as may be amended from time to time;
- 14 (2) Unless covered by subpart (1) above, storing hazardous material as defined by
15 Department of Transportation regulations at 49 C.F.R. Parts 171-180, as may be
16 amended from time to time, but only to the extent that the facility is storing the
17 hazardous material in the "Bulk Packaging" container in which it was delivered as
18 that term is defined at 49 C.F.R. 171.8, as may be amended from time to time;
- 19 (3) Storing a hazardous substance of the type and quantity listed by §29-22-107,
20 C.R.S., as may be amended from time to time; or
- 21 (4) Regulated as a transfer facility under Colorado hazardous waste regulations at 6
22 C.C.R. 1007-3, Part 263, as may be amended from time to time.

23 (Floodplain)

24 "Hazardous substance" means any substance, as determined from time to time by the city
25 manager pursuant to the rule making authority granted by Ssubsection 9-3-2(c), B.R.C. 1981,
that is flammable, radioactive, toxic, or explosive, and that in times of flooding could be released
in sufficient quantities to be harmful to humans, animals, or plant life. (Floodplain)

...
26

27 "High hazard zone" means those portions of the floodplain where an unacceptably high hazard to
28 human safety exists defined as those areas where the product number of flow velocity (measured
29 in ft./sec.) times flow depth (measured in feet) equals or exceeds four, or where flow depths
30 equal or exceed four feet. (Floodplain)

31 ...

1 "Hostel" means a facility for residence of under one month that provides simple dormitory or
2 sleeping rooms and common rooms for cooking, meeting, recreational, and educational use; that
3 is chartered or approved by the International Hostel Federation or its national or regional
4 affiliates, or similar organizations; and that is supervised by resident house-parents or managers
5 who direct the guests' participation in the domestic duties and activities of the hostel.

6 "Hotel/motel" means an establishment that offers temporary lodging in rooms, for less than one
7 month, and may include a restaurant, meeting rooms, and accessory uses and services, including,
8 without limitation, newsstands, gift shops, and similar incidental uses conducted entirely within
9 the principal building but excludes a "bed and breakfast," as defined in this section.

10 ...

11 "Intended for human occupancy" means, as applied to structures, capable of and likely to be used
12 for residential habitation, or for commercial, industrial or governmental occupation by persons
13 on a regular basis. Examples of structures normally not intended for human occupancy include,
14 without limitation, garages useable solely for the parking of vehicles or storage, open air
15 carwashes, unheated pavilions, porches or patio covers, crawl spaces, flood resistant enclosures
16 useable solely for building access, barns and other agricultural buildings, garden storage sheds,
17 ATMs, and mausoleums. (Floodplain)

18 ...

19 "Lodging facility" means a hotel, motel, dormitory, bed and breakfast, hostel, emergency shelter,
20 and overnight shelter as defined in the Boulder Revised Code. (Floodplain)

21 ...

22 "Lowest floor" means the lowest floor of the lowest enclosed area (including basement or crawl
23 space). An unfinished or flood resistant enclosure, usable solely for parking of vehicles, building
24 access or storage, in an area other than a basement area, is not considered a building's lowest
25 floor, provided that such enclosure is not built so as to render the structure in violation of the
applicable design requirements of Sections 9-3-2 through 9-3-8, B.R.C. 1981. (Floodplain)

...

"Maintenance" means any activity undertaken to repair or prevent the deterioration, impairment
or failure of any stream, previously constructed improvement or structure, including, without
limitation the removal of sediment and debris, installation of erosion and sediment control
devices and the replacement of structural components. Maintenance does not include expansion
or enlargement of a structure, substantial modifications, substantial improvements, total
replacement of existing facilities or total reconstruction of a facility. (Floodplain)

...

