City of Fort Collins

Floodplain Regulations for the Poudre River

Quick Guide

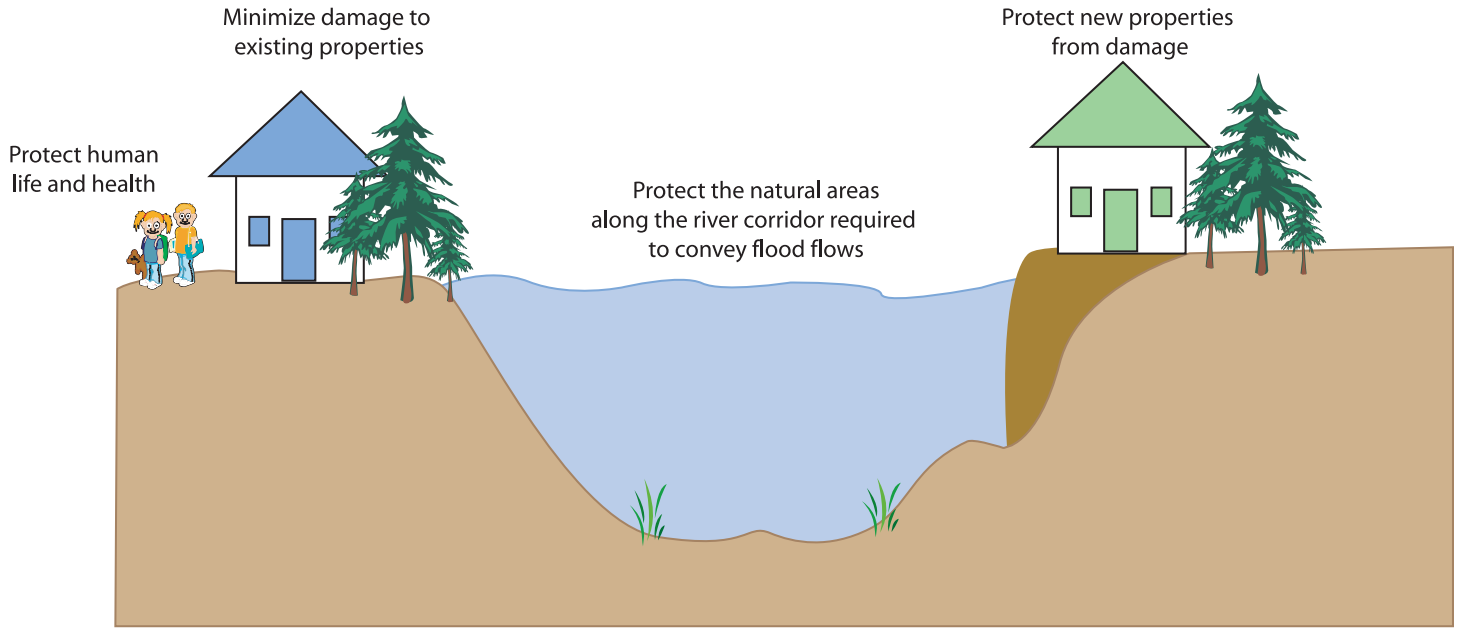
Note: This guide was prepared as an educational tool to help explain portions of the floodplain regulations, and is not intended as a complete or detailed explanation of the legal requirements that may apply to a particular property. Article II of Chapter 10 of the *City Code* specifies the requirements 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

