

Public Hearing for
Z-17-0001: Zoning Map Amendments to the
Floodplain Overlay District &
DC-17-0001: Land Use Code text amendments to the
Floodplain regulations

Planning Commission

April 19, 2017

Erin Cooper, Floodplain Specialist

Varda Blum, Floodplain Program Manager

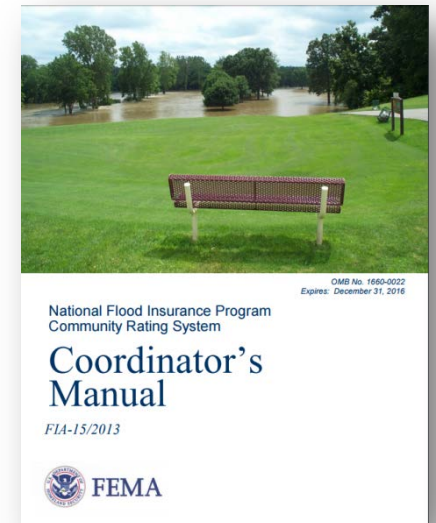


September 2013 Flood Changed Physical Floodplains

- Hazard areas changed
- Rebuilding relied heavily on predictive floodplain mapping
- Current floodplain map delineations not as accurate as desirable

National Flood Insurance Program Participation

- Boulder County's participation in FEMA NFIP program:
 - Since 1979
 - Residents are guaranteed the opportunity to purchase flood insurance
 - Federal government provides assistance after flooding
 - Unincorporated Boulder County public assistance for infrastructure could reach \$97 million
 - \$35 million to residents throughout Boulder County for individual assistance
- NFIP program requires:
 - Local floodplain maps of predicted extent of 100-year floodplain – to predict hazard and to determine zone for applicability of floodplain regulations
 - Local floodplain regulations – to promote resilience
 - Local floodplain permitting – to review projects for compliance with requirements for development



'Boulder County Floodplain' (DC-15-0004)

September 2016 – Land Use Code floodplain regulations (4-400) amended to include a regulatory '**Boulder County Floodplain**' and also:

- Created a process for adoption of best available floodplain data onto maps of predicted extent of 100-year floodplain
- Eliminated the need for the county to wait for FEMA to produce Flood Insurance Rate Maps (FIRMs) before updating maps with better data
- Furthered the county's ability to protect health, safety, & welfare of residents and visitors

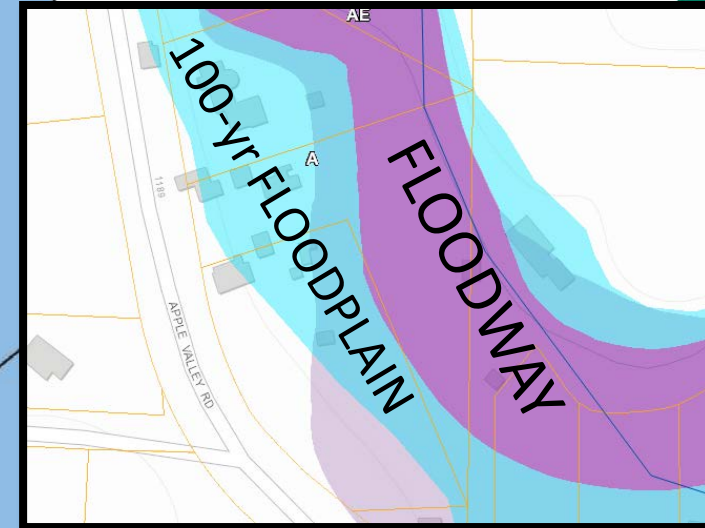
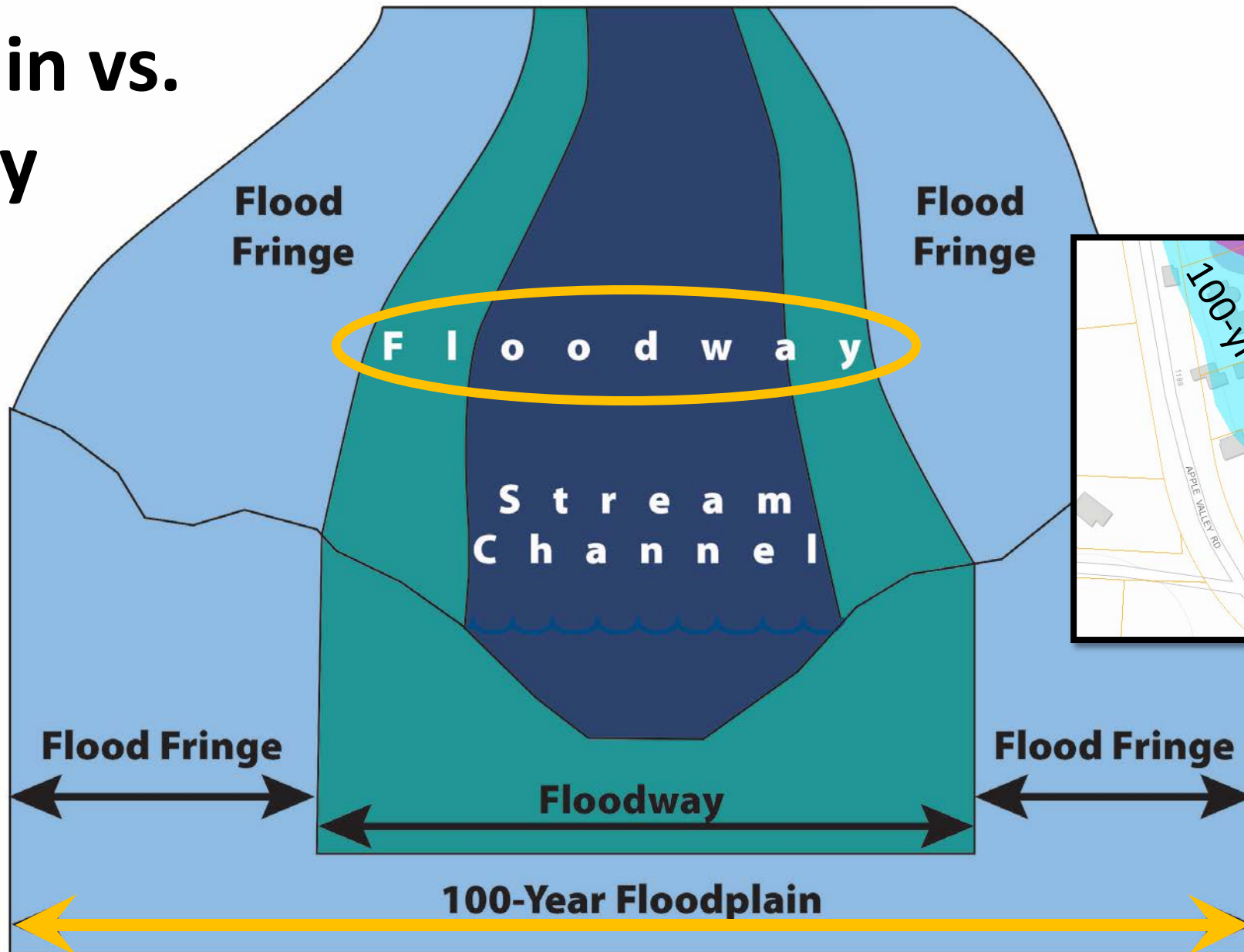
Flood insurance rate changes not affected by local floodplain map adoption.

The Floodplain Overlay (“FO”) District

**Boulder County “FO District” =
FEMA Floodplain + Boulder County Floodplain**

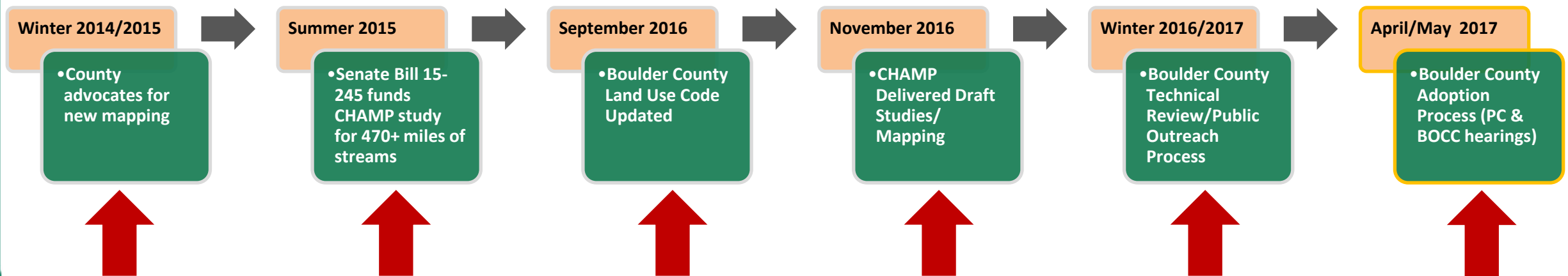
The purpose of adopting a Boulder County Floodplain is to facilitate use of the best available data for the County to establish floodplain boundaries... (4-403 FO District Defined; Official Map)

