City of Fort Collins Floodplain Regulations

For all floodplains other than the Poudre River

Quick Guide

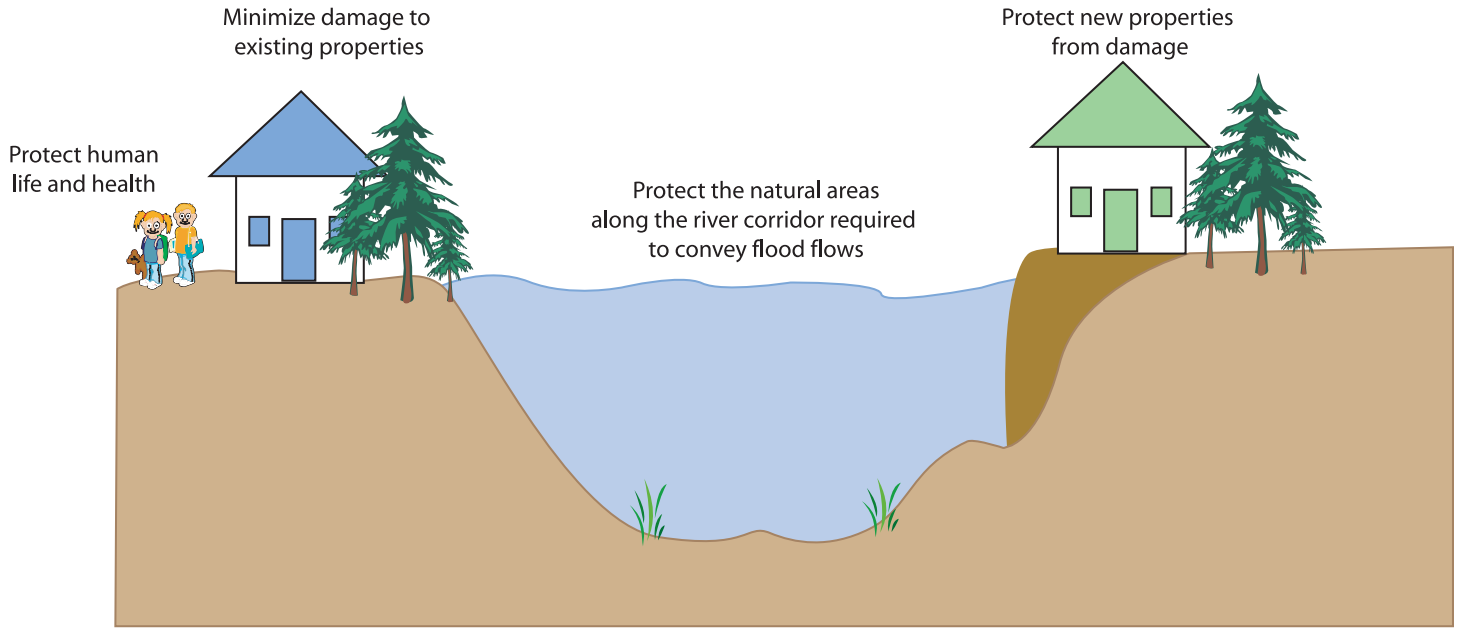
Note: This guide was prepared as an educational tool to help explain portions of the floodplain regulations, and is not intended as a complete or detailed explanation of the legal requirements that may apply to a particular property. Article II of Chapter 10 of the *City Code* specifies the requirements and prohibitions that are outlined generally in this guide and is the controlling legal document in the event of any conflict or inconsistency between this guide and the *City Code*. The *Code* provisions can be found on the Web at *http://www.colocode.com/ftcollins/municipal/chapter10.htm.*

Prepared by Fort Collins Utilities, PO Box 580, 700 Wood St., Fort Collins, CO 80522-0580
(970) 221-6700 • *www.fcgov.com/stormwater/fldplain.php*

City of Fort Collins Utilities

03/09

Purpose of Floodplain Regulations



Floodplain Facts

- Property in the 100-year floodplain has a 1 percent chance in any given year of being flooded.
- Over a 30-year period, there is a 26 percent chance that a property in the 100-year floodplain will be flooded. For comparison, there is only a 5 percent chance that the building will catch fire during that same 30-year period.
- Some properties have an even higher risk of flooding because they are in areas where smaller, more frequent floods cause damage.

Table of Odds for Different Events

Event	*Odds*
Structure in the 100-year floodplain being flooded in any given year	**1 in 100**
Matching one number plus Powerball in the Powerball Lottery	**1 in 124**
Structure in the 500-year floodplain being flooded in any given year	**1 in 500**
Annual chance of being killed in a car accident if you drive 10,000 miles/year	**1 in 4,000**
Being struck by lightning	**1 in 600,000**
Winning the Powerball Lottery jackpot (matching five numbers and the Powerball)	**1 in 120,526,770**

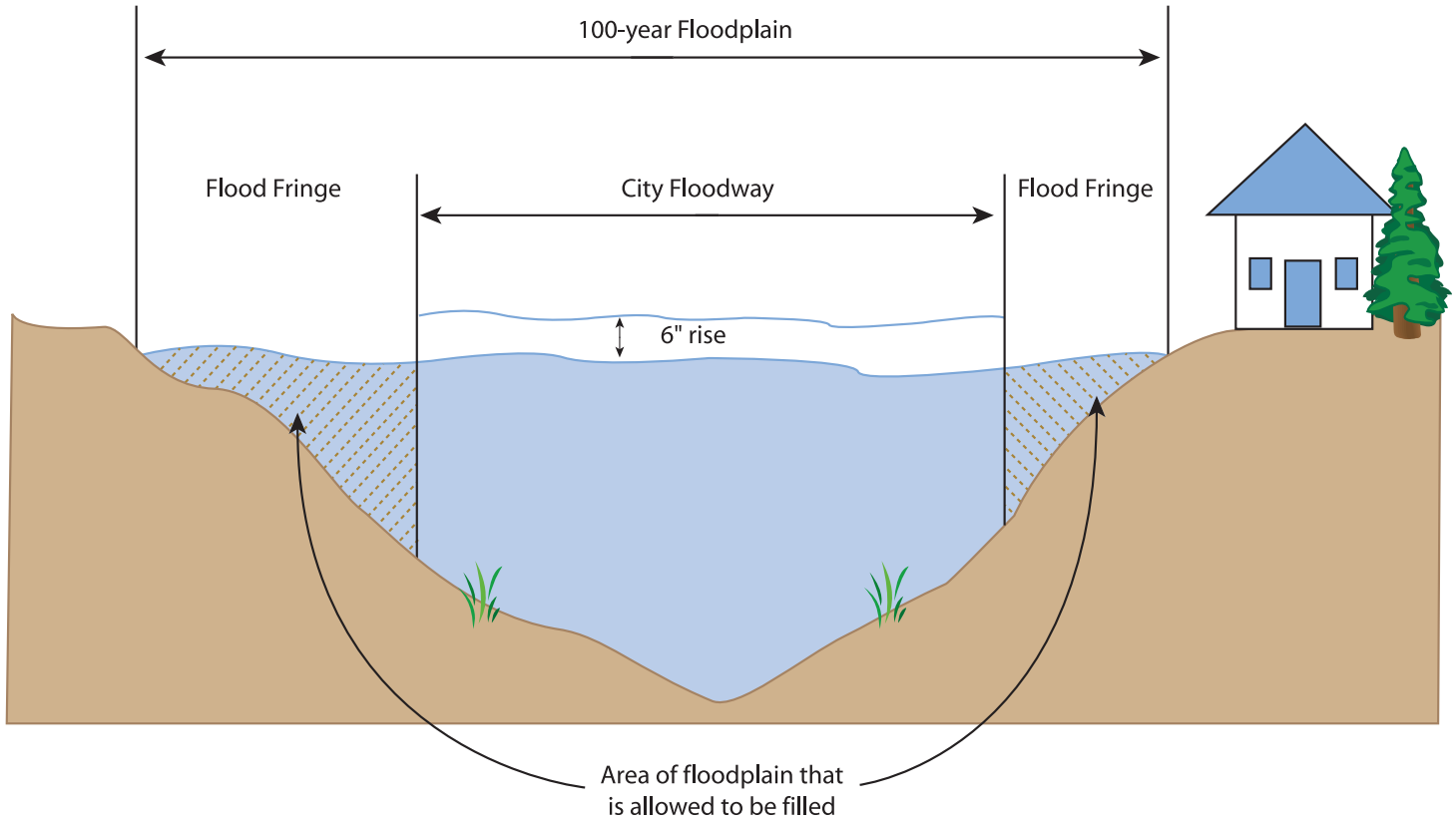
Types of Floodplains

- In Fort Collins, floodplains are designated by the City as well as by the Federal Emergency Management Agency (FEMA).
- The FEMA-basin floodplains cover only the major drainages. Changes in these floodplains must be approved by FEMA *(p. 5)*.
- The City-basin floodplains further identify the flood hazard. Some of the flooding in City-basin floodplains is from irrigation ditch spills or undersized storm sewers that result in overland flooding. Changes in these floodplains can be approved by the City *(p. 5)*.
- For floodplain regulation purposes, a floodplain property is either in a FEMA-basin floodplain, a City-basin floodplain or the Poudre River floodplain.