3/09

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**

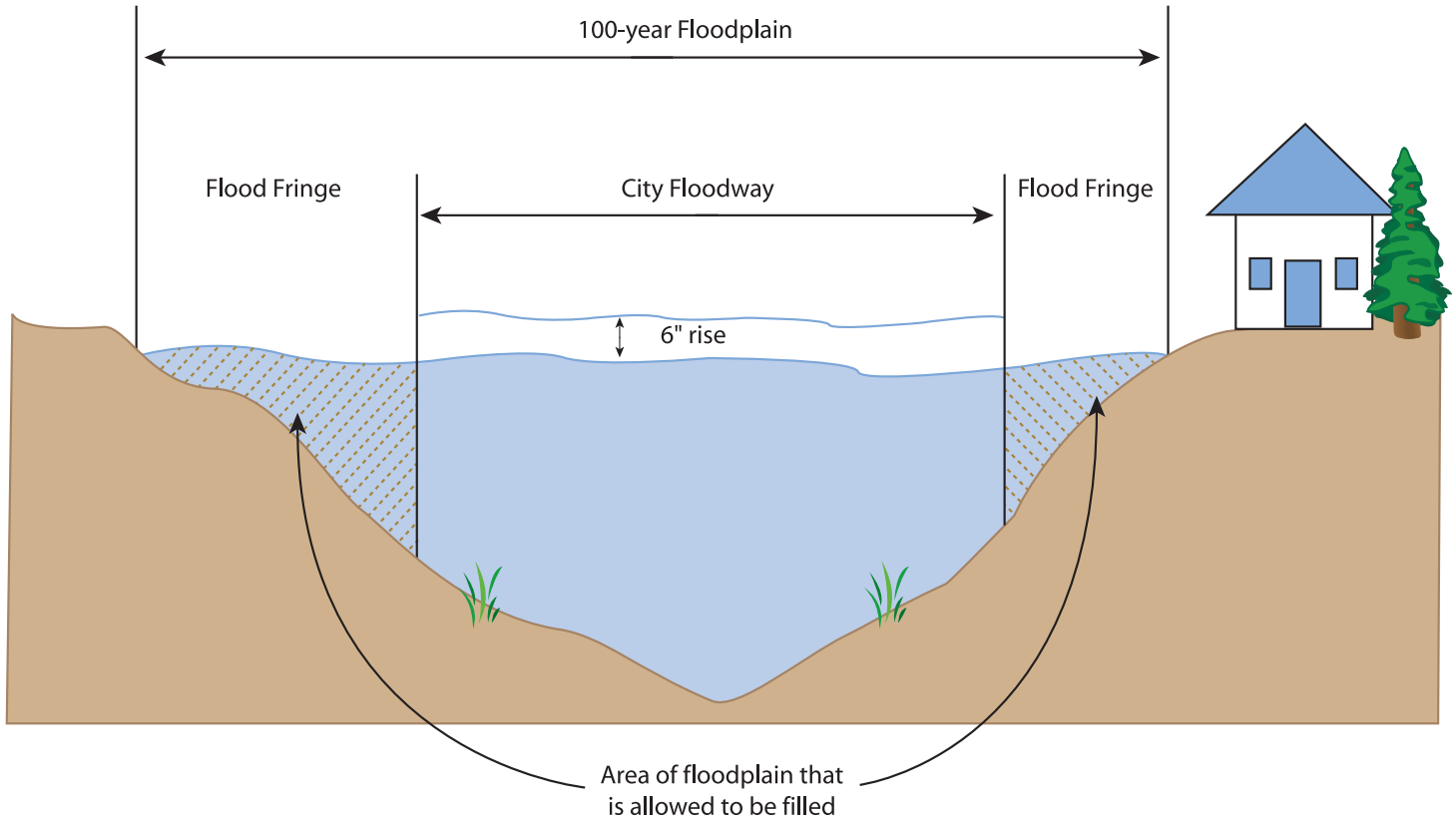
Types of Floodplains

- 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 causes no-rise in the 100-year flood level.
- In the Poudre River floodplain, the applicant must submit information to FEMA for approval before and after construction if the boundaries of the floodplain or floodway change.
- If the applicant's project causes a rise, 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.
- The floodway modification will be evaluated based on broad criteria, including:

  –effects upon lands upstream, downstream and in the immediate vicinity;