1 "Manufactured home" means a structure, transportable in one or more sections, which is built on
2 a permanent chassis and is designed for use with or without a permanent foundation when
3 connected to the required utilities. The term "manufactured home" does not include a
"recreational vehicle." (Floodplain)

4 "Manufactured home park or manufactured home subdivision" means any lot or tract of land
5 designed, used, or intended to provide a location or accommodation for one or more
6 manufactured homes and upon which any manufactured home or homes are parked or located,
whether or not the lot or tract or any part thereof is held or operated for profit, on which
construction was completed on or after July 12, 1978. (Floodplain)

7 ...

8 "Mixed-use structure" means any structure with both residential uses and nonresidential uses
9 where no less than twenty-five percent of the finished floor area contains nonresidential uses.
(Floodplain)

10 ...

11 "Moveable object" means an item or material not anchored to the ground that is subject to being
12 transported by water, including, without limitation, a manufactured home not anchored to a
13 permanent foundation, a tank, a trash dumpster, lumber, and other materials, but not a motor
vehicle. (Floodplain)

14 ...

15 "New construction" means structures for which the "start of construction" commenced on or after
16 July 12, 1978, and includes any subsequent improvements to such structures. (Floodplain)

17 "New manufactured home park or subdivision" means a manufactured home park or subdivision
18 for which the construction of facilities for servicing the lots on which the manufactured homes
19 are to be affixed (including, at a minimum, the installation of utilities, the construction of streets,
final site grading, or pouring of concrete pads) is completed on or after July 12, 1978.
(Floodplain)

20 ...

21 "Nonresidential structure" means any structure ~~or any portion of a structure~~ used exclusively for,
22 or designed as and capable of being used for, office, commercial, industrial, or governmental
23 occupation, or the temporary lodging of persons for periods of less than six months including
hotels, motels, emergency shelters, and overnight shelters but excluding dormitories, fraternities,
and bed and breakfasts. (Floodplain)

24 ...

25 "Obstruction" means any item or material not constituting a moveable object in, along, across, or
projecting into the floodplain that might impede, retard, or change the direction of a flow of

1 water, either by itself or by catching or collecting debris carried by such water, in a way that the
2 city manager determines would increase the flood hazard to adjacent properties. (Floodplain)

3 ...

4 "One hundred-year flood" means a flood having a one percent chance of occurring in any year.
(Floodplain)

5 ...

6 "Residential structure" means any structure ~~or any portion of a structure~~ that is used for, or
7 designed as and capable of being used for, the temporary or permanent domicile of persons for
8 periods of six months or more, including, without limitation, a dwelling, a boarding house, a
9 dormitory, a fraternity, a bed and breakfast ~~hotel, a motel~~, and similarly used structures.
(Floodplain)

10 ...

11 "Reconstruction" means exact replacement of an existing structure or portion thereof or exact
12 structural repair of a damaged structure. (Floodplain)

13 "Recreational vehicle" means a vehicle which is: 1) built on a single chassis; 2) four hundred
14 square feet or less when measured at the largest horizontal projections; 3) designed to be self-
15 propelled or permanently towable by a light duty truck; and 4) designed primarily not for use as
16 a permanent dwelling but as temporary living quarters for recreational, camping, travel, or
17 seasonal use. (Floodplain)

18 ...

19 ...

20 "Start of construction" means the date the building permit was issued, provided the actual start of
21 construction, repair, reconstruction, rehabilitation, addition, placement, or other improvement
22 was within one hundred eighty days of the permit date. The actual start means either the first
23 placement of permanent construction of a structure on a site such as the pouring of slab or
24 footings, the installation of piles, the construction of columns, or any work beyond the stage of
25 excavation; or the placement of a manufactured home on a foundation. (Floodplain)

26 ...

27 "Structure" means a building or other roofed construction, a basement, a wall, a fence, a
28 manufactured home, or a storage tank. (Floodplain)

29 ...