Floodplain vs. Floodway

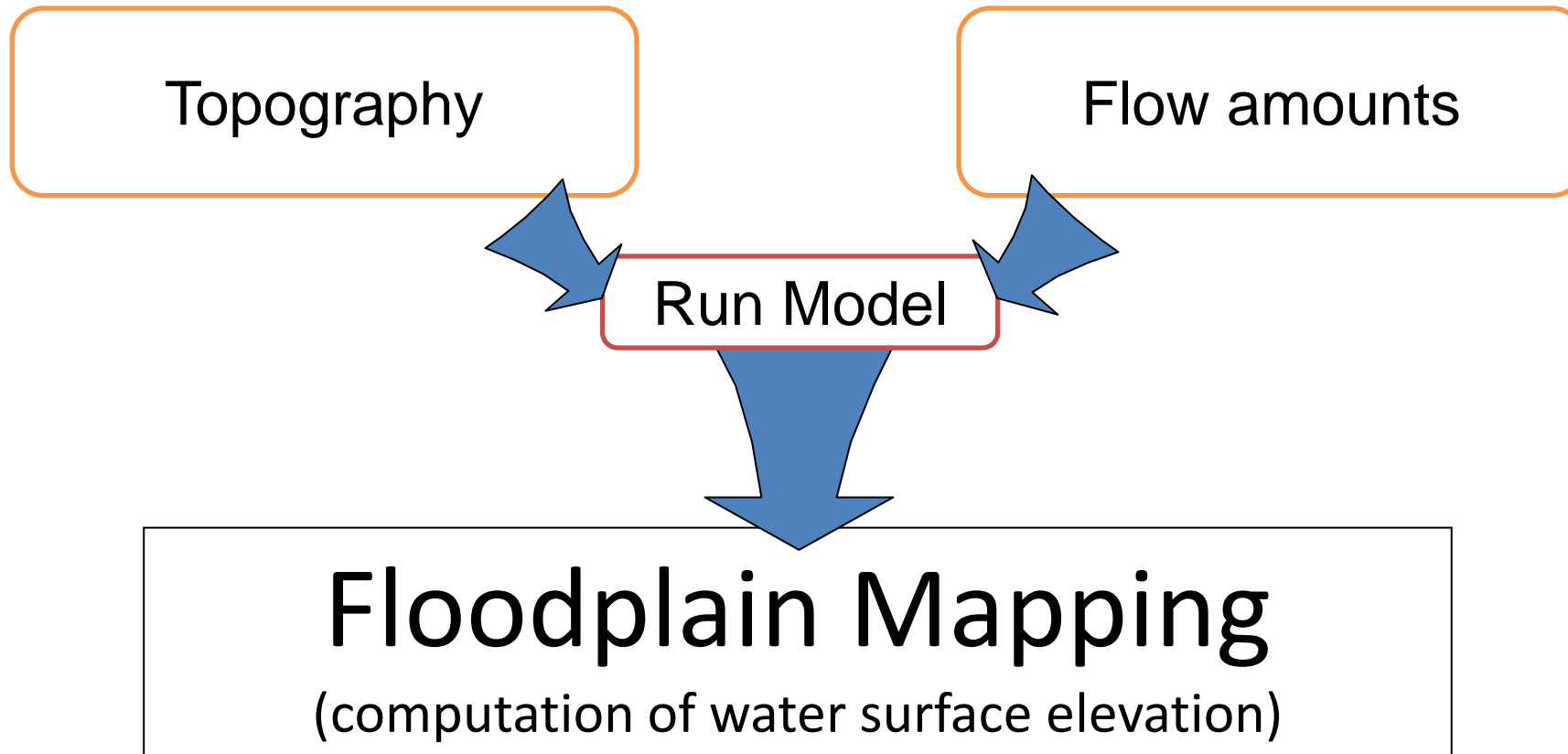


Updating the Floodplain Maps

The proposed zoning map amendments are based on the floodplain mapping of the Colorado Water Conservation Board's (CWCB) Colorado Hazard Mapping Program ("CHAMP")



How are floodplain maps created?



Frequent Property Owner Question

“How are these new maps being developed? How is a floodplain determined?”

The CHAMP flood studies conducted to identify flood risk included:

- Post flood topographic surveys,
- Statistical analysis of rainfall, stream flow, and storm frequency data including information collected during the 2013 Flood to predict 100-year and other flood flow amounts, and
- Modeling analyses of the flow movement over the topography predicts water surface elevations.

The predicted water surface elevations are projected on to the topography to determine the extents (mapping) of where flooding is predicted to occur.

These floodplain maps provide the foundation for floodplain management.

Roles and Responsibilities

Federal Role (FEMA, NFIP)

- Floodplain mapping *lead*
- Floodplain management
- Flood insurance

State Role (CWCB, CHAMP)

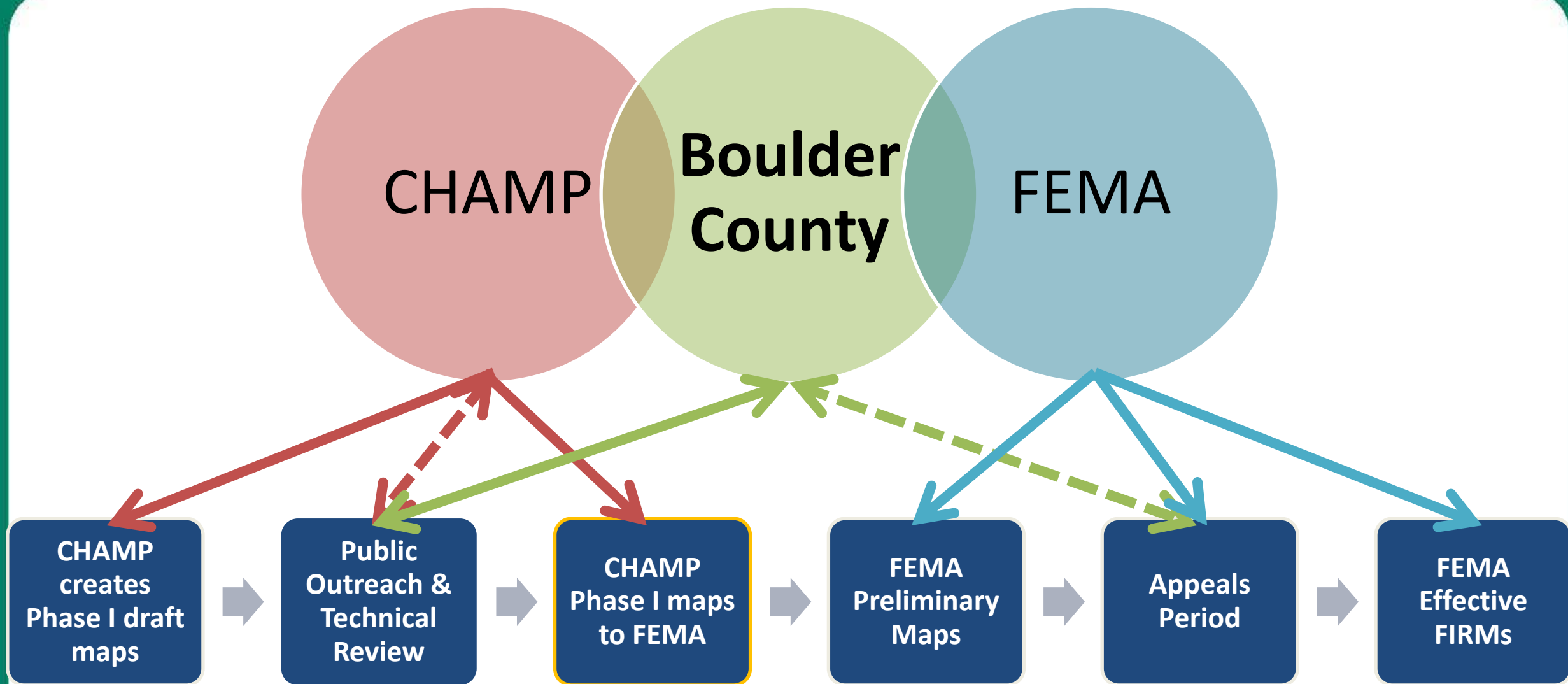
- Floodplain mapping – *as FEMA partner*
- Community assistance

Local Role (Boulder County)