Floodplain Designations

Floodplain Name	*Poudre River*	*FEMA-Basin*	*City-Basin*
Poudre River	X		
Spring Creek		X	
Dry Creek		X	
Cooper Slough		X	
Boxelder Creek		X	
Fossil Creek			X
Old Town			X
Canal Importation			X
McClellands Creek			X
Mail Creek			X
Foothills Channel			X
West Vine			X

Floodway



- The floodway is the portion of the floodplain with the greatest depths and velocities.
- The floodway is the area of highest risk.
- The floodway must be preserved to allow the floodwater to pass through without being obstructed.
- Areas along the flood fringe are allowed to be filled and developed, but this raises the 100-year flood level. The City has set an allowable rise of 0.5 feet.

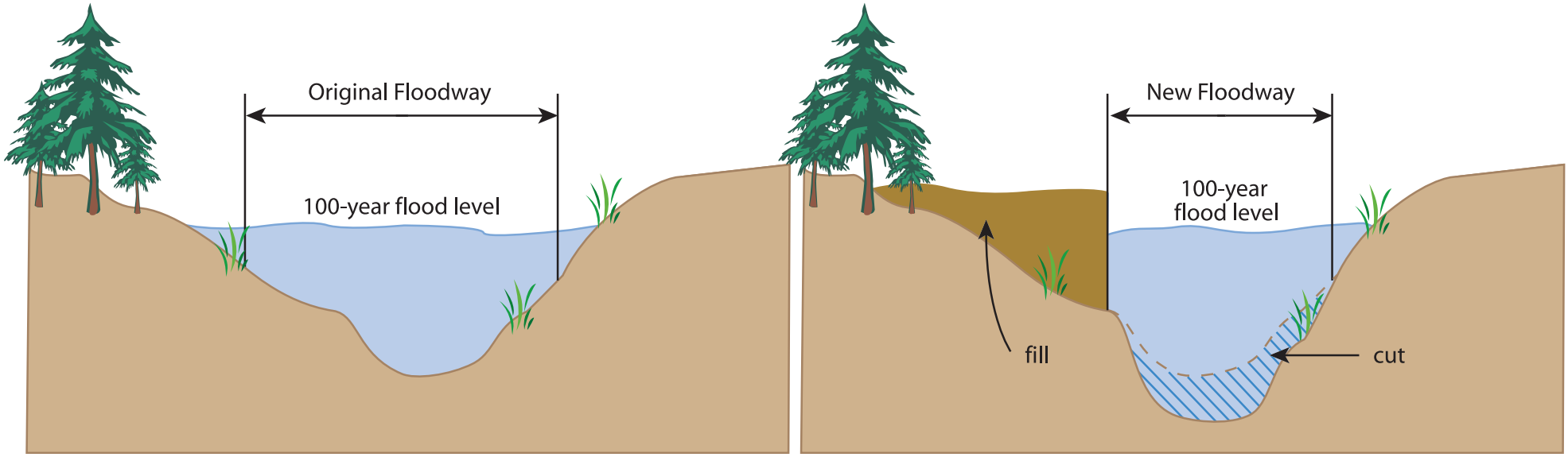
Floodway Modifications

- Floodways can be modified, but the applicant must be able to show that the project casues no-rise in the 100-year flood level.
- In FEMA-basin floodplains, the applicant must submit information to FEMA for approval before construction and after construction if the boundaries of the floodplain or floodway change.

If the applicant's project causes a rise, there are two options:

1. In FEMA-basin floodplains, the applicant must show the entire rise is on their property or obtain easements from other property owners. No structures can be impacted by a rise in the flood level.
2. In City-basin floodplains, the applicant must show that the entire rise is on their property or obtain easements from other property owners.

Example of a Floodway Modification



Summary of Floodway Development Regulations

Residential Development

- New residential development is not allowed.
- Fill is not allowed unless the applicant can show no-rise *(Floodway Modifications, p. 5)*.
- Residential additions are not allowed.
- Remodels are allowed subject to the substantial improvement requirements *(p. 14-15)*.
- Manufactured homes are allowed only in existing manufactured home parks.
- Redevelopment (rebuild) of an existing structure is allowed *(p. 14-15)*. Must meet the freeboard requirements for redevelopments *(p. 10)*.
- Detached garages and sheds are allowed if the applicant can show no-rise *(p. 17 and Floodway Modifications, p. 5)*.

Non-Residential Development

- New non-residential development is allowed if the applicant can show no-rise *(Floodway Modifications, p. 5)*. Must meet the freeboard requirements *(p. 10-11)*.
- Fill is not allowed unless the applicant can show no-rise *(Floodway Modifications, p. 5)*.
- Non-residential additions are allowed if the applicant can show no-rise *(Floodway Modifications, p. 6)*. Must meet the freeboard requirements *(p. 10-11)*.
- Remodels are allowed subject to the substantial improvement requirements *(p. 14-16)*.
- Mobile buildings (modular offices) are allowed only in existing mobile building developments.
- Redevelopment (rebuild) of an existing structure is allowed *(p. 14-16)*. Must meet the freeboard requirements for redevelopments *(p. 10-11)*.
- Attached garages, detached garages and sheds are allowed if the applicant can show no-rise (*p. 17 and Floodway Modifications, p. 5)*.

Mixed-Use Development

- New mixed-use development is not allowed.
- Fill is not allowed unless the applicant can show no-rise *(Floodway Modifications, p. 5*).
- Residential additions are not allowed to a mixed-use structure. Non-residential additions are allowed to a mixed-use structure if the applicant can show no-rise (*Floodway Modifications, p. 5*). Must meet the freeboard requirements (*p. 10-11*).
- Remodels are allowed subject to the substantial improvement requirements (*p. 14-16*).
- Redevelopment (rebuild) of an existing structure is allowed (p. 14-16). Must meet the freeboard requirements for redevelopments (p. 10-11).
- Detached garages and sheds are allowed if the applicant can show no-rise (*p. 17 and Floodway Modifications, p. 5*).

Summary of Floodway Development Regulations *(continued)*

Residential Development

- Critical facilities are not allowed *(p. 18)*.
- New basements are not allowed below the freeboard level *(p. 10)*. An existing basement in a redeveloped or substantially improved structure is not allowed to remain *(p. 10 and 14-15)*.

Non-Residential Development

- Critical facilities are not allowed *(p. 18)*.
- New basements are not allowed below the freeboard level *(p. 10-11)*. An existing basement in a redeveloped or sub-stantially improved structure can remain if floodproofed *(p. 10-11 and 14-16)*.
- New outside storage of equipment or materials is not allowed unless the applicant can show no rise *(Floodway Modifications, p. 5)*.

Mixed-Use Development

- Critical facilities are not allowed *(p. 18)*.
- New basements are not allowed below the freeboard level *(p. 10-11)*. An existing basement in a redeveloped or substantially improved structure is not allowed to remain if it is in residential use *(p. 10 and 14-15)*. An existing basement in a redeveloped or substantially improved structure is allowed to remain if it is in nonresidential use and floodproofed *(p. 10-11 and 14-16)*.
- New outside storage of equipment or materials is not allowed unless the applicant can show no rise *(Floodway Modifications, p. 5)*

Summary of Floodplain Fringe Development Regulations

Residential Development

- New residential development is allowed. Must meet the freeboard requirements *(p. 10)*.
- Fill is allowed.
- Residential additions are allowed. Must meet the freeboard requirements *(p. 10)*.
- Remodels are allowed subject to the substantial improvement requirements *(p. 14-15)*.
- Manufactured homes are allowed only to replace an existing manufactured home or fill a vacant lot in an existing manufactured home park.
- Redevelopment (rebuild) of an existing structure is allowed *(p. 14-15)*. Must meet the freeboard requirements for redevelopments *(p. 10)*.
- Attached garages, detached garages and sheds are allowed *(p. 17)*.
- Critical facilities are not allowed *(p. 18)*.