30 "Substantial damage" means damage of any origin sustained by a structure whereby the cost of
31 restoring the structure to its before-damaged condition would equal or exceed fifty percent of the
32 market value of the structure before the damage occurred. (Floodplain)

1 "Substantial improvement" means any repair, reconstruction, rehabilitation, addition, or
2 improvement of a structure, the cost of which equals or exceeds fifty percent of the market value
3 of the structure before the "start of construction" of the improvement. This term includes
4 structures which have incurred "substantial damage," regardless of the actual repair work
5 performed. For the purposes of this definition, "substantial improvement" is considered to occur
6 when the first alteration of any wall, ceiling, floor, or other structural part of the building
7 commences, whether or not that alteration affects the external dimensions of the structure. The
8 term does not, however, include either: 1) any project for improvement of a structure to comply
9 with existing state or local health, sanitary, or safety code specifications which are solely
10 necessary to assure safe living conditions or 2) any alteration of a structure listed on the National
11 Register of Historic Places or the Colorado Inventory of Historic Places or designated as an
12 individual landmark under Section 9-11-2, "City Council May Designate Or Amend Landmarks
13 And Historic Districts," B.R.C. 1981. (Floodplain)

9 "Substantial modification" means any expansion or enlargement of a structure which equals or
10 exceeds fifty percent of the floor area of the structure intended for human occupancy, considered
11 cumulatively, commencing July 12, 1978. (Floodplain)

11 ...

12
13 Section 9. This ordinance shall become effective on the later of January 1, 2014, or 30
14 days after its final passage by the City Council. This ordinance shall apply to all permits and
15 development applications submitted to the city after the effective date of its passage.

16
17 Section. 10. This ordinance is necessary to protect the public health, safety, and welfare
18 of the residents of the city, and covers matters of local concern.

19 Section 11. The city council deems it appropriate that this ordinance be published by title
20 only and orders that copies of this ordinance be made available in the office of the city clerk for
21 public inspection and acquisition
22
23
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25

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INTRODUCED, READ ON FIRST READING, AND ORDERED PUBLISHED BY
TITLE ONLY this ____ day of _____, 20__.

Mayor

Attest:

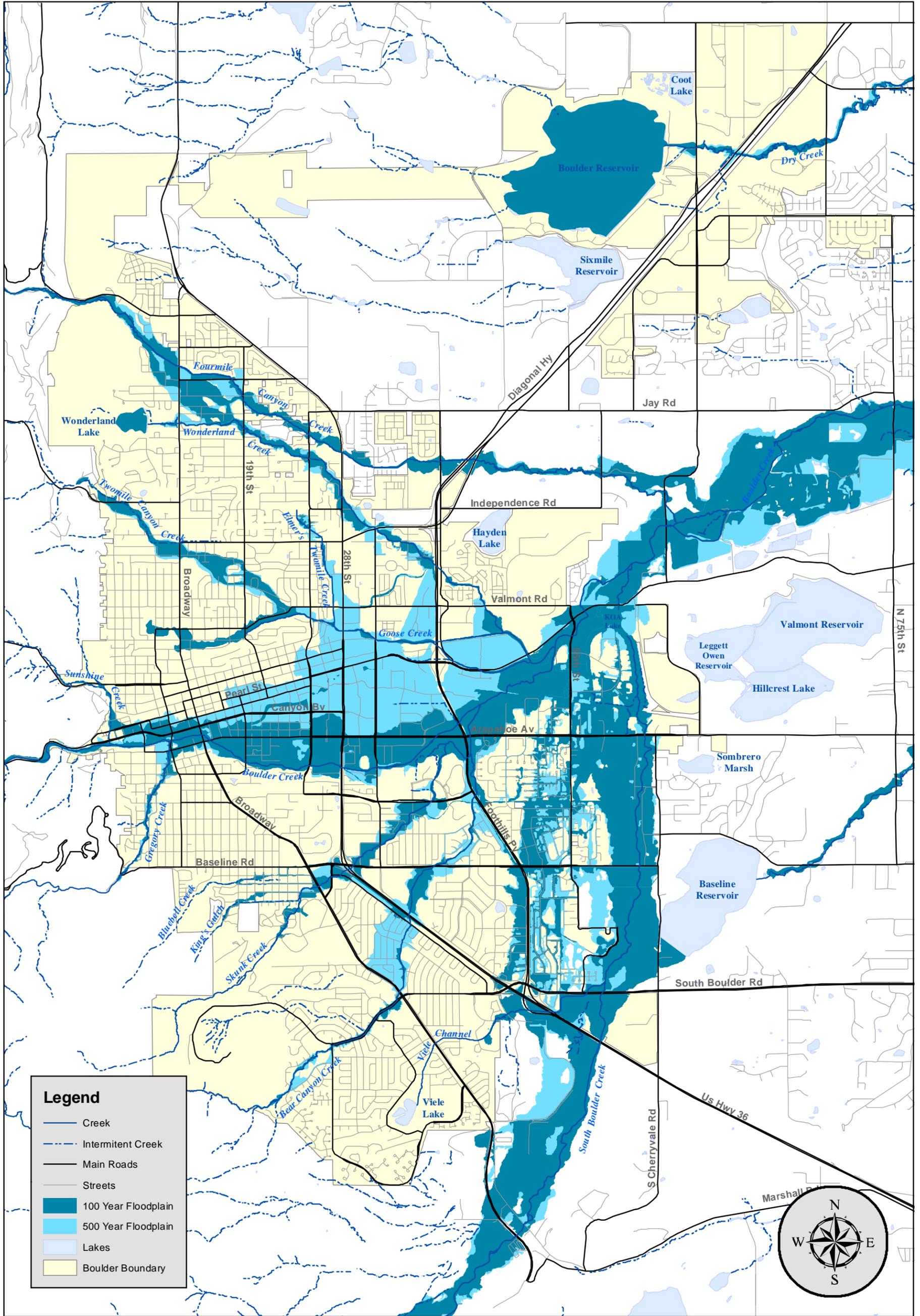
City Clerk

READ ON SECOND READING, PASSED, ADOPTED, AND ORDERED
PUBLISHED BY TITLE ONLY this ____ day of _____, 20__.

Mayor

Attest:

City Clerk



0 0.5 1 2 3 Miles



City of Boulder

100 & 500 Year Floodplains

List of Existing Critical Facilities and Lodging Facilities

500-year Floodplain

Name	Address	Facility Type	Creek
Boulder County Justice Center	1777 6th St	Essential Service	Boulder
Boulder Fire Station 7	1380 55th St	Essential Service	South Boulder
Police Annex	1500 Pearl St	Essential Service	Boulder
Century Link	1545 Walnut St	Essential Service	Boulder
American Medical Response	3800 Pearl St	Essential Service	Goose
Boulder Community Foothills Hospital	4747 Arapahoe Ave	Essential Service	Boulder
Boulder County Clerk and Recorder	1750 33rd St	Essential Service	Boulder
Boulder Fire Station 5	4365 19th St	Essential Service	Fourmile Canyon
Boulder Sheriff	5600 Flatiron Parkway	Essential Service	Boulder
Public Safety Building	1805 33rd St	Essential Service	Boulder
Regional Transportation District	1707 Exposition Dr	Essential Service	Boulder
Municipal Service Center	5050 Pearl St	Essential Service	Goose
Xcel Boulder Terminal	2500 28th St	Essential Service	Goose
75th St Wastewater Treatment Facility	4049 N 75th St	Essential Service	Boulder
Eisenhower Elementary School	1220 Eisenhower Dr	At-risk Population	South Boulder
First Presbyterian Church	1820 15th St	At-risk Population	Boulder
September School	1902 Walnut St	At-risk Population	Boulder