- Floodplain mapping *participant*
- Floodplain regulation & outreach



***Ultimate Goal:
Protect Life, Health, & Safety***

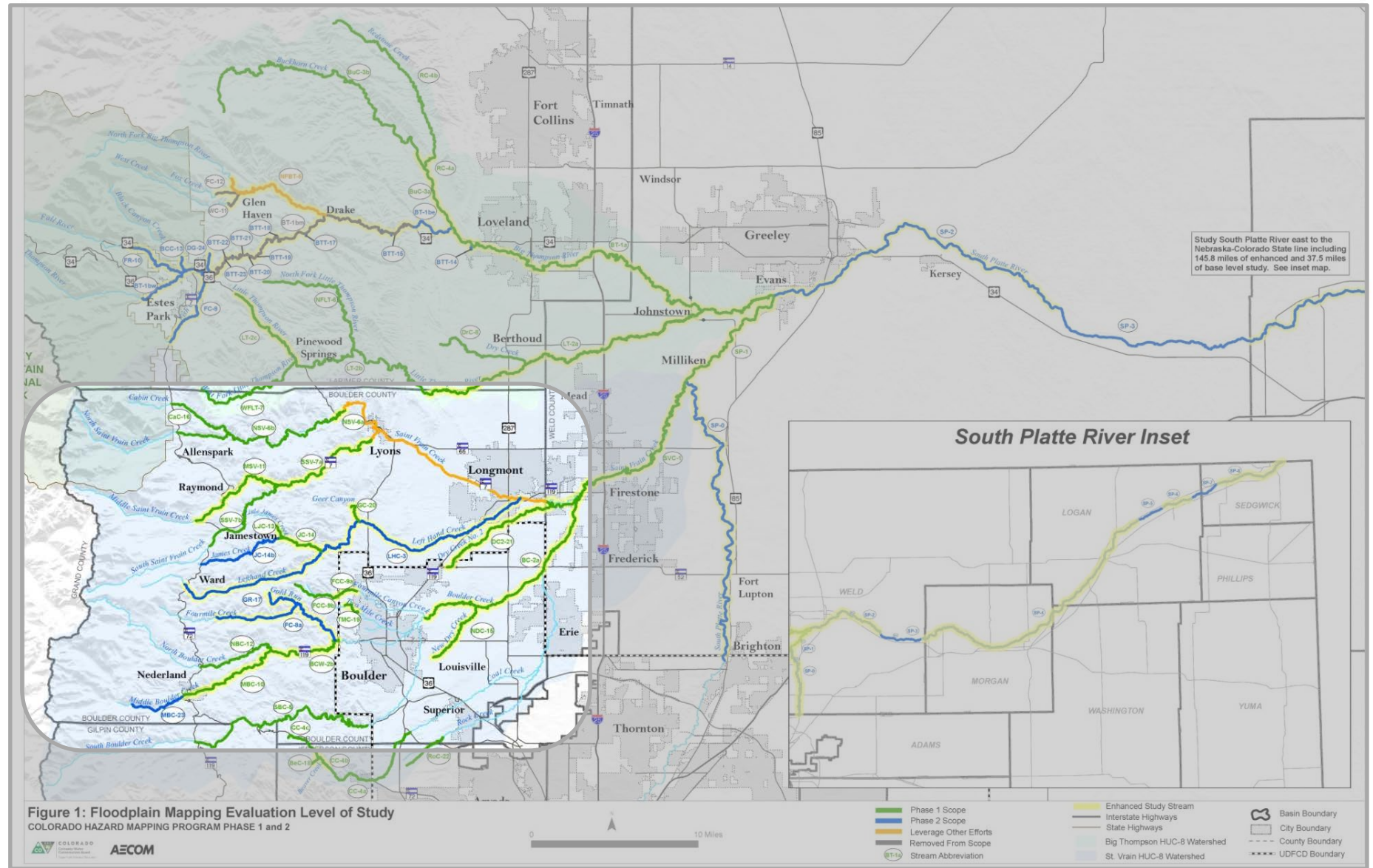


All steps will repeat for CHAMP Phase II draft mapping

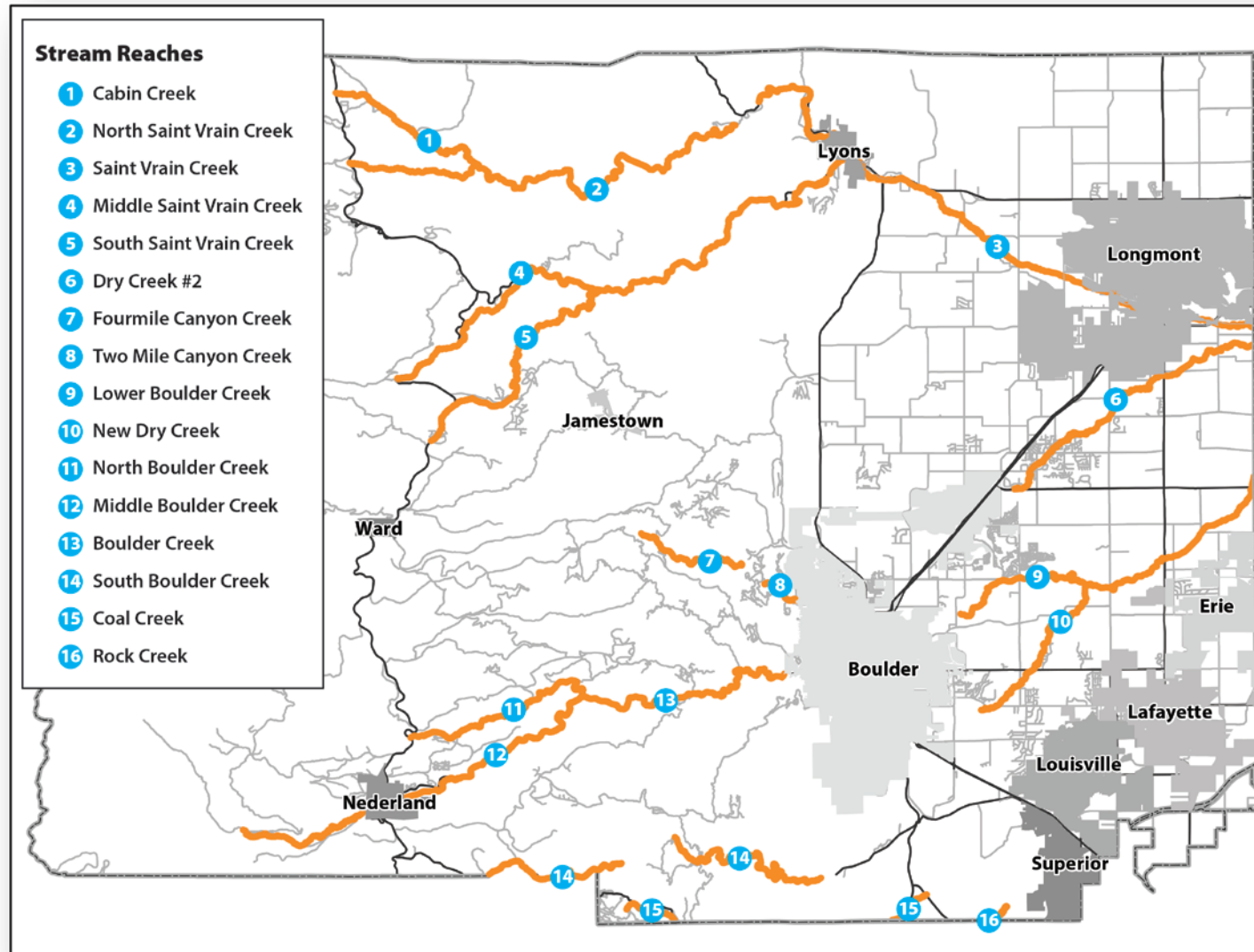
Summary of Proposed Floodplain Overlay District Zoning Map Amendments (Z-17-0001)

- Proposed zoning map amendments include updates to the Boulder County Floodplain & Floodway
- Amendments come after extensive technical review, interagency coordination, and public outreach activities