Non-Residential Development

- New non-residential development is allowed. Must meet the freeboard requirements *(p. 10-11)*.
- Fill is allowed.
- Non-residential additions are allowed. Must meet the freeboard requirements *(p. 10-11)*.
- Remodels are allowed subject to the substantial improvement requirements *(p. 14-16)*.
- Mobile buidlings (modular offices) are allowed only to replace an existing mobile building or fill a vacant lot in an existing mobile building development.
- Redevelopment (rebuild) of an existing structure is allowed *(p. 14-16)*. Must meet the freeboard requirements for redevelopments *(p. 10-11)*.
- Attached garages, detached garages and sheds are allowed *(p. 17)*.
- Critical facilities are not allowed *(p. 18)*.

Mixed-Use Development

- New mixed-use development is allowed. Must meet the freeboard requirements *(p. 10-11)*.
- Fill is allowed.
- Mixed-use additions are allowed. Must meet the freeboard requirements *(p. 10-11)*.
- Remodels are allowed subject to the substantial improvement requirements *(p. 14-16)*.
- Redevelopment (rebuild) of an existing structure is allowed *(p. 14-16)*. Must meet the freeboard requirements for redevelopments *(p. 10-11)*.
- Attached garages, detached garages and sheds are allowed *(p. 17)*.
- Critical facilities are not allowed *(p. 18)*.

Summary of Floodplain Fringe Development Regulations *(continued)*

Residential Development

- New basements are not allowed below the freeboard level *(p. 10)*. An existing basement in a redeveloped or substantially improved structure is not allowed to remain *(p. 10 and 14-15)*.

Non-Residential Development

- New basements are allowed. Must meet freeboard requirements and be floodproofed *(p. 10-11)*. An existing basement below the freeboard level in a redeveloped or substantially improved structure can remain if floodproofed *(p. 10-11 and 14-16)*.

Mixed-Use Development

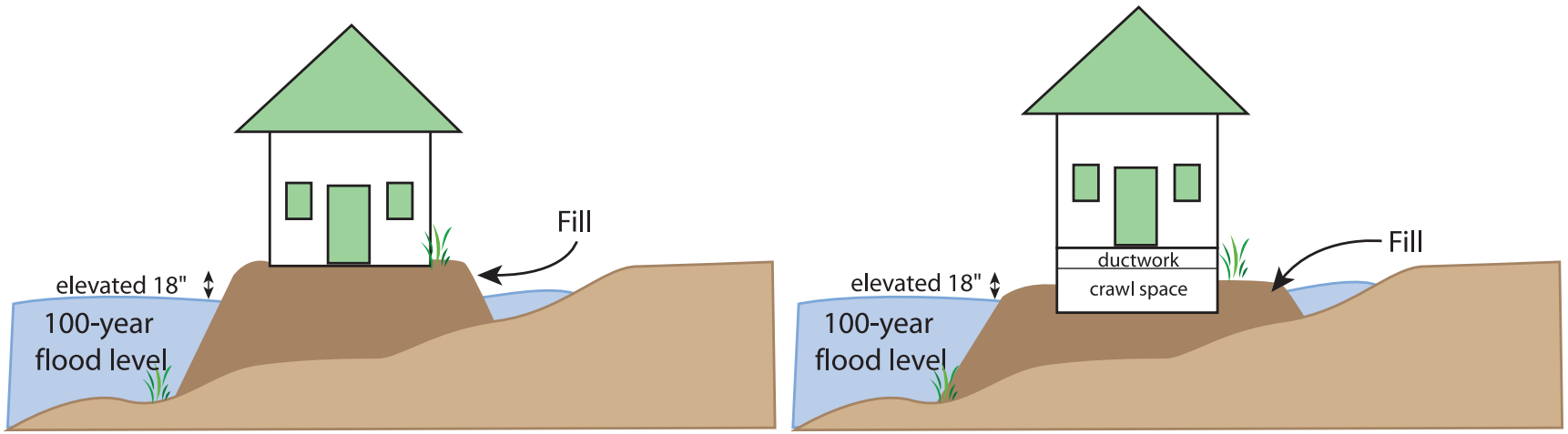
- New basements are not allowed below the freeboard level for residential portions of mixed-use structures *(p. 10)*. An existing basement in a redeveloped or substantially improved structure is not allowed to remain if it is in residential use *(p. 10 and 14-15)*. New basements are allowed for non-residential portions of mixed-use structures. Must meet freeboard requirements and be floodproofed *(p. 10-11)*. An existing basement in a redeveloped or substantially improved structure is allowed to remain if it is in non-residential use and floodproofed *(p. 10-11 and 14-16)*.

Freeboard

- Freeboard is a factor of safety that accounts for the allowed rise in flood level due to development in the flood fringe and for larger floods and debris that may cause the flood elevation to be higher.
- Freeboard is a measure of how high above the flood level the structure must be built or floodproofed.

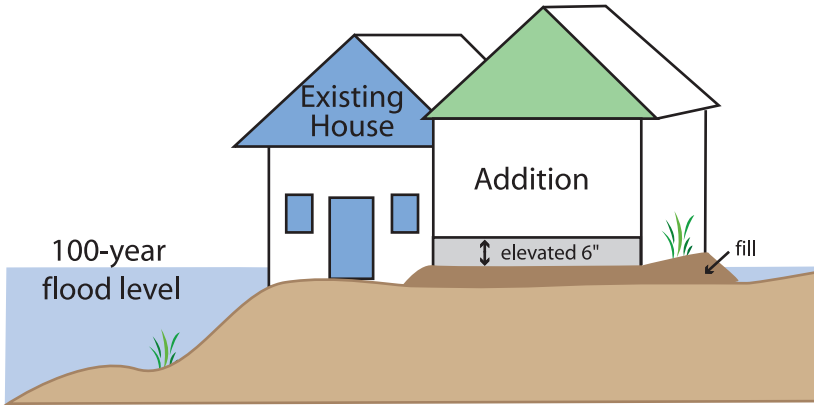
Residential Structures and Residential Portions of Mixed-Use Structures

- Freeboard for new development and redevelopment of an existing structure, including any attached garages, is 18 inches;
- Freeboard for additions and substantial improvements (including attached garages) is 6 inches;
- Freeboard for new detached garages or sheds that are accessory to an existing structure is 6 inches *(p. 17)*;
- Must elevate the structure; not allowed to floodproof; and
- The lowest floor of the structure *(p. 12-13)*, including the basement, all HVAC and electrical, must be elevated above the freeboard height.



Example of new development residential elevation

(See p. 12-13 for detailed foundation designs)



Example of residential addition

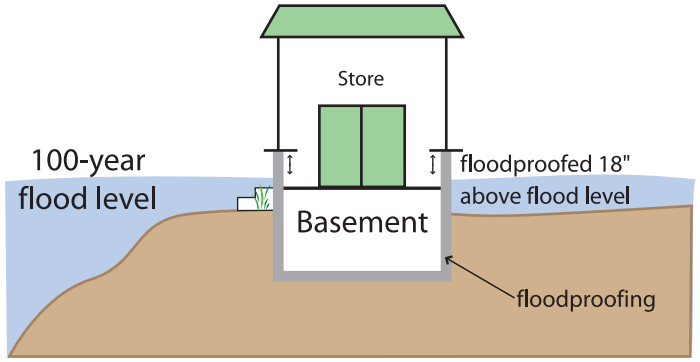
Non-Residential Structures and Non-Residential Portions of Mixed-Use Structures

- Freeboard for new development and redevelopment of an existing structure, including any attached garages, is 18 inches;
- Freeboard for additions and substantial improvements (including attached garages) is 6 inches;
- Freeboard for new detached garages or sheds that are accessory to an existing structure is 6 inches *(p 17)*;
- Allowed to either elevate or floodproof the structure;
- In the floodway, new basements are not allowed;
- If elevating, the lowest floor of the structure *(p. 12-13)*, including the basement, all HVAC and electrical, must be elevated above the freeboard height; and
- If floodproofing, the structure as well as all HVAC and electrical, must be floodproofed to the freeboard height.

Floodproofing uses various techniques to make a building water tight:

- **Sealants and waterproof membranes;**
- **Closure shields in front of doorways; and**
- **Mini-walls to protect window or stair wells.**

Floodproofing generally works only when flood depths are less than 3 feet.