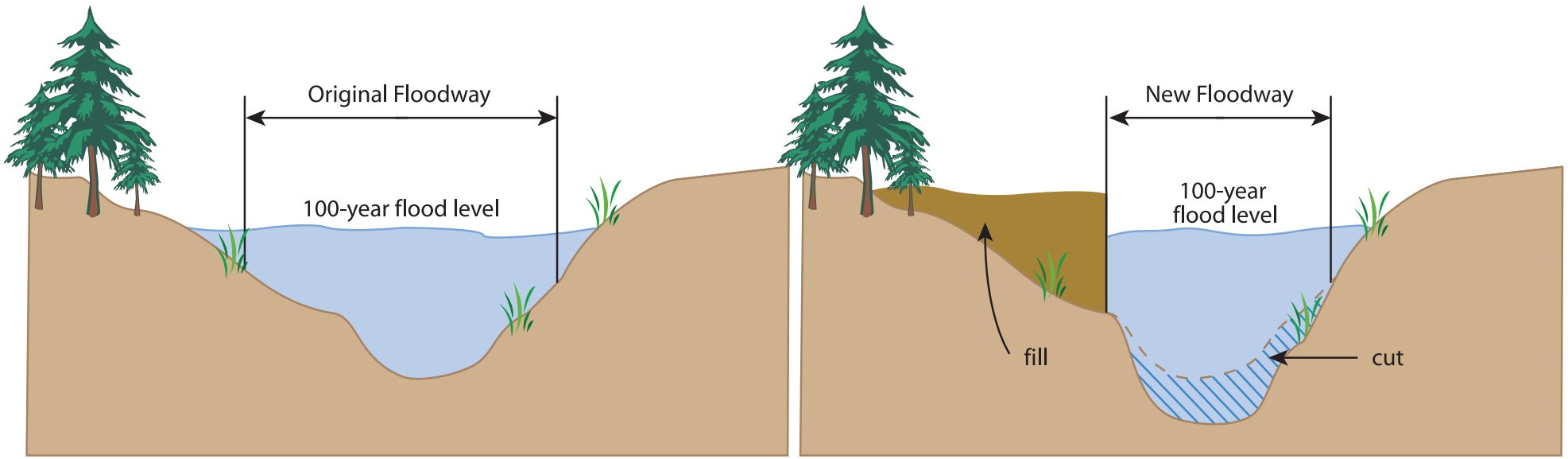
  –effects upon the 100-year flood and channel stability;

  –any adverse environmental effects on the watercourse, including bank erosion, streamside trees, vegetation and wildlife habitat;

  –any adverse effects on the flood elevation, velocities, rate of rise, channel stability and sediment transport; and

  –protection of the natural areas required to convey flood flows and retain flow characteristics.

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 not allowed.
- Detached garages and sheds are not allowed.

Non-Residential Development

- New non-residential development is not allowed.
- Fill is not allowed unless the applicant can show no-rise *(Floodway Modifications, p. 5).*
- Non-residential additions are not allowed.
- 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 not allowed.
- Detached garages and sheds are not allowed.

Mixed-Use Development (Residential and Non-Residential in the same building)

- New mixed-use development is not allowed.
- Fill is not allowed unless the applicant can show no-rise *(Floodway Modifications, p. 5*).
- Additions are not allowed to a mixed-use structure.
- Remodels are allowed subject to the substantial improvement requirements (*p. 14-16*).
- Redevelopment (rebuild) of an existing structure is not allowed.
- Detached garages and sheds are not allowed.

Summary of Floodway Development Regulations *(continued)*

Residential Development

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

Non-Residential Development

- Critical facilities are not allowed *(See proposed alternatives on p. 18)*.
- New basements are not allowed below the freeboard level *(p. 10-11)*. An existing basement in a substantially improved structure can remain if floodproofed *(p. 10-11 and 14-16)*.
- New outside storage of material or equipment, including flotable materials, is not allowed *(p. 20)*.

Mixed-Use Development (Residential and Non-Residential in the same building)

- Critical facilities are not allowed *(See proposed alternatives on p. 18)*.
- New basements are not allowed below the freeboard level *(p. 10-11)*. An existing basement in a substantially improved structure is not allowed to remain if it is in residential use *(p. 10 and 14-15)*. An existing basement in a substantially improved structure is allowed to remain if it is in non-residential use and floodproofed *(p. 10-11 and 14-16)*.
- New outside storage of material or equipment, including flotable materials, is not allowed *(p. 20)*.

Summary of Floodplain Fringe Development Regulations

Residential Development

- New residential development is not allowed.
- Fill is allowed.
- Residential additions are not allowed.
- 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 *(p. 10).*
- Attached garages are not allowed. Detached garages and sheds are allowed *(p. 17).*
- Critical facilities are not allowed *(See proposed alternatives on 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 buildings (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. *(p. 10-11).*
- Attached garages, detached garages and sheds are allowed *(p. 17).*
- Critical facilities are not allowed *(See proposed alternatives on p. 18).*

Mixed-Use Development (Residential and Non-Residential in the same building)

- New mixed-use development is not allowed.
- Fill is allowed.
- Residential additions are not allowed to a mixed-use structure. Non-residential additions are allowed to a mixed-use structure. 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 *(p. 10-11).*
- Attached garages, detached garages and sheds are allowed *(p. 17).*
- Critical facilities are not allowed *(See proposed alternatives on 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 outside storage of equipment or materials that are considered "floatable" is not allowed *(p. 20)*.
- 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 (Residential and Non-Residential in the same building)

- New outside storage of equipment or materials that are considered "floatable" is not allowed *(p. 20)*.
- 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)*.