CHAMP Study Reaches

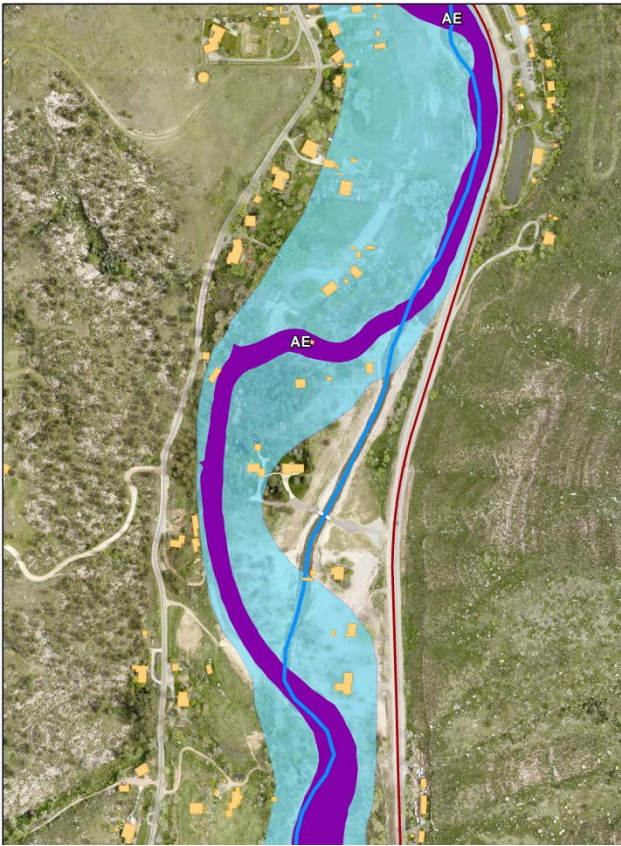


CHAMP Phase I Reaches in Boulder County

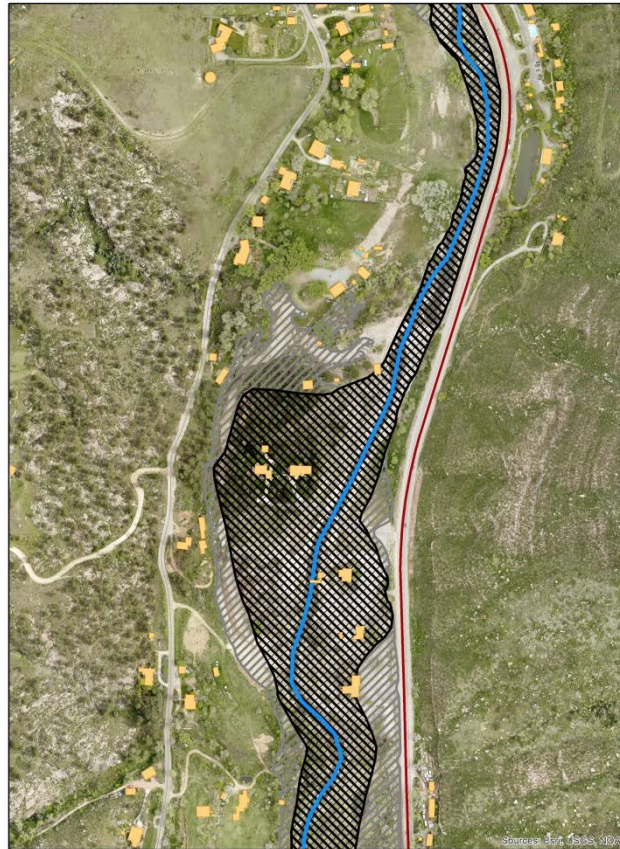


The interactive web map allows users to see other data used by Boulder County to administer Land Use Code requirements

Current Regulatory Floodplain



Proposed Boulder County Floodplain



Proposed Floodplain Overlay District



Current Regulatory Floodplain



Proposed Boulder County Floodplain



Proposed Floodplain Overlay District



Criteria Review (Z-17-0001)

| | | |
|---|--|---|
| 1) A public need exists for the map amendment | Outdated mapping; inaccurate portrayal of flood risk; need for more effective floodplain management Proposed mapping will enable more effective floodplain management | ✓ |
| 2) The amendment is consistent with and in furtherance of the stated intent and purposes of this Code | Section 4-401, Purpose, <i>'...to protect life, property, and health; to ensure the best available data is used in making development decisions; ...'</i> | ✓ |
| 3) The amendment is in accordance with the Boulder County Comprehensive Plan | <p>Natural Hazard Goal L.1: <i>'Inappropriate development in natural hazard areas should be reduced as much as possible or eliminated in order to minimize potential harm to life, health, and property'</i></p> <p>Natural Hazards Policy NH1.02: <i>'Natural hazards potentially affecting the county should continue to be identified and made known to the public and public officials. The county should promote a high level of public awareness about the risks of these identified hazards which may impact people, property, and the environment...'</i></p> <p>Natural Hazards Policy NH4.01: <i>'The county should strongly discourage and strictly control land use development from locating in designated floodplains, as identified in the Boulder County Zoning Maps'</i></p> <p>The Comprehensive Plan encourages reduction of inappropriate development in known flood risk areas</p> | ✓ |

Criteria Review (Z-17-0001)*

| | | |
|---|---|---|
| 4) The subject property is an appropriate site for the map amendment, and is a reasonable unit of land for such reclassification | County technical review and CHAMP quality assurance checks have prepared data suitable for submittal to FEMA Confidence exists that it is the best available flood risk data for these reaches | ✓ |
| 5) The map amendment would not have a material adverse effect on the surrounding area | Appropriate regulation of development within identified flood hazard areas will benefit surrounding areas | ✓ |
| 7) The map amendment will not have a material adverse effect on community capital improvement programs | Appropriate regulation of development within identified flood hazard areas will benefit community capital improvement programs | ✓ |
| 8) The map amendment will not require a level of community facilities and services greater than that which is available | Map adoption informs residents and visitors of known flood hazards, resulting in a more resilient community & better use of resources | ✓ |
| 13) The map amendment will not otherwise be detrimental to the health, safety, or welfare of the present or future inhabitants of Boulder County | Adopting best available data benefits health, safety, and welfare by improving long-term planning and resiliency efforts | ✓ |

* Criteria 6, 9, 10, 11, 12 found not applicable

Summary of Proposed Text Amendments (DC-17-0001)

- Proposed changes focus on clarifying existing processes for adopting floodplain data
- Additional changes to Article 4-400 were made to best protect residents and visitors in the event of a future flood event