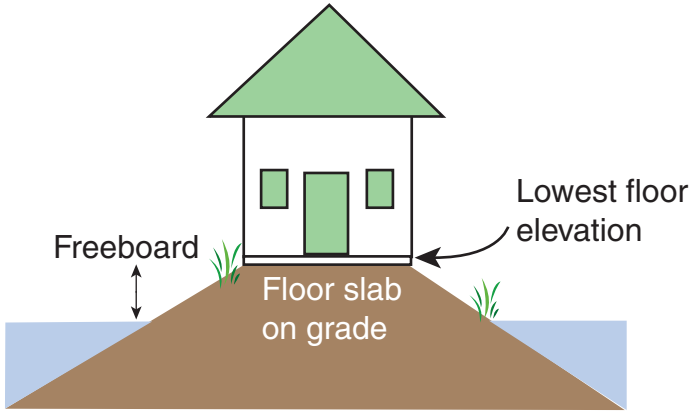


Example of new development non-residential floodproofing

Determination of Lowest Floor Based on Type of Foundation

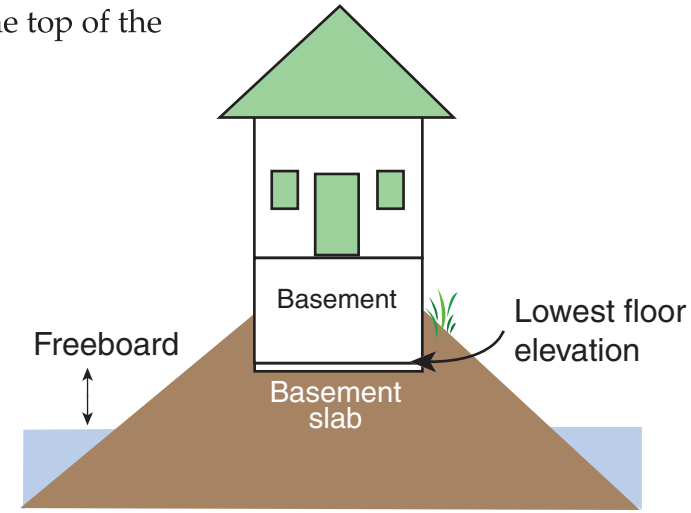
Slab on Grade

The lowest floor elevation of a slab on grade structure is measured at the top of the slab.



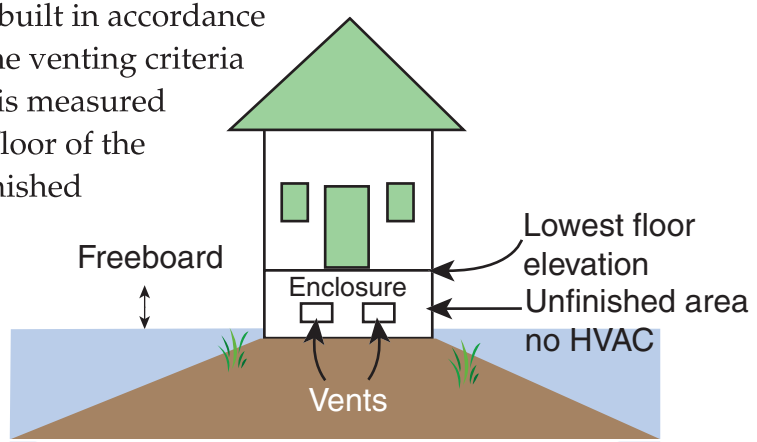
Basement

The lowest floor elevation of a structure with a basement is measured at the top of the basement slab.

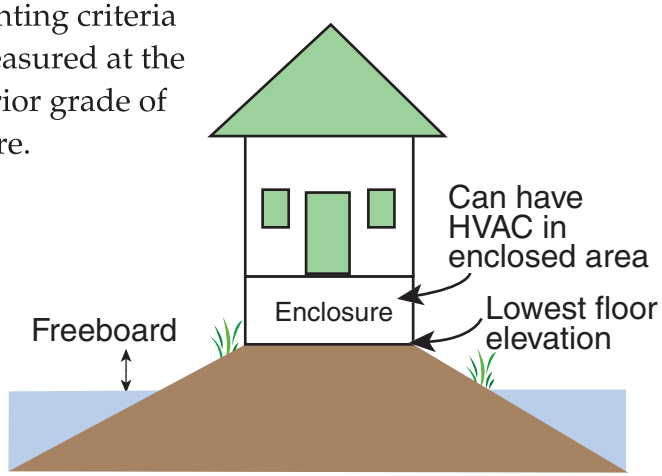


Enclosure (above grade crawl space)

1. The lowest floor elevation of a structure with an enclosure that is built in accordance with the venting criteria *(p. 17)* is measured at the floor of the first finished floor.



2. The lowest floor elevation of a structure with an enclosure that is not built in accordance with the venting criteria *(p. 17)* is measured at the lowest interior grade of the enclosure.



Crawl Space (below grade)

The lowest floor of a structure with a crawl space is measured at the lowest finished floor if the following conditions are met:

a. The velocity of the flood flows hitting the structure is less that 5 feet per second;

b. The interior grade elevation that is below the flood elevation is no lower than 2 feet below the lowest adjacent grade;

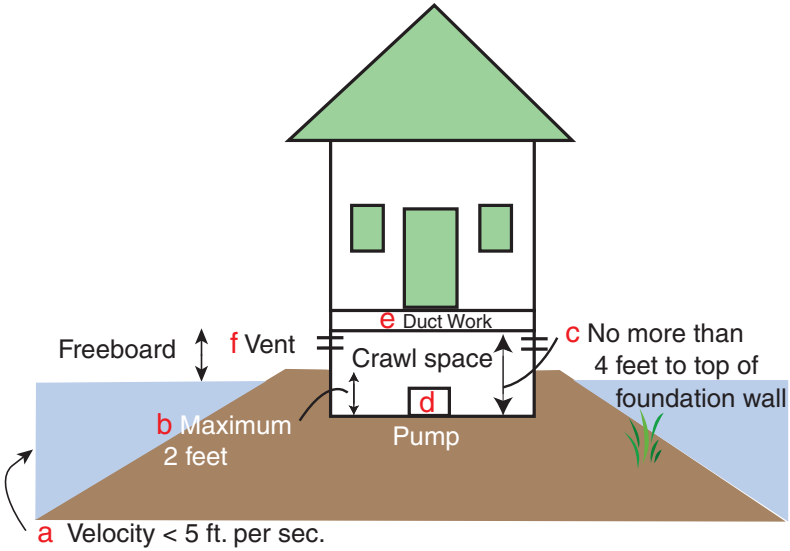
c. The height of the crawl space, as measured from the lowest interior grade of the crawl space to the top of the foundation wall, does not exceed 4 feet at any point;

d. An adequate drainage system is in place, including a totally immersible pump;

e. All ductwork, HVAC, hot water heater and electrical is elevated to the regulatory flood protection elevation; and

f. Venting requirements *(p. 17)* are met.

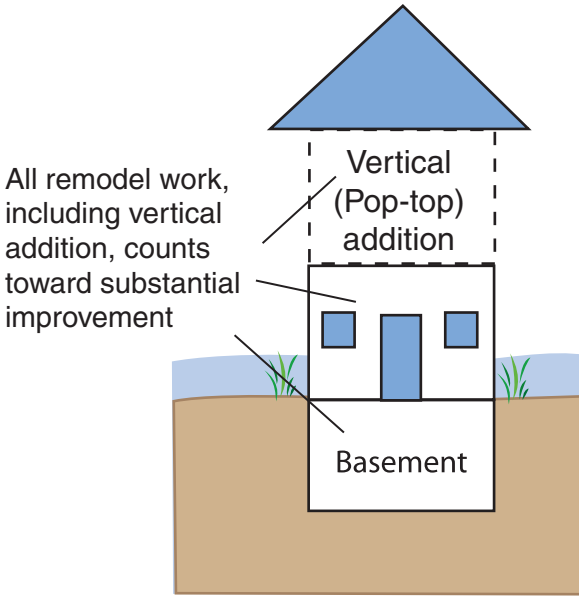
If the above conditions are not met, the lowest floor is determined based on the criteria for a basement *(p. 12)*.



Remodels or Repair of Damaged Buildings

FEMA-Basin Floodway and Floodplain Fringe and City-Basin Floodway

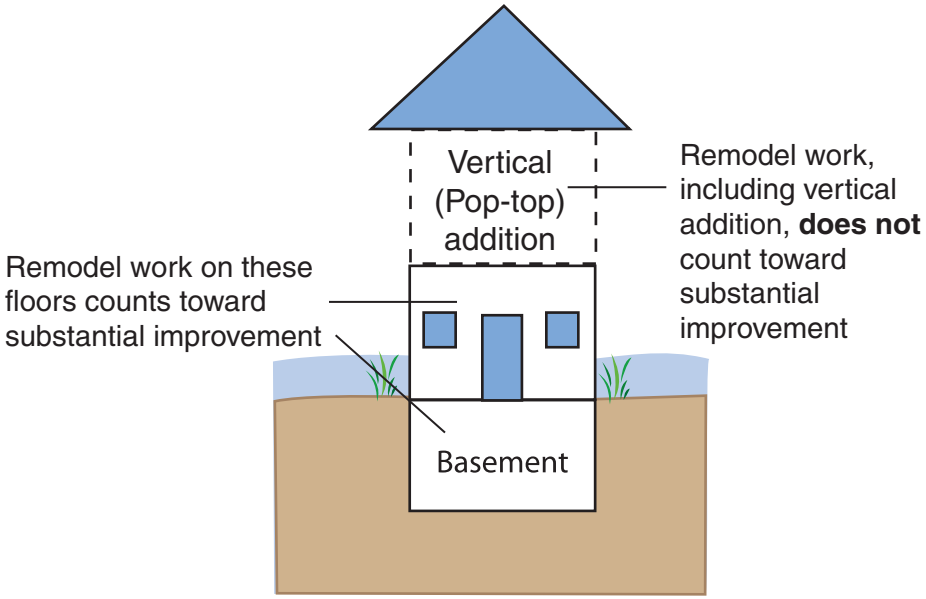
- Remodels and repairs are allowed subject to the substantial improvement requirements *(p. 15-16)*.
- Vertical additions (pop-tops) are considered a remodel and are subject to the substantial improvement requirements *(p. 15-16)*.