September School (auditorium)	1833 19th St	At-risk Population	Boulder
Alterra Villas at the Atrium	3350 30th St	At-risk Population	Wonderland
Alaya Preschool	3340 19th St	At-risk Population	Goose
Boulder County Head Start	2675 Mapleton Ave	At-risk Population	Goose
Boulder County Head Start (Martin Park)	3650 Martin Dr	At-risk Population	Bear Canyon
Canyon Pointe Housing	700 Walnut St	At-risk Population	Boulder
Columbine Elementary School	3130 Replier St	At-risk Population	Twomile Canyon
Homestar Child Development Center	3280 Dartmouth Ave	At-risk Population	Bear Canyon
McGregor's Garden Preschool	3535 Eastman Ave	At-risk Population	Bear Canyon
Montessori Education Center of the Rockies	4745 Walnut St	At-risk Population	Boulder
Mountain Morning Preschool	1286 Sumac Ave	At-risk Population	Wonderland
New Horizons Cooperative Preschool	1825 Upland Ave	At-risk Population	Fourmile Canyon
Shining Mountain Waldorf School	1179 Union Ave	At-risk Population	Fourmile Canyon
Sunflower Preschool	3340 Dartmouth	At-risk Population	Bear Canyon
Tiny Minders Day Care	3685 Martin Dr	At-risk Population	Bear Canyon
Comcast	3250 Walnut St	Hazardous Material	Boulder
Corden Pharma	2075 55th St	Hazardous Material	South Boulder
The Bradley Boulder Inn	2040 16th St	Lodging	Boulder
Boulder Best Western	770 28th St	Lodging	Skunk
Golden Buff Motel	1725 28th St	Lodging	Boulder
Residence Inn	3030 Center Green Dr.	Lodging	Wonderland
The Village Marriott	2660 Canyon Blvd	Lodging	Boulder