Summary of 500-Year Floodplain Development Regulations

Residential Development

- Life-safety and emergency response critical facilities are not allowed (*p. 18*).

Non-Residential Development

- Life-safety and emergency response critical facilities are not allowed (*p. 18*).

Mixed-Use Development Residential and Non-Residential in the same building)

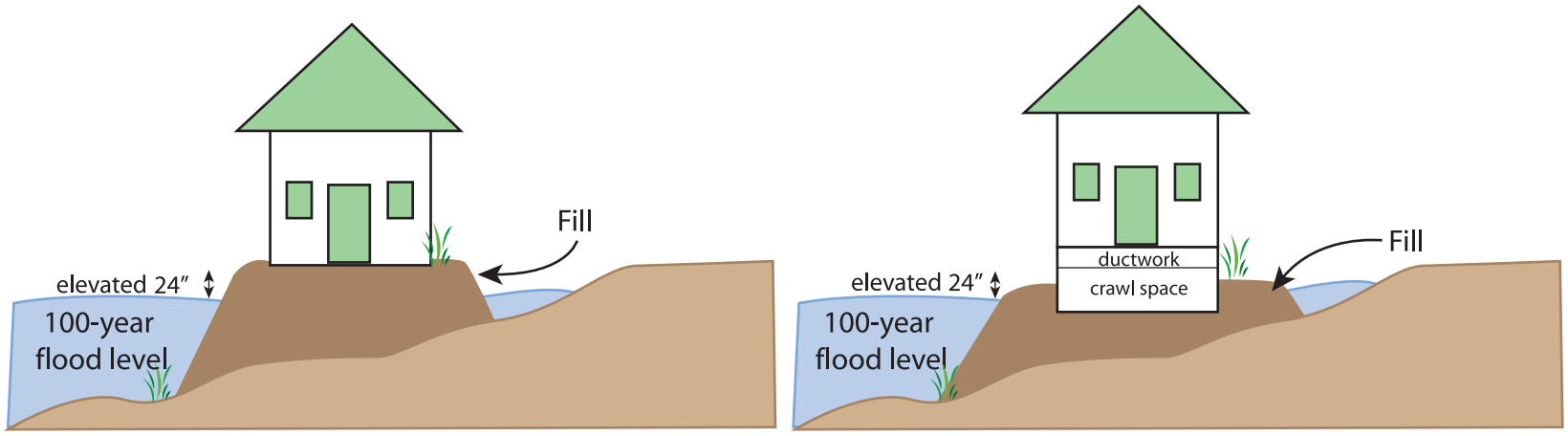
- Life-safety and emergency response critical facilities are not allowed (*p. 18*).

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 is 24 inches;
- 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.



Slab on grade foundation **Crawl space foundation**

Example of redevelopment residential elevation

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

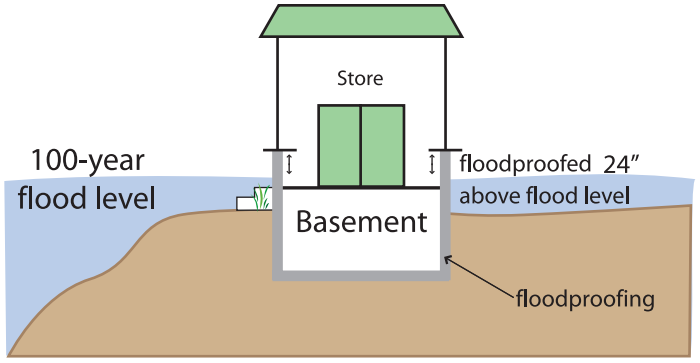
Floodproofing uses various techniques to make a building water tight:

- **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.

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

- Freeboard is 24 inches;
- 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.