City-Basin Floodplain Fringe

Remodels and repairs are allowed subject to the following:

- If the improvement is on a floor of the structure that is below the 100-year flood level, it is subject to the substantial improvement requirements *(p. 15-16)*.
- If the improvement is on a floor of the structure that is above the 100-year flood level, it is **not** subject to the substantial improvement requirements *(p. 15-16)*.
- If constructing a vertical addition (pop-top), the applicant must have a registered professional engineer certify that the foundation can withstand the depths and velocities of a 100-year flood.



Substantial Improvement and Redevelopment

Substantial improvement occurs when **all** of the following conditions are met:

1. A building permit is requested for any repair, reconstruction or improvement to a non-conforming structure, involving alteration of any wall, ceiling, floor or other structural part of the building;
2. The cost of the improvement, or the amount of damage, equals or exceeds 50 percent of the market value of the structure either before the improvement or repair is started or before the building was damaged; and
3. The cost is calculated on a per project basis. A project is based on all building permits issued one year from the first permit that results in item #1 above.

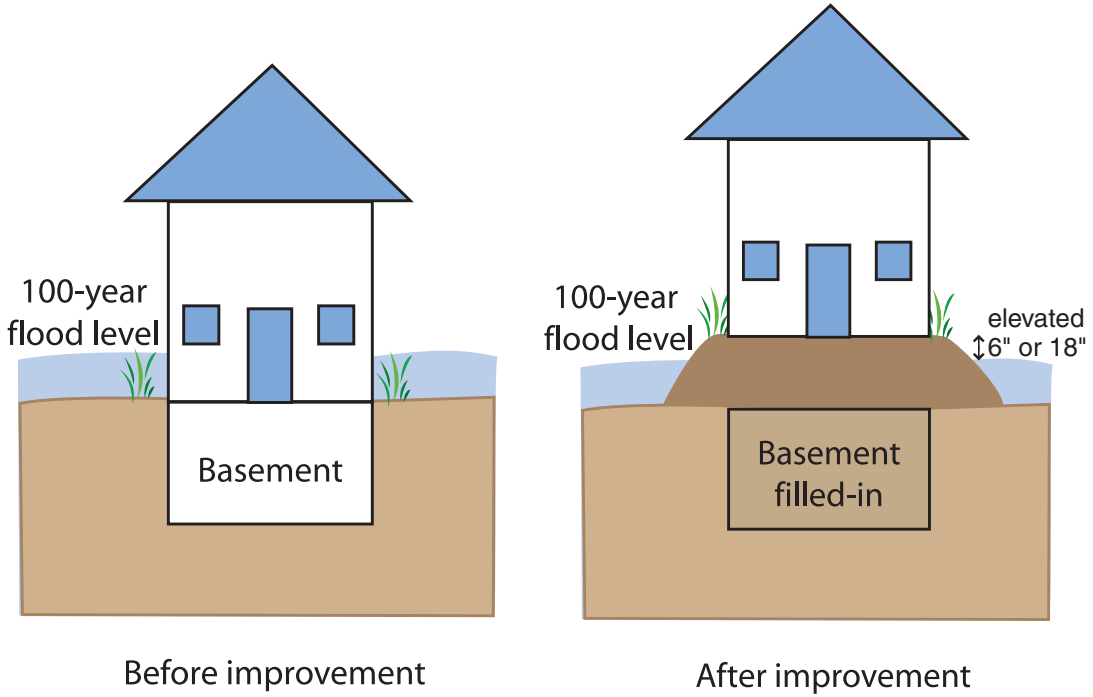
A substantial improvement policy ensures that non-conforming structures are brought into conformance over time and are therefore protected from flood damage and the risk to occupants is reduced.

Redevelopment occurs when there is a substantial improvement **and** more than 50 percent of the wall perimeter of any floor of a structure that is partially or completely below the flood elevation is removed or replaced and the building footprint is not increased.

Residential Structures and Residential Portions of Mixed-Use Structures

If a ***substantial improvement*** occurs, the lowest floor *(p. 12-13)* of a non-conforming structure, including the basement, and all HVAC, electrical and utilities, must be elevated 6 inches above the flood elevation. After improvements, the structure will be protected from flood damage.

If a ***redevelopment*** occurs, the lowest floor *(p. 12-13)* of a non-conforming structure, including the basement, all HVAC, electrical and utilities, must be elevated 18 inches above the flood elevation. After improvements, the structure will be protected from flood damage.



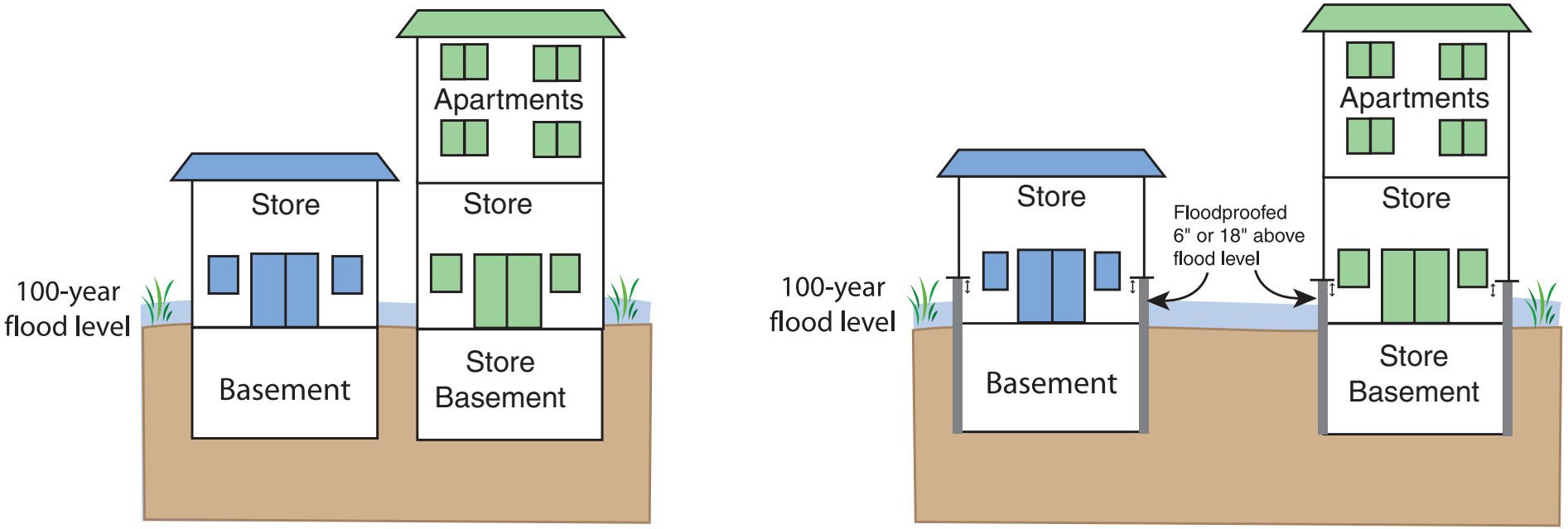
Example of residential substantial improvement or redevelopment

Substantial Improvement and Redevelopment *continued*

Non-Residential Structures and Non-Residential Portion of Mixed-Use Structures

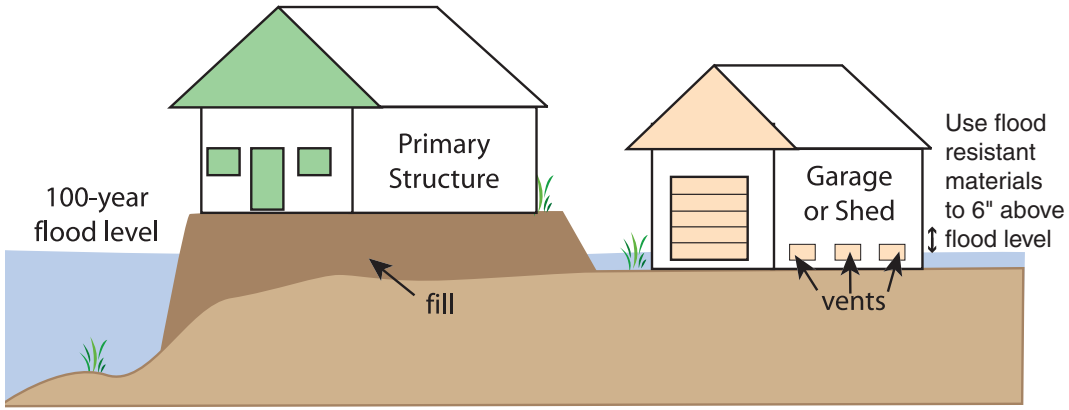
If a ***substantial improvement*** occurs, the lowest floor *(p. 12-13)* of a non-conforming structure, including the basement and all HVAC and electrical, must be elevated or floodproofed 6 inches above the flood elevation. After improvements, the structure will be protected from flood damage.