| Change Number | Code Major Section No. | Minor Section No. | Description of Change | Explain why this change is necessary |
|---------------|------------------------|-------------------|--|---|
| 1 | 4-402 | (F)(2) | Last sentence should read "...or the County Engineer has determined that a FDP is NOT required." | The unintentional omission of the word 'not' from the October 2016 code adoption changed the meaning of this subsection. |
| 2 | 4-403 | (A)(2)(c) | Removed initial from 'The following reports, maps, constitutes the initial location...'. Also, added language on periodic adoption of new flood hazard information. Removed mention of Love, 1992 study of the North and Main St Vrain as defining the Boulder County Floodplain. | This change is necessary to allow for updates to the FO District through zoning map adoption to occur without the need for a code text amendment. |
| 3 | 4-403 | (C)(1) | Removed previously from 'The County Engineer shall determine which uses, parcels, structures, or other facilities are located in an previously adopted FEMA Floodplain or a Boulder County Floodplain ...' | Clarification. |
| 4 | 4-403 | (C)(5) | Changed 'boundary lies' to 'boundaries lie', clarified 'Engineer' means 'County Engineer' | The first change clarifies that interpretation can apply to all boundaries within the FO District (including Floodway); not just the FO District boundary itself. The second change was to correct an omission of the word County in 'County Engineer'. |
| 5 | 4-403 | (D)(3) | This section deleted. | This section was repetitive. |
| 6 | 4-403 | (D)(5)(a) | Added relocated language on revision/amendment of existing Floodway delineations from the existing Floodway definition in Section 4-414. | The addition of this language is necessary to refer people that wish to revise the FO District where a Floodway exists to the modeling section 4-404.2(E) and to the appropriate Floodway surcharge criteria, as-applicable. This language has same effect as similar currently existing language in 4-414 Definitions. |
| 7 | 4-404 | (A) | Language added to clarify that A only applies to development projects that are allowed in the floodway. | Existing language was misleading. |
| 8 | 4-404 | (B) | Insert portion of Floodway definition here. Also, 'The following activities and uses are prohibited within all mapped floodways' | Distribution of portions of the Floodway definition throughout the code (in this case, to 404 where it describes the Floodway). Also, removed the word 'mapped' because it |
| 9 | 4-404 | (B)(15) | Added 'above-ground oil and gas operations as defined in Article 12-1400' to list of prohibited uses in the Floodway. | The prohibition is already included in Article 12 but should also be included where people will look for it in Article 4-400 floodway prohibitions. |
| 10 | 4-404 | (C)(2) | Add reference '...that the proposed encroachment is in compliance with the provisions of 404.2(E).' | Reference made to modeling section. Also previously existing language describing need for CLOMR, LOMR, and local floodway review has been relocated from this section to 404.2(E)(4). |
| 11 | 4-404 | (C)(3) | Add language concerning development within areas of ineffective flow in Floodway areas above 6,000 feet. | This language is necessary to direct applicants that wish to propose a use or development within the Floodway above 6,000 feet that they may only do so if they are able to demonstrate that areas of ineffective flow (low velocity and therefore not likely a Floodway-type hazard) exist. |
| 12 | 4-404.1 | (A) | Replace floodplain with FO district as follows: '...certain limited uses and activities in the floodplain FO District without the need for...' | Clarification to differentiate 'Floodplain' from 'FO District'. Article 4-400 governs the FO District. |
| 13 | 4-404.1 | (F) | Removal of words 'to the owner' | Removal of reference 'to the owner' since there could be an agent applying on behalf of an owner, etc. |
| 14 | 4-404.2 | (B)(1)(d) | Moved 'adequate evidence of either direct ownership ...' from end of Section 4-404.2(B) to earlier in the Section. | It is a requirement for all individual FDPs |
| 15 | 4-404.2 | (B)(2) | Moved 'For projects in the floodway' up higher in Section. Removed depth x velocity procedure for delineating floodway in Plains that was not acceptable to FEMA. | Requirements for ALL floodway projects needed to be higher in the section. Per FEMA, depth x velocity procedure did not address encroachments sufficiently. |
| 16 | 4-404.2 | (B)(3)(g) | Add reference to a floodway analysis that is required for projects below 6,000 feet that involve proposed buildings. From existing Floodway definition. | This language is necessary to align with floodway definition and Boulder County policy, to ensure all new buildings are outside of the floodway, that any new buildings proposed in FO District areas without a floodway must first establish a floodway boundary. |
| 17 | 4-404.2 | (B)(3)(h) | Relocate existing language listing requirements for new development of 5 acres or 50 lots or greater from 4-404(C)(2) to section on submittal requirements for New Construction/buildings. | This item does not fit in it's current location; a better fit exists in 404.2(B)(3) |
| 18 | 4-404.2 | (B)(4)(c) | Change to 'Documentation, including hydraulic modeling, that addresses scour...' | Change is necessary to emphasize that, per Boulder County Storm Drainage Criteria Manual, hydraulic modeling is required in order to properly size and design water crossings. |
| 19 | 4-404.2 | (E) | Changed 'procedures for modeling development in the floodway' to 'procedures for modeling development within the FO District'. | This section also talks about modeling requirements for projects that do not have a floodway. |
| 20 | 4-404.2 | (E)(1) | Edited introductory language -- about modeling procedures -- for clarification. Intent unchanged. | Language change clarifies that this section on modeling applies to floodway areas as well as areas that may not have a floodway identified. |
| 21 | 4-404.2 | (E)(2)(b) | In 4-404.2(E)(2)(b), add language on updating flood discharges (taken from existing 404.2(E)(2)(e) and re-worded). | This change provides clarification on the application of updated flood discharges to new modeling for a proposed project. |
| 22 | 4-404.2 | (E)(2)(b) | Remove language '...by measuring from the effective FIRM.' | Remove reference to the effective FIRM as there may be times where the Boulder County flood hazard information is used, or another study. This is a FEMA standard language remnant |
| 23 | 4-404.2 | (E)(2)(d) | These results must demonstrate no impact to the 100-year water surface elevations... | Removed from this section and redistributed as 404.2(E)(4) in order to provide clarity on procedures |
| 24 | 4-404.2 | (E)(3) | Insert reworded portion of Floodway definition here. | This language has been removed from the current Floodway definition and moved to a more pertinent location, where Floodway modeling is discussed. |
| 25 | 4-404.2 | (E)(4) | Portions of existing subsection 4-404(C)(2) - relocate to 404.2(E) and redistribute in other sections as well. Also, reworded to describe more simply when CLOMRs, LOMRs, and local floodway reviews are required. | This language has been moved to a more proper location (the modeling section) and the logic statements have been simplified for the user. No updates to requirements have been made. |
| 26 | 4-404.2 | (E)(4)(d) | Added language to 'In all instances, no increases in water surface elevation that are a direct result of a man-made development project will be allowed...' | Reworded this item and moved from 4-404(C)(2)(g). Language added to clarify that natural changes within the watershed may cause increases on insurable structures and this would be acceptable. |
| 27 | 4-404.2 | (E)(5) | Added from 404(C)(2). | Language moved to a more proper location. Same as above. |
| 28 | 4-405 | (A)(1) | In areas depicted as Zone AE and AH in the FO District... | Language updated to include all possible A zones. |
| 29 | 4-405 | (A)(2)(c)(i) | For buildings, the FPE will be 3 feet above the highest grade within the proposed building footprint, or the highest grade adjacent to the exterior of the existing building, unless the applicant supplies information sufficient to determine a BFE and subsequent FPE for the building, including data submitted as a part of identifying the Floodway boundary pursuant to the Floodway definition in 4-414. | Revised because distribution of Floodway definition makes the stricken clause unnecessary. |
| 30 | 4-405 | (G)(2)(a) | Reworded to clarify less strict regulation of OWTS in flood fringe/other floodplain areas. | Provide clarity to strict prohibition of OWTS in the Floodway and less-strict in the flood fringe. |
| 31 | 4-405 | (G)(3)(b)(i) | Edited to remove clause: Tanks that are installed within the Boulder County or FEMA 500-year floodplain should be anchored to protect against uplift from high groundwater. Where the 500-year floodplain is not shown, the anchoring requirement will apply if the lowest elevation of the tank is at or below the 100-year base flood elevation adjacent to the tank location. | Clause applied to area outside the FO district. Removed because this requirement applied to areas outside FO district. |
| 32 | 4-413 | (B)(3) | Added FPE: '...results in a higher BFE/FPE such that...' | It's necessary to add FPE because in some instances, a Base Flood Elevation will not be used but a flood depth will (Zone AO), which has an associated FPE. |
| 33 | 4-414 | Definitions | Existing floodway definition distributed throughout code rather than left in definitions. | Floodway definition has been updated to simply definition and to redistribute additional Floodway criteria throughout pertinent sections of 4-400. |

Select Proposed Code Changes

| | |
|--|---|
| 4-414 Definitions - Floodway | Floodway. Those portions of the FO District required for the passage or conveyance of the base flood <u>1% annual-chance (100-year) flood</u> in which waters will flow at significant depths or with significant velocities, including the channel of a river or other watercourse and any adjacent floodplain areas that must be kept free of development and other encroachments <u>in order to protect the health and safety of the residents of and visitors to Boulder County, and to discharge the base-100-year flood without cumulatively increasing the water surface elevation more than a designated height (also called 'surcharge' and described in Section 4-404.2(E)(3)).</u> |
| Floodway above 6,000 ft; 4-404(C)(3) | <u>3. For Floodway areas above 6,000 feet in elevation, uses other than those described in 4-404(C)(1) above may be allowed at the discretion of the County Engineer if the proposed use or development will occur within an area of ineffective flow,</u> |
| Floodway above 6,000 ft; 4-404.2(E)(3)(b) | <u>3. For Floodway modeling, the following surcharge criteria apply:</u> <u>b. In the foothill canyons and mountain areas above 6,000 feet in elevation, as a result of steep channel slopes, high flow velocities, and erosive forces, and to reserve areas of active flow such that those areas are free of development and other encroachments, a 0.00-foot surcharge shall be applied to all reaches studied by detailed and approximate methods (Zone AE and Zone A).</u> |

Criteria Review (DC-17-0001)

| | | |
|--|--|---|
| 1) The existing text is in need of amendment | Text changes needed to facilitate adoption of best available floodplain mapping data which better protects the health, safety, and welfare of residents and visitors | ✓ |
| 2) The amendment is not contrary to the intent and purpose of this Code | Section 4-401, Purpose, <i>'...to protect life, property, and health; to ensure the best available data is used in making development decisions; ...'</i> | ✓ |
| 3) The amendment is in accordance with the Boulder County Comprehensive Plan | Natural Hazard Goal L.1: <i>'Inappropriate development in natural hazard areas should be reduced as much as possible or eliminated in order to minimize potential harm to life, health, and property'</i> Natural Hazards Policy NH4.01: <i>'The county should strongly discourage and strictly control land use development from locating in designated floodplains, as identified in the Boulder County Zoning Maps'</i> The Comp. Plan encourages using best available data to reduce inappropriate development in the floodplain | ✓ |

Public Notice & Public Outreach

Z-17-0001 & DC-17-0001

| | |
|------------------------|--|
| Public Meeting Notices | ≈200 attendees at 5 meetings 1,634 total addresses notified |
| Listserv Notices | 3,377 email addresses contacted |
| Newsletters | 4 editions published 1,000+ email addresses contacted |
| County Website | 2,695 unique visitors to site |
| Interactive Web Map | 4,790 total visitors to site |
| Public Comments | 99 compiled comments |



Referral, Public Notice, & Involvement

- County Technical Review
- Staff provided comments received from the public to the CHAMP team
- Responses were received from CHAMP on those comments from the public that were technical in nature

| Boulder County Response | CHAMP Response |
|--|--|
| Staff discussed the property and related questions over the phone; There is no mortgage on the structure, so he is not worried about his mapping situation | This high ground was surrounded by flooding on either sides. The 100yr storm reaches an elevation of 7758.89 ft upstream of the area and 7757.82 ft downstream of the area. According to topo, the area of concern is at an elevation of about 7758 ft. This highground would be inundated by the surrounding floodplain. There may be an opportunity for a mapping certificate once mapping is finalized. |

Water surface elevation at the upstream and downstream cross sections are 7791.17 ft and 7786.22 ft, respectively. The 100yr storm does not flood the roadway in this location. The 500yr storm is at an elevation of about 7792 ft in this location. It is possible that there would be shallowing of the roadway in the event of a 500yr storm if the roadway is not mapped within the floodplain.

All engineering calculations are done within standard practice. 1%+ profile is a calculation of the standard deviation for the 100yr storm. This error calculation can be seen on the stream profiles.

Frequent Property Owner Question

“Why is my property being mapped into the floodplain? It didn’t flood here in 2013.”

- The proposed floodplain map updates are not intended to reproduce the 2013 Flood, but instead are informed by data from the 2013 Flood, and are a predictive tool for future flood events.
- Floodplain maps cannot model random events that might have occurred during the 2013 Flood and impacted flooding (e.g. house or tree fell into stream, changed flow direction and flooding distribution)
- According to stream flow data collected during the 2013 flood, many areas throughout Boulder County, especially at higher elevations, experienced less than a 100-year flood event. Some areas experienced greater than 100-year flood events.
- Topography reflected in proposed floodplain map updates is existing topography, not what existed before or during the 2013 flooding.