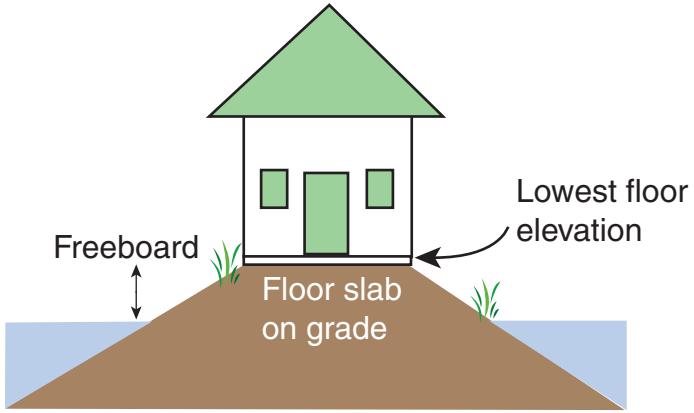


Example of new development non-residential floodproofing

Determination of Lowest Floor Based on Type of Foundation

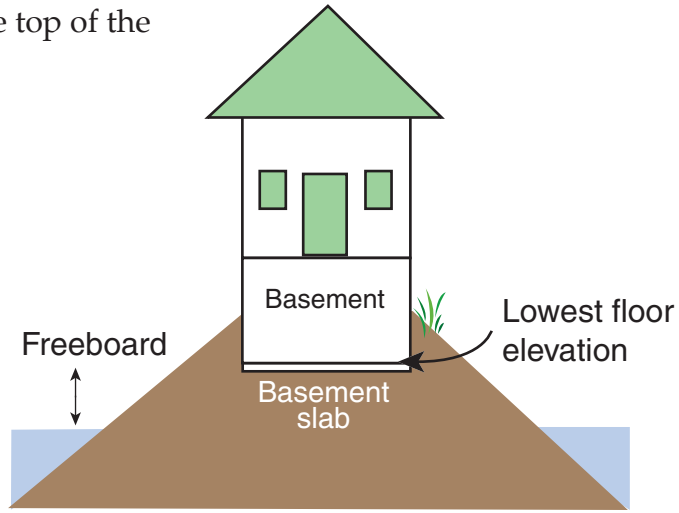
Slab on Grade

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



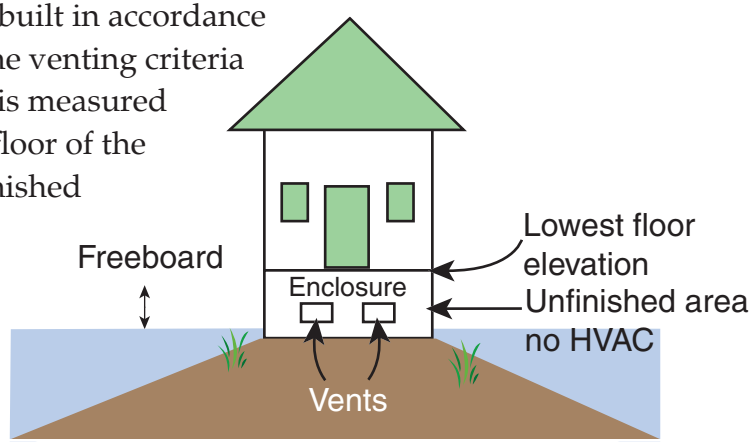
Basement

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

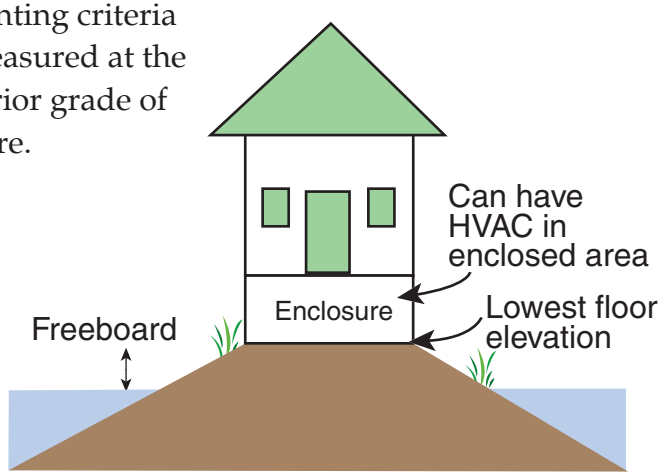


Enclosure (above grade crawl space)

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;