If a ***redevelopment*** occurs, the lowest floor *(p. 12-13)* of a non-conforming structure, including the basement and all HVAC and electrical, must be elevated or floodproofed 18 inches above the flood elevation. After improvements, the structure will be protected from flood damage.

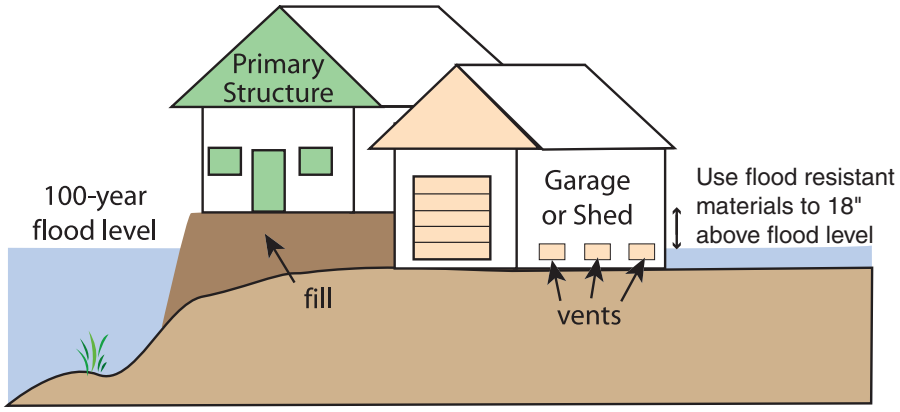


Example of non-residential and mixed-use substantial improvements or redevelopments

Garages, Sheds and Accessory Structures



Example of detached structure



Example of attached structure

- Used only for parking or storage;
- Is an accessory to a main structure;
- Must be anchored to resist flotation;
- Can either elevate to freeboard level *(p. 10-11)* or be built at grade;
- If not elevated to freeboard level, the garage or shed must meet the following requirements:
  - Must have 1 square inch of venting for every square foot of enclosed area;
  - Must have at least two vents located on different sides of the structure;
  - Have at least one vent on the upstream side of the structure;
  - Bottom of vents cannot be higher than 1 foot above grade;
  - Flood resistant materials must be used below the freeboard level *(p. 10-11)*; and
- All HVAC and electrical must be elevated to the freeboard level *(p. 10-11)*.

Venting Calculation Example

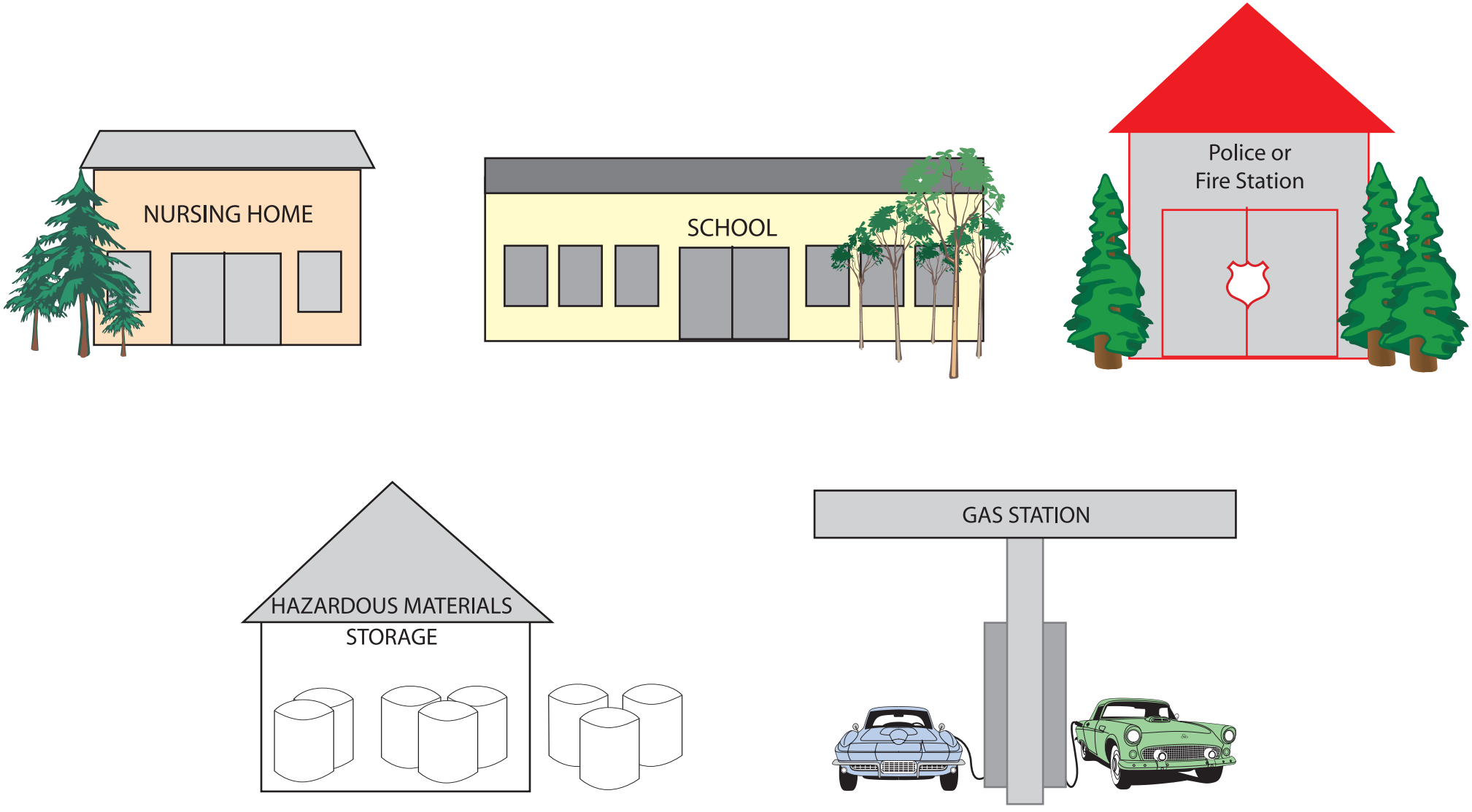
600 square foot shed
600 square inches of venting required