Partner Support

Matthew Buddie

FEMA Region VIII Flood Insurance &
Mitigation Specialist



FEMA

Staff recommends that the Planning Commission **approve and recommend to the Board of County Commissioners approval of:**

Docket Z-17-0001: Zoning Map Amendments to the Floodplain Overlay District; and

Docket DC-17-0001: Land Use Code text amendments to the floodplain regulations

The Board of County Commissioners is scheduled to make a recommendation on the proposed zoning map and code amendments at a Public Hearing on Tuesday, May 16, 2017 at 2:00 P.M.

Boulder County Floodplain Information

Map and Code Amendments Docket Webpage:

<http://www.bouldercounty.org/property/build/pages/lucodeupdatedc170001.aspx>

Boulder County Floodplain Remapping information:

www.bocofloodplainremapping.com

Boulder County Floodplain Management Website:

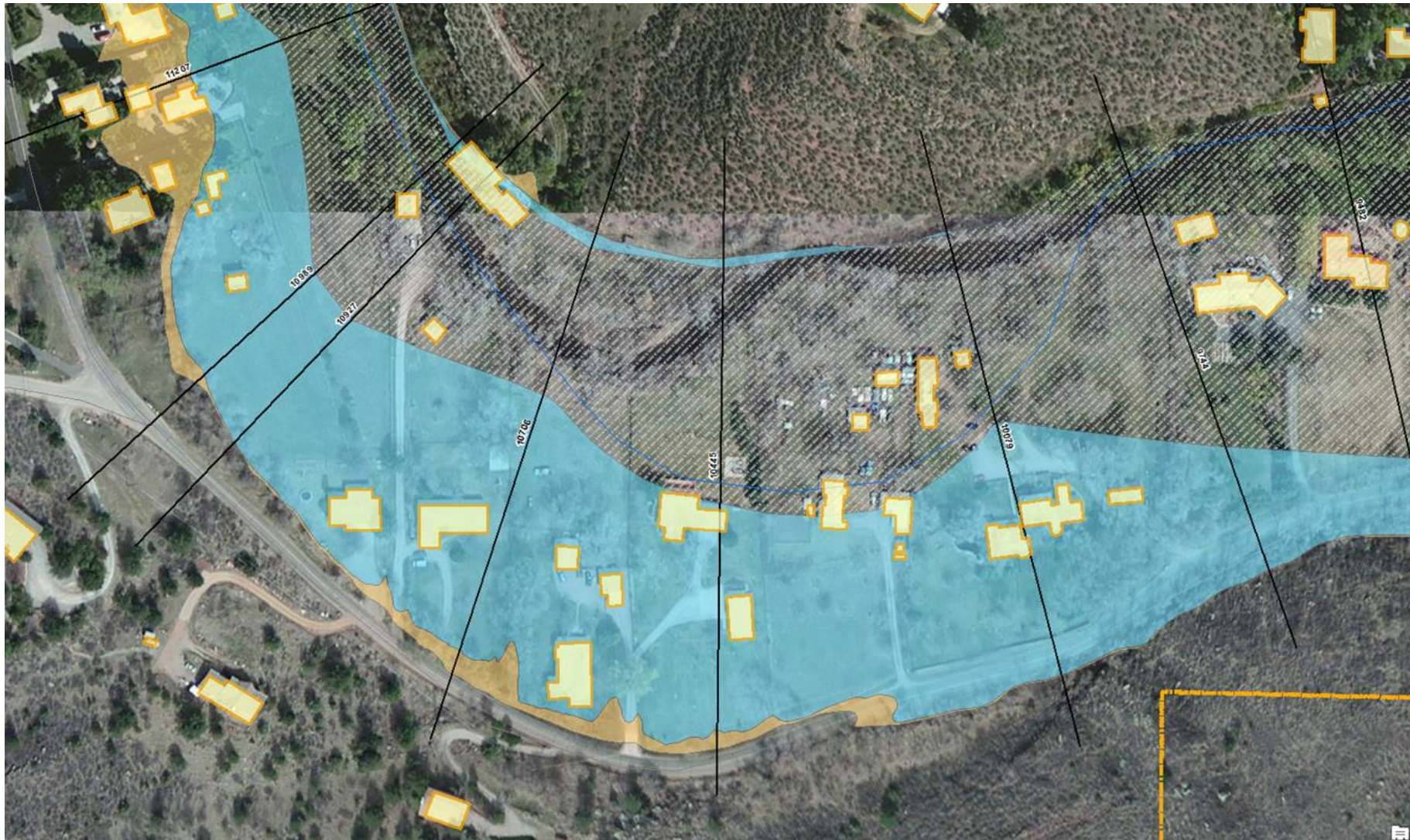
www.bouldercounty.org/property/flood/pages/default.aspx

Email: floodplainmapscomment@bouldercounty.org

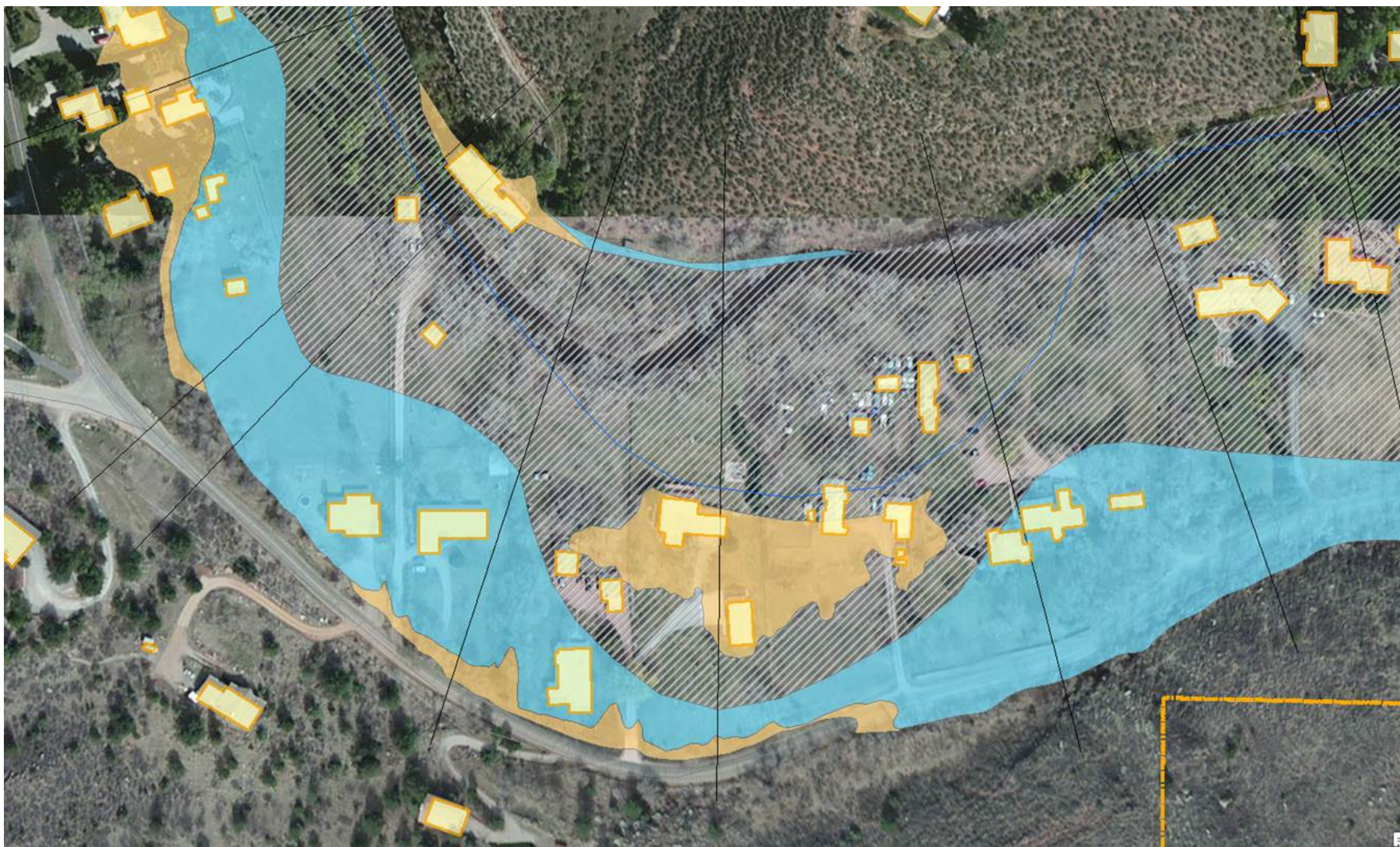
Boulder Creek upstream of Eben G. Fine. Comparison of the effective FEMA 100-yr floodplain (red/pink) and the CHAMP 100-yr floodplain & floodway (cross hatched)