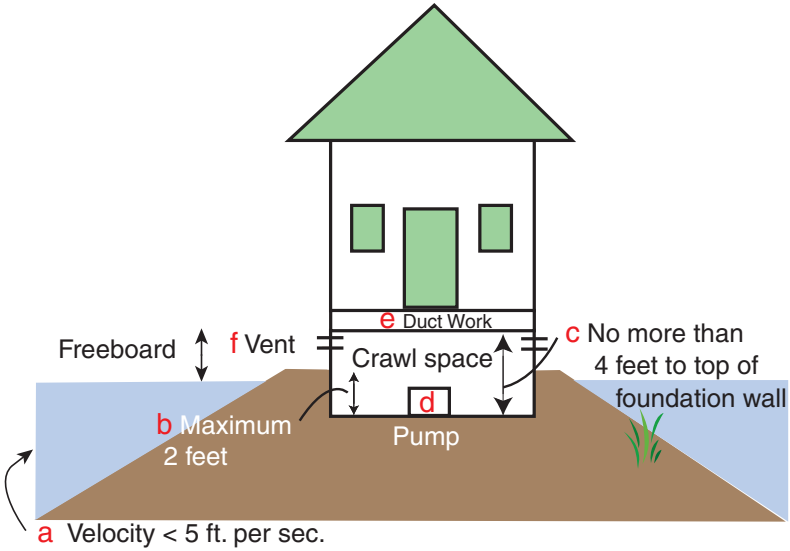
c. The height of the crawl space, as measured from the lowest interior grade of the crawl space to the top of the foundation wall, does not exceed 4 feet at any point;

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

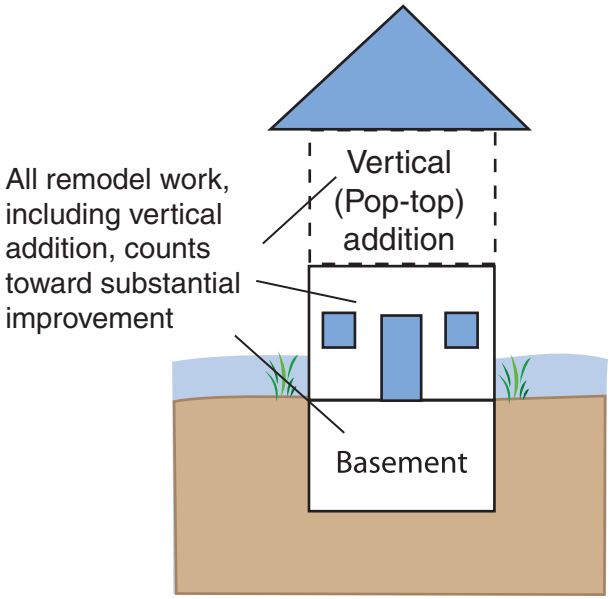
f. Venting requirements *(p. 17)* are met.

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

- 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).*



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 cumulatively over the life of the structure.

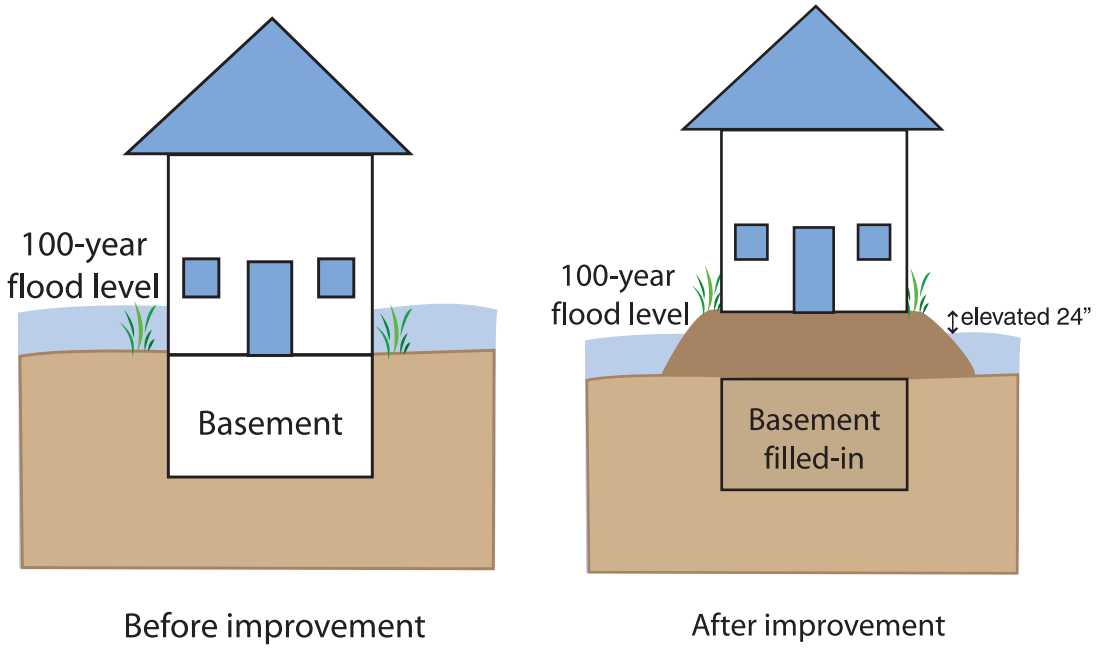
A substantial improvement policy ensures that non-conforming structures are brought into conformance over time and are therefore protected from flood damage and the risk to occupants is reduced.