Notes:

1. New flood protection regulations for listed essential service, at-risk population, and hazardous material facilities in the 500-year floodplain.
2. Emergency management plan requirements for all listed facilities in the 500-year floodplain.
3. Blue fill denotes government facilities.

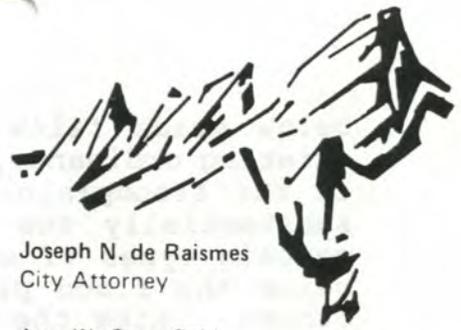
100-year Floodplain

Name	Address	Facility Type	Creek
Regional Transportation District	4920 Table Mesa Dr	Essential Service	South Boulder
Regional Transportation District Terminal	1800 14th St	Essential Service	Boulder
Atrium Building	1300 Canyon Blvd	Essential Service	Boulder
Boulder Building Maintenance	1720 13th St	Essential Service	Boulder
Boulder Community Hospital	1100 Balsam Ave	Essential Service	Goose
Boulder Fire Station 3	1585 30th St	Essential Service	Boulder
Boulder Medical Center	2750 Broadway	Essential Service	Goose
Boulder Municipal Building	1777 Broadway	Essential Service	Boulder
CU Research Center	3300 Marine St	Essential Service	Boulder
FBI	1050 Walnut #219	Essential Service	Boulder
New Britain Building	1101 Arapahoe Ave	Essential Service	Boulder
Park Central Building	1739 Broadway	Essential Service	Boulder
Countryside Montessori Preschool	5524 Baseline Rd	At-risk Population	South Boulder
Friend's School	5465 Pennsylvania Ave	At-risk Population	South Boulder
Frasier Meadows	4950 Thunderbird Dr	At-risk Population	South Boulder
The Carillon at Boulder Creek	2525 Taft Dr	At-risk Population	Boulder
Boulder High School	1604 Arapahoe Ave	At-risk Population	Boulder
Boulder Presbyterian Manor	1050 Arapahoe Ave	At-risk Population	Gregory Canyon
Boulder Waldorf Kindergarten	4072 N 19th	At-risk Population	Wonderland
City Assisted Housing on Arapahoe	951-53 Arapahoe Ave	At-risk Population	Gregory Canyon
Cottage School	805 30th St	At-risk Population	Skunk
Cottage School North	1301 North St	At-risk Population	Goose
Crest View Elementary School	1897 Sumac Ave	At-risk Population	Fourmile Canyon
CU Children's Center	2202 Arapahoe Ave	At-risk Population	Boulder
Dream Makers Preschool	1345 28th St	At-risk Population	Boulder
Flatirons Elementary School	1150 7th St	At-risk Population	Gregory Canyon
Foothills Elementary School	1001 Hawthorn Ave	At-risk Population	Twomile Canyon
Living School	1852 Arapahoe Ave	At-risk Population	Boulder
Patience Montessori	3600 Hazelwood Ct	At-risk Population	Wonderland
Shining Mountain Waldorf School	999 Violet Ave	At-risk Population	Fourmile Canyon
The Elm Tree	1330 Alpine Ave	At-risk Population	Goose
Wynwood at Ridge Point	3375 34th St	At-risk Population	Wonderland
Ball Aerospace	1600 Commerce St	Hazardous Material	Boulder
Athens Court Family Housing	2010 Athens St	Lodging	Boulder
Boulder University Inn	1632 Broadway St	Lodging	Boulder
Briar Rose Bed & Breakfast	2151 Arapahoe Ave	Lodging	Boulder
Homewood Suites	4950 Baseline Rd	Lodging	South Boulder
Marine Court Family Housing	1350 20th St	Lodging	Boulder
Millennium Harvest House	1345 28th St	Lodging	Boulder
Newton Court Family Housing	1475 Folsom St	Lodging	Boulder
Quality Inn & Suites Boulder Creek	2020 Arapahoe Ave	Lodging	Boulder
St. Julien Hotel	900 Walnut St	Lodging	Boulder

Notes:

1. Emergency management plan requirements for all listed facilities in the 100-year floodplain.
2. Blue fill denotes government facilities.

CITY OF BOULDER, COLORADO



Office of the City Attorney
Municipal Building
P.O. Box 791
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Phone 441-3020

Joseph N. de Raismes
City Attorney

Jane W. Greenfield
Deputy City Attorney

MEMORANDUM

TO: James W. Piper, City Manager
Linda S. Jourgensen, Mayor
Members of the City Council

FROM: David A. Rhodes, Director of Public Works
Robert L. Wheeler, Assistant Director of Public Works for Utilities
Alan Taylor, Development Review Coordinator
Joseph N. de Raismes, III, City Attorney
Jane W. Greenfield, Deputy City Attorney

SUBJECT: Options/ Elevation Requirements for Structures in the Floodplain

DATE: May 11, 1989

BACKGROUND

At Council's March 17th meeting, staff presented a memo outlining the issues discussed at the Feb. 28th flood control study session and asking for Council's comments on the issue of the impact of the proposed ordinance on the construction of commercial and industrial buildings in the floodplain. The proposed ordinance requires all structures in the floodplain to be elevated to the flood protection elevation. The existing code requires only residential structures to be elevated. Since the proposed requirement could create an additional restriction on proposed and future development in the floodplain, Council requested staff to prepare several options for its consideration, prior to preparing the final draft of the ordinance. The ordinance is scheduled to be returned to Council for action in June. Six options are described below.

ISSUE

The issues that staff was addressing by requiring non-residential structures as well as residential structures to be elevated instead of floodproofed were those of life safety and property protection. Although flood depths may be fairly shallow in the flood fringe portions of the floodplain, the placement of a "basement" below ground level may produce as dangerous a condition in the flood fringe as in the floodway, since once the floodwaters reach the elevation of the surrounding grade, the area

below grade fills up. Thus, the proposed ordinance, like the existing ordinance, does not differentiate between different areas in the floodplain in applying this restriction as the hazard is substantially the same throughout. Staff also recognizes that certain types of uses, such as residential habitation, occurring below the flood protection elevation may be more hazardous than others. Like the City, FEMA regulations currently require that residential structures be elevated, not merely floodproofed.