Vent size: 12” x 10” = 120 sq. inches per vent

600 divided by 120 = 5 vents

Critical Facilities

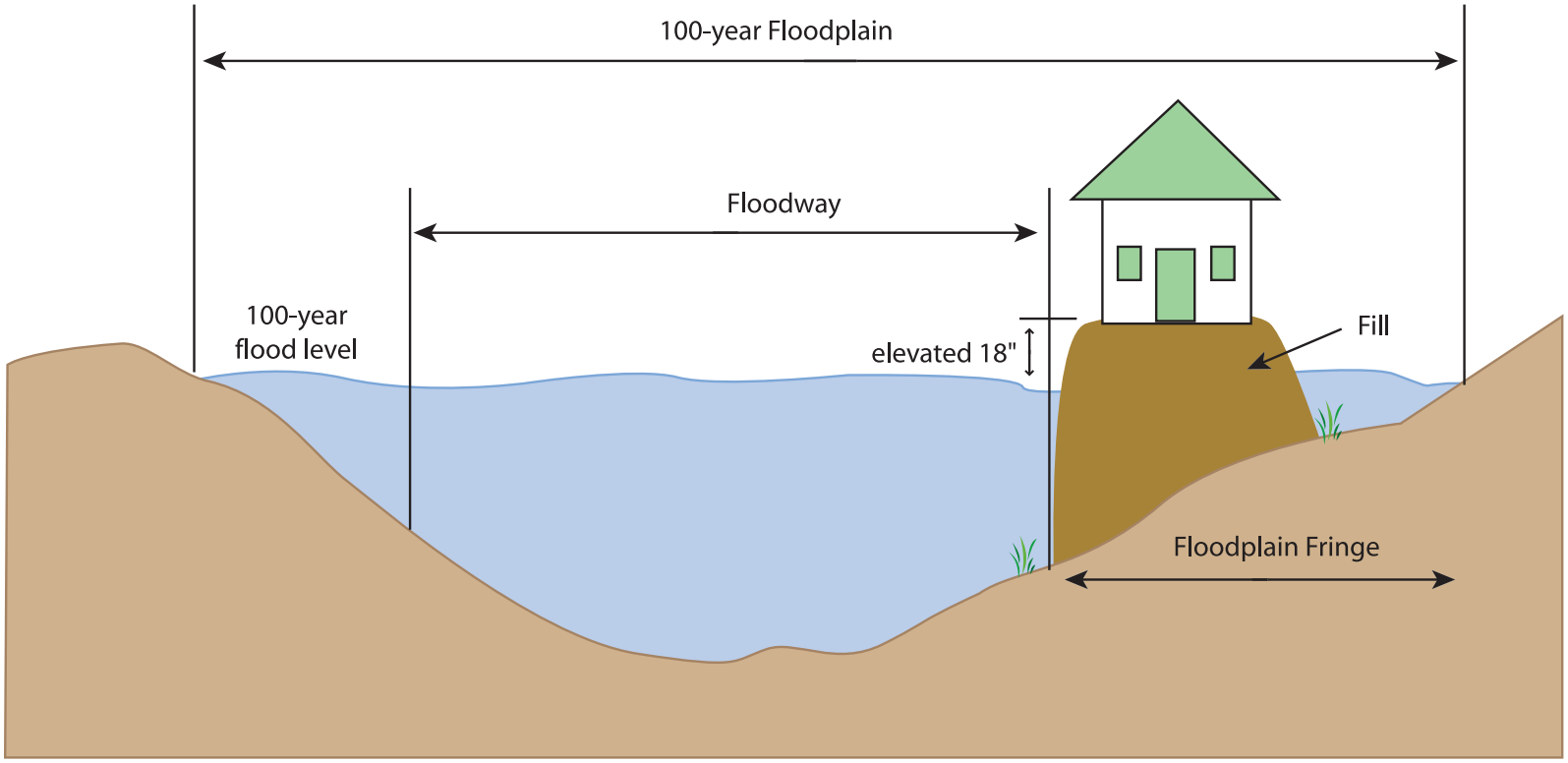
Critical facilities are not allowed in the floodplain fringe or floodway.



Examples of critical facilities

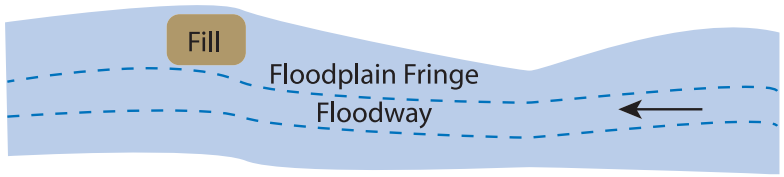
Letter of Map Revision Based on Fill

- A Letter of Map Revision Based on Fill (LOMR-Fill) is a FEMA process whereby a property in the flood fringe can be filled and is no longer considered in the floodplain for insurance requirements.
- A community must sign-off on the application to FEMA and certify that all existing and future structures will be "reasonably safe from flooding."
- To meet this "reasonably safe from flooding" standard, all floodplain requirements *(p. 8-9)* must be met even if fill is placed and the property is "removed" from the floodplain by FEMA.



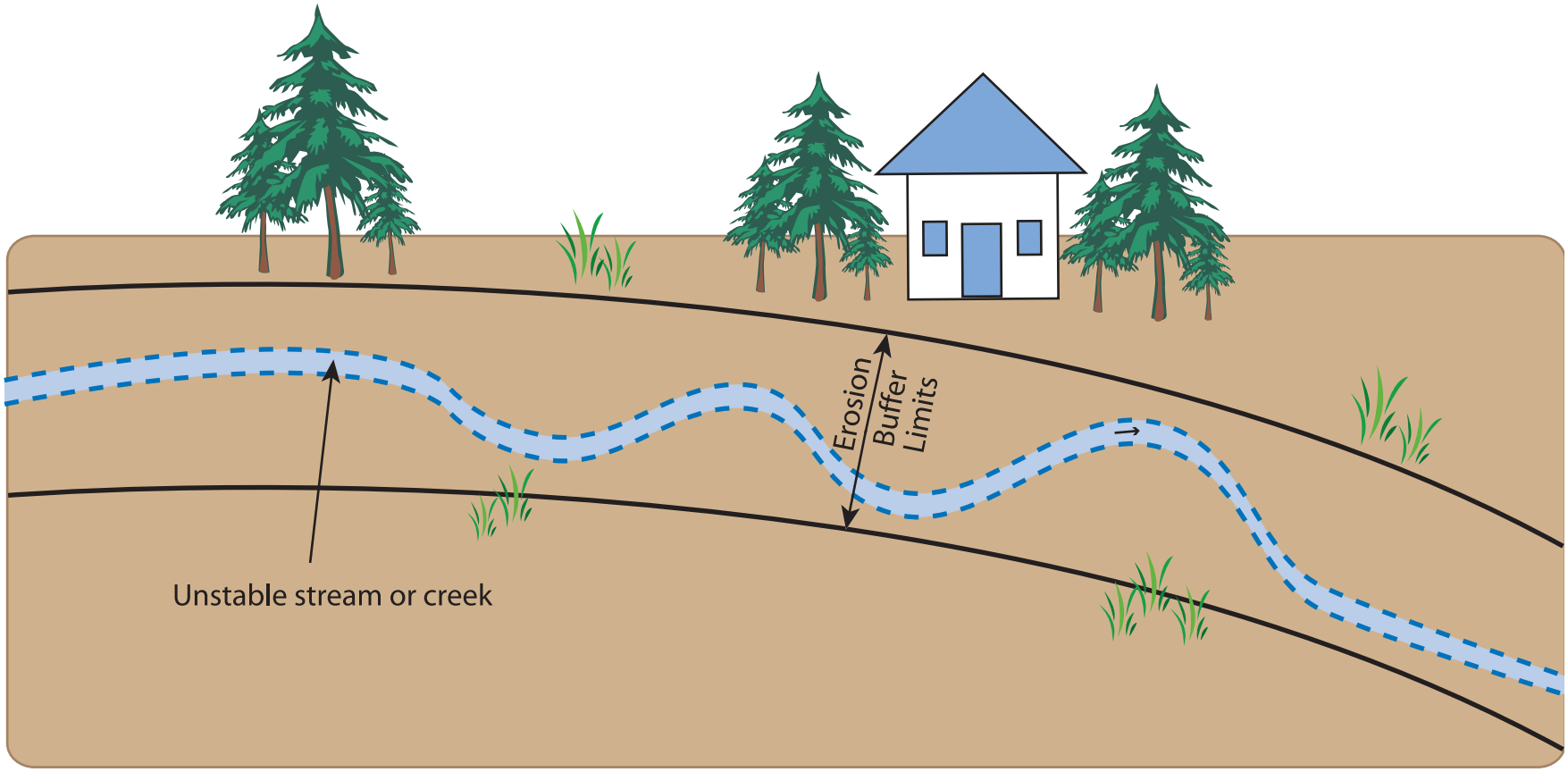
Example of fill placed in the flood fringe

Plan View:



Erosion Buffer Limits

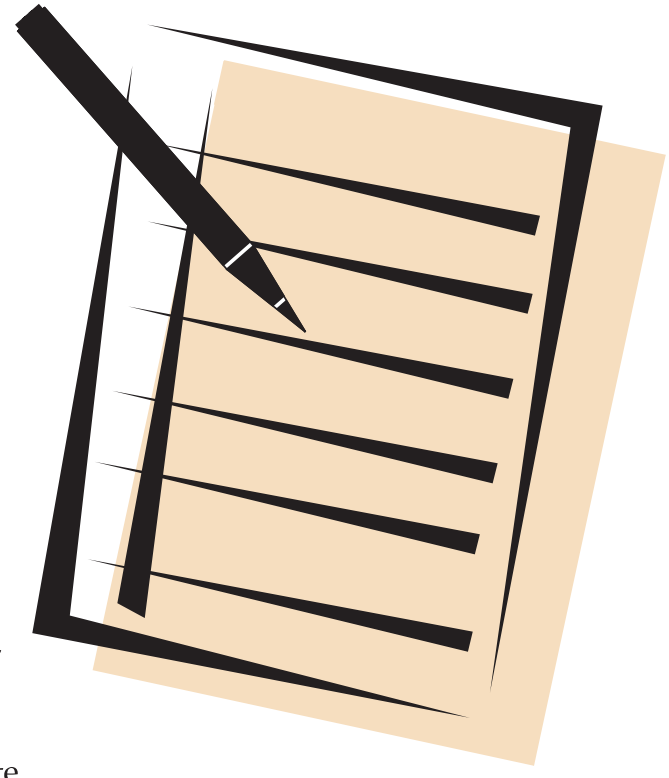
- Erosion hazard areas occur where the channel bed and banks are unstable, causing the stream to move over time.
- Migration is a natural characteristic of a stream. Some streams are more prone to migration than others depending on the type of material that makes up the bed and banks.
- Urbanization can have a pronounced impact on these natural processes, resulting in accelerated erosion.
- Erosion buffer limits have been delineated for those streams that are subject to severe erosion hazards. These include Fossil Creek, Boxelder Creek, McClellands Creek and Mail Creek.
- If development is restricted from these unstable areas, there will be less need in the future to defend the development from the stream. Defending the development may solve one problem but could create another upstream or downstream.