North St. Vrain Creek – Apple Valley. Original CHAMP floodplain Mapping



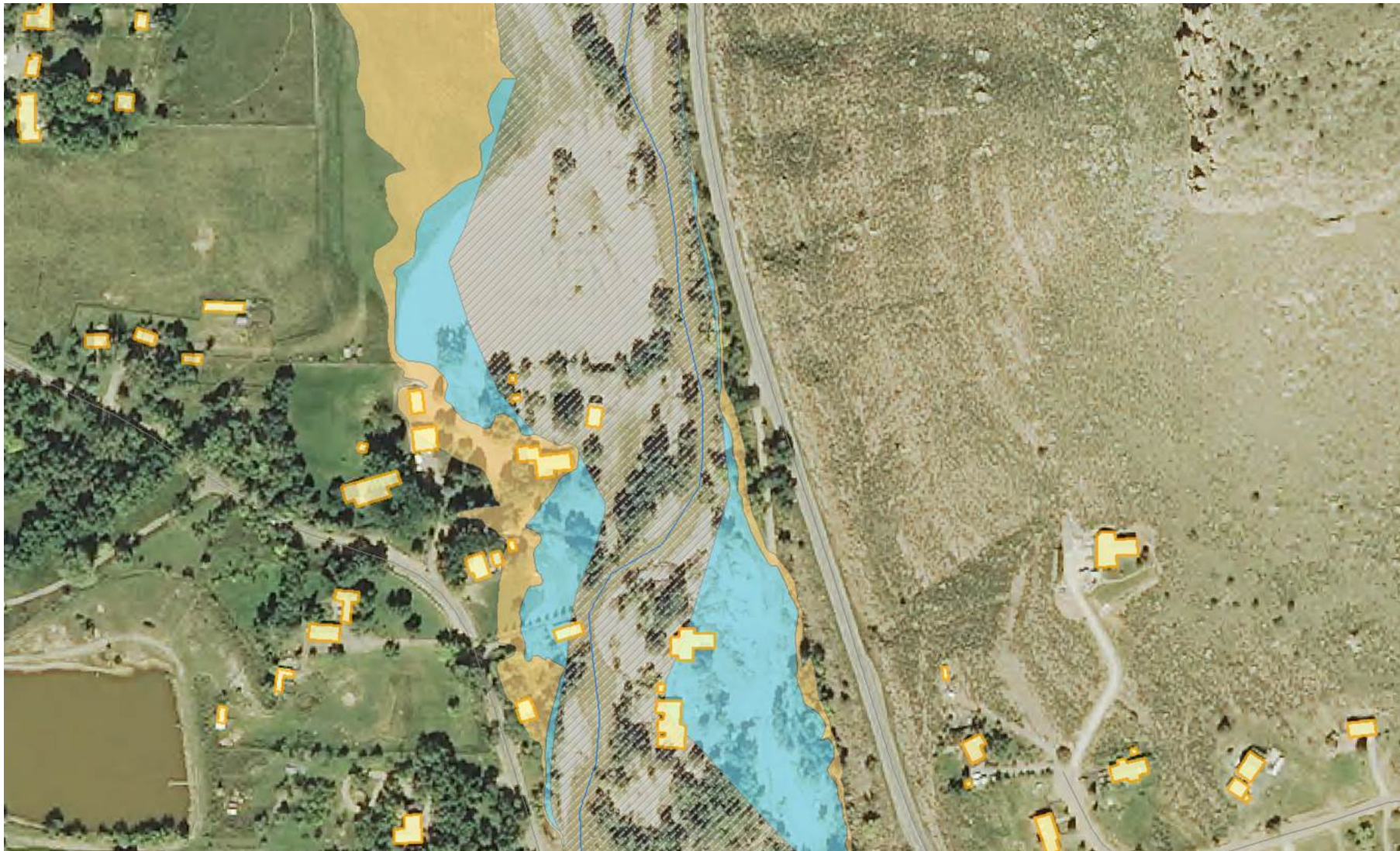
North St. Vrain Creek – Apple Valley. Revised CHAMP floodplain Mapping



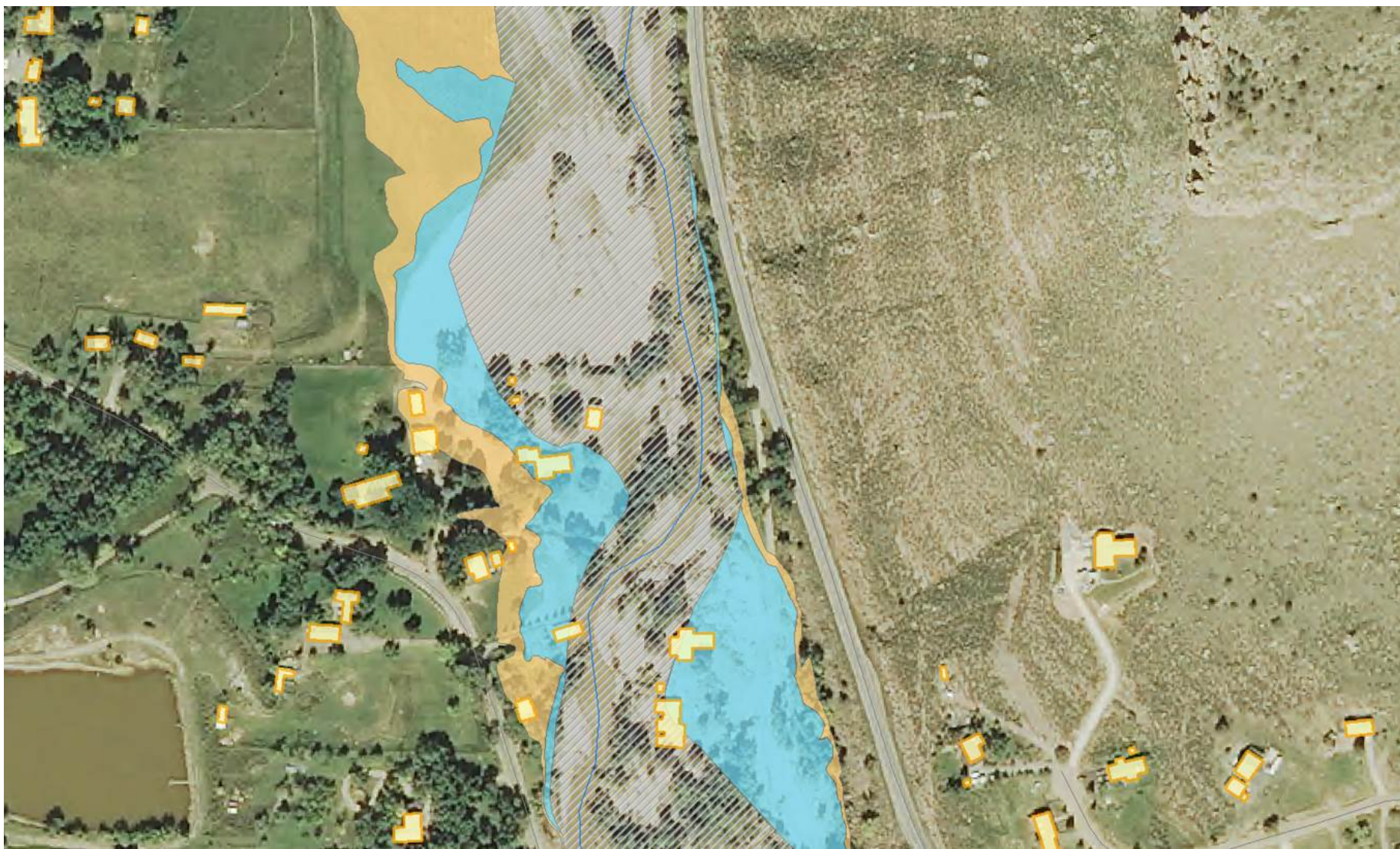
North St. Vrain – Apple Valley. Post Flood Aerial Photo



North St. Vrain Creek – Apple Valley. Original CHAMP floodplain Mapping



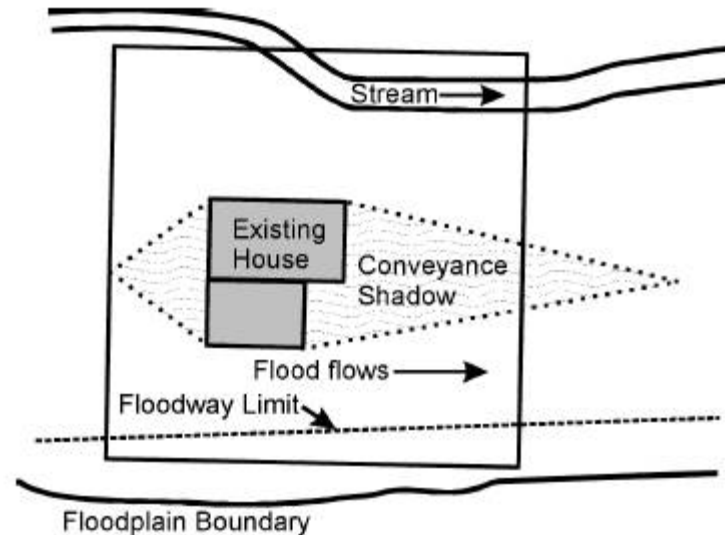
North St. Vrain Creek – Apple Valley. Revised CHAMP floodplain Mapping



Conveyance shadow concept
(ineffective flow areas) for
allowing projects in a floodway
that wouldn't cause a rise:

Building additions, accessory buildings, and similar small projects can be located in a conveyance shadow. This is the area upstream and downstream of a natural obstruction to flood flows or an existing structure. Flood water is already flowing around the larger obstruction, so the addition of a new structure will not change existing water surface elevations.