The protection of property by floodproofed structures assumes greater level of risk than that of elevated structures. Any flooding depths greater than the design elevation will result in overtopping of the elevated floor or floodproofing. Where this occurs, damage will be much less in an elevated structure where the potential depth of overtopping is small. However, in a floodproofed structure, any overtopping or failure of the floodproofing will result in flooding to the depth of the floodproofing plus the overtopping, and damage will be significant. Full depth basements would experience depths of eight feet plus.

OPTIONS

Staff has developed the following six options in response to Council's request. They are ranked in order from least restrictive to most restrictive. However, each option assumes that floodproofing to the flood protection elevation level would be required. An analysis of the options follows in the next section.

1. **Retain existing code language.** This allows new construction and substantial improvements of commercial, industrial, or other non-residential structures to be elevated or floodproofed.
2. **Same as 1. above but require that the method of floodproofing provided not involve any active human intervention.** Types of acceptable floodproofing would include berms or floodwalls. A variation on this option would be to require the floodproofing to be extended to some height greater than the present 100-year flood protection elevation ("f.p.e.") (two feet of freeboard over the projected 100-year depths).
3. **Allow floodproofing of certain types of non-residential structures based upon their use or occupancy characteristics.** This option would attempt to identify those uses that would be less hazardous if located below the f.p.e., and permit structures or portions of structures containing such uses to be constructed below the f.p.e. protected by the type of passive floodproofing described in 2. above. Elevation would be required for those structures or portions of structures that enclose less benign uses.

4. **Require the lowest floor of non-residential structures to be placed at or above the existing grade rather than the f.p.e.** This option would prohibit the placement of "basements" or other occupiable space below ground level.
5. **Require elevation of non-residential structures to the base flood elevation rather than the f.p.e.** This option would prohibit the placement of "basements" or other occupiable space below the anticipated water surface of the 100-year flood.
6. **Adopt proposed ordinance, requiring non-residential as well as residential structures to elevate to the f.p.e.**

ANALYSIS

In formulating the recommendation below, staff considered several factors. In the first three options, effective floodproofing is the mechanism relied upon to provide protection against flooding, while in the last three options that protection is achieved by the degree of elevation required. This factor recognizes that, in the first three options, floors below grade could become "high hazard" zones, by definition, if the floodproofing fails. In the last three options, since no construction will be permitted in the high hazard zone, even if the floodproofing fails no high hazard is created as a structure at or above grade will not flood more deeply than the surrounding floodplain. The second factor considered was that if floodproofing is effective, the interior of a structure can be "removed" from the floodplain, just as it can be with elevation. In examining the effectiveness of floodproofing it is fairly obvious that permanent floodproofing that requires no human intervention, at the time of the flood, to emplace will be more successful. Thus, berms, floodwalls and watertight foundations will be more effective than shields or gaskets that must be put in place after a flood warning is received or must remain a constant maintenance item for the life of the structure.

In evaluating the level of acceptable risk associated with floodproofing, staff also considered the types of uses which would be protected. Uses involving fewer human occupants or a lower intensity of human activity pose a lesser threat to life safety; whereas, occupancy by a less mobile population, such as children or the elderly, or residential habitation seem to present a greater risk. Staff identified two lower intensity uses, parking and storage, which might be placed below the flood protection elevation.

Another factor considered was the degree to which future development in the floodplain would be affected. Many proposed uses, such as the Depot relocation project and the 9th & Canyon hotel and parking structure, would be seriously affected by the

choice of options. The urban design of the downtown area could be affected by the inability to construct underground parking.

RECOMMENDATION

After consideration of the above factors, staff recommends the approach outlined in Option 3 with parking and storage being the uses allowed below the f.p.e. If Council wishes to allow other uses such as office space, meeting rooms, lobbies, or retail space, to be placed below the flood protection elevation, staff would recommend that the lowest floor of these uses not be placed at an elevation which could create an artificial high hazard area.

PW FC DDI