Requirements within erosion buffer limits

- Structures are not allowed.
- Irrigated grasses or shrubs are not allowed.
- Detention ponds or water quality ponds are not allowed.
- Parking lots are not allowed.
- Temporary or permanent storage of materials is not allowed.
- The area within the buffer must not be used for construction traffic for any development.
- All utilities must be kept out except for necessary stream crossings.
- Bike paths must be kept out except for necessary stream crossings.
- Road bridges must span the entire buffer limit. If there is no possibility of spanning the entire limit, the location crossing and design of abutments must be done so as to limit disturbance of the channel banks.
- Grading or excavation is not allowed in the buffer unless associated with a bridge or utility crossing as noted above.
- A stability study may be required.

Required Documentation and Submittals



(Note: Some items may require a registered professional engineer.)

Building Permit and Development Review Approval Requirements

- Floodplain Use Permit for **any** work being done on a structure or property in the floodplain. The permit fee is $25 or $325 if modeling is required.
- Building plans showing foundation design, flood elevation, floor elevations, HVAC elevations, size and locations of vents, floodproofing design and other relevant information.
- Floodplain Modeling Report if doing a floodway modification *(p. 5)*. (See separate modeling guidelines handout.) No-Rise certification may be required.
- Other plans or reports to document information such as grading, fill, channel stability and floodplain boundaries.

Certificate of Occupancy Approval Requirements

- FEMA Elevation Certificate or FEMA Floodproofing Certificate for any new structure, addition, substantial improvement or redevelopment built in any floodplain. Allow two weeks for review and approval. Requires licensed surveyor or engineer for elevation certificate; requires licensed engineer or architect for floodproofing certificate.
- Grading certification if working in the floodway.
- As-built modeling report, if applicable.

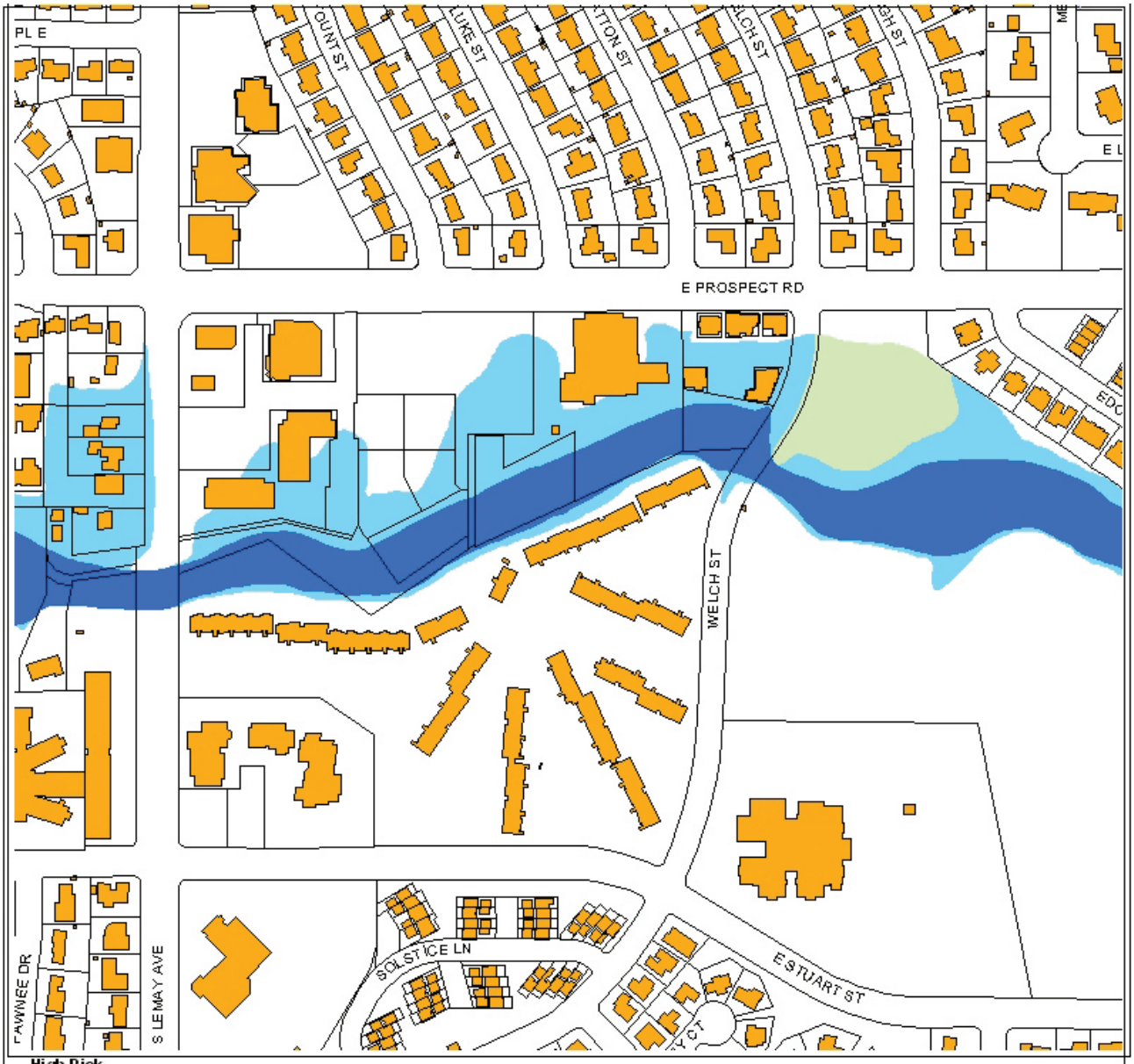
Variances

The Fort Collins Water Board has the authority to issue variances to the floodplain regulations if certain requirements are met. The Board meets the fourth Thursday of the month. An application packet must be submitted three weeks prior to the board meeting, with a $325 application fee. (See separate variance submittal handout for documentation and justification requirements.)

Floodplain Determinations and Assistance

Call Fort Collins Utilities at (970) 221-6700 or e-mail utilities@fcgov.com to determine if a property is in the floodplain or to discuss floodplain regulations. More information about floodplain managment in Fort Collins is availalbe at www.fcgov.com/stormwater/fldplain.php.

Example of Flood Risk Map



High Risk

Poudre River 500-year Product Corridor (Depth x Velocity >= 6)

Floodway - Area of 100-year floodplain with greatest depths and fastest velocities.

Flood Fringe - May Include:
- Areas of FEMA 100-year floodplain (FEMA Zones A, AE, AO, and AH)
- Areas of City 100-year floodplain including ponding areas and sheet flow areas with average depths of 1-3 feet.

There is a 1% annual chance that these areas will be flooded.

Moderate Risk

May include:
- Areas of FEMA 500-year floodplain (FEMA Zone X-shaded).
- Areas of FEMA or City 100-year floodplains (sheet flow) with average depths of less than 1 foot.
- Areas protected by levees from the 100-year flood.

Low Risk

Areas outside of FEMA and City mapped 100-year and 500-year floodplains. Local drainage problems may still exist.

Example Flood Risk Map

This information is based on the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) and the City of Fort Collins Master Drainageway Plans. This letter does not imply that the referenced property will or will not be free from flooding or damage. A property not in the Special Flood Hazard Area or in a City Designated Floodplain may be damaged by a flood greater than that predicted on the map or from a local drainage problem not shown on the map. This map does not create liability on the part of the City, or any officer or employee thereof, for any damage that results form reliance on this information.

All floodplain boundaries are approximate.

N W E S

0 95 190 380 Feet