Note: Just because a small structure can be located in the conveyance shadow, it is still preferable to keep all development out of the floodway. Don't forget: all buildings must be elevated or otherwise protected from the base flood.

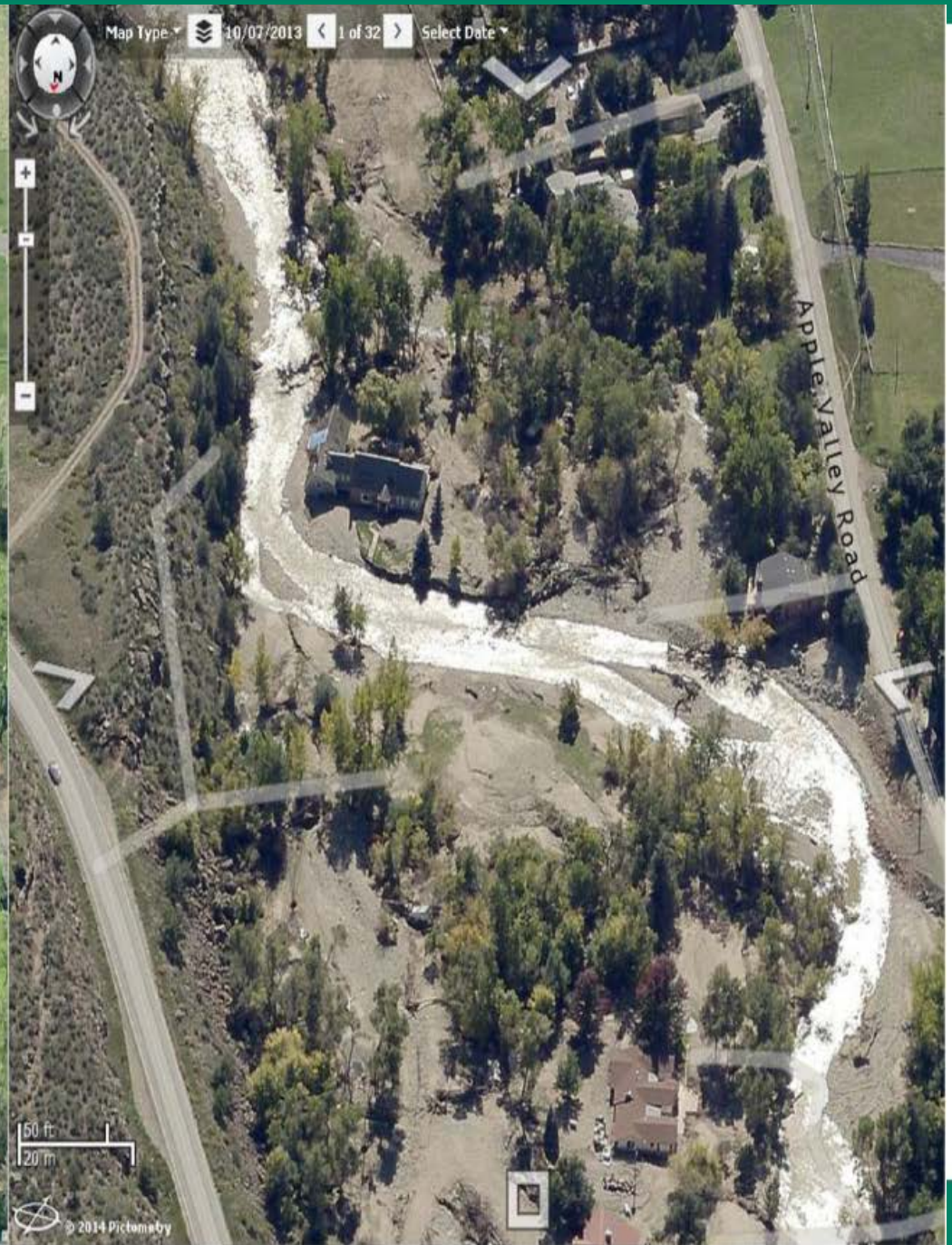
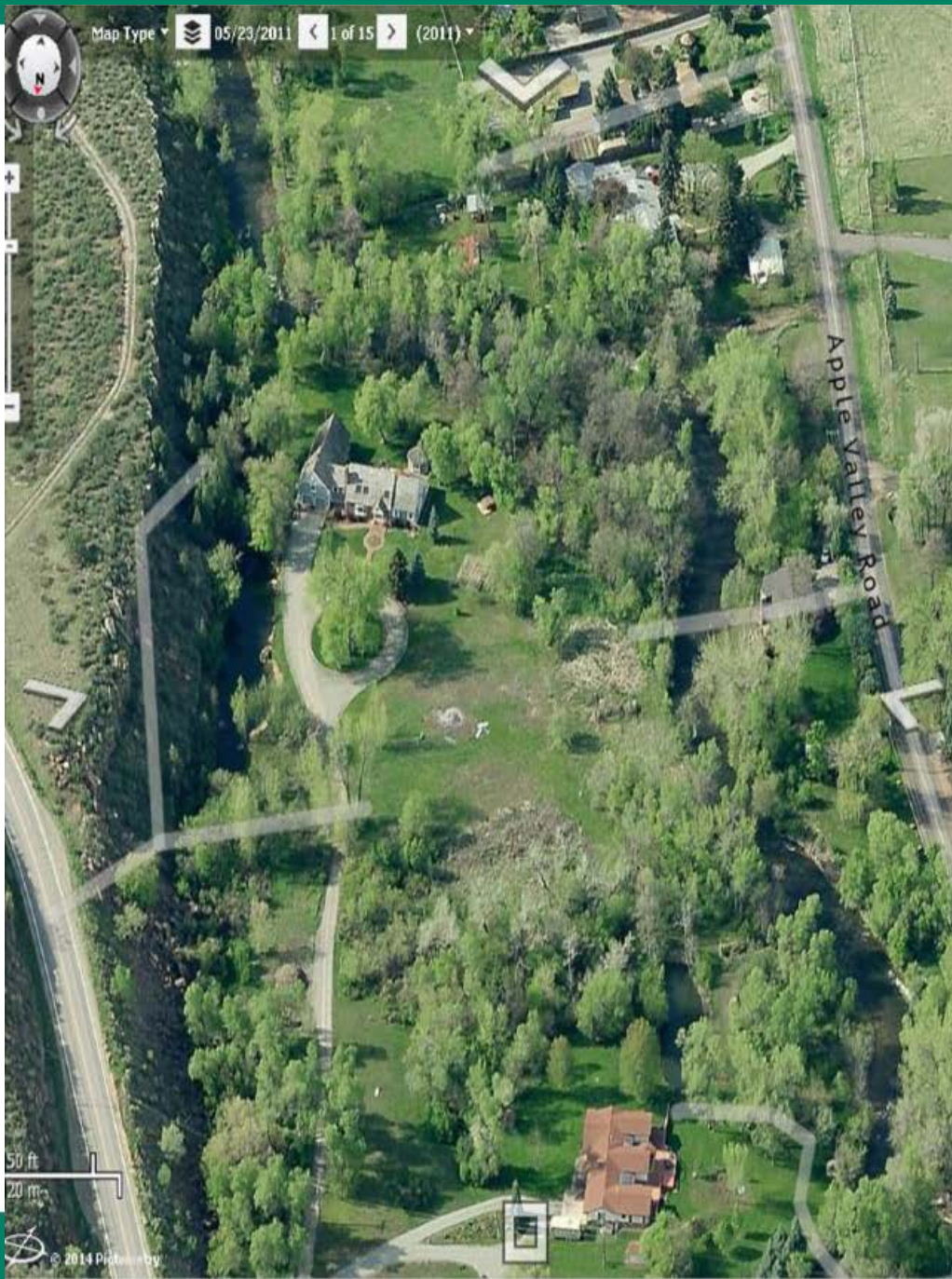


Upstream of the existing
obstruction: draw lines
at a 1:1 ratio.

Downstream: draw lines
at a 4:1 ratio

Structure located in a conveyance shadow because of a ridge of high ground immediately upstream of the structure.





FEMA Appeals Period - explanation

- Input becomes categorized as an appeal or a comment by FEMA. Appeals will get an acknowledgement letter back; FEMA will review appeal and ask for additional information if they feel it is needed. Then will send a letter explaining whether the appeal was accepted or denied. Appellant will then be given information on how to go to a scientific resolution panel. The county would need to agree that this panel should happen. County can also weigh in on whether a community can/should request a scientific resolution panel.

Anticipated Questions

- What happens when FEMA maps are effective but are narrower than current FO District?
 - The County has the authority according to [the Code] to regulate to a more conservative map if it deems such regulation appropriate
- Why is the CHAMP data being called the Boulder County Floodplain?
 - ...