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 24 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 24 inches above the flood elevation. After improvements, the structure will be protected from flood damage.



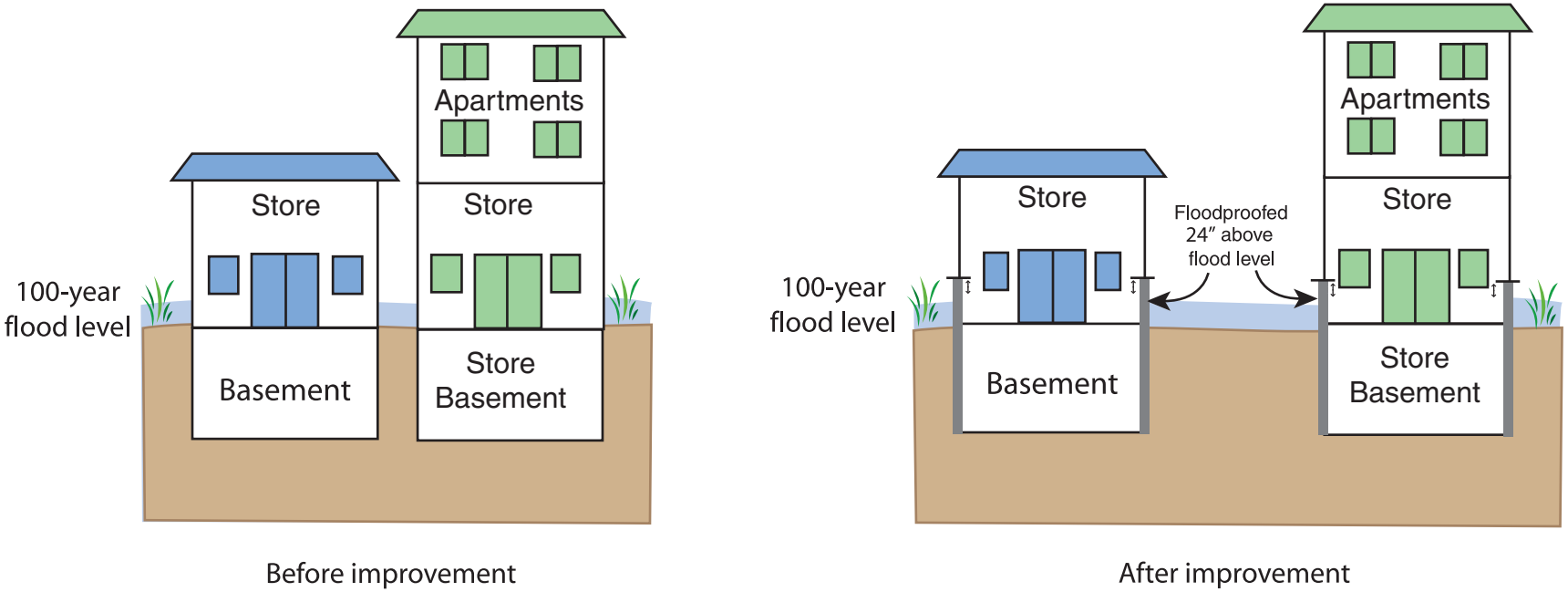
Example of residential substantial improvement or redevelopment

Substantial Improvement and Redevelopment *continued*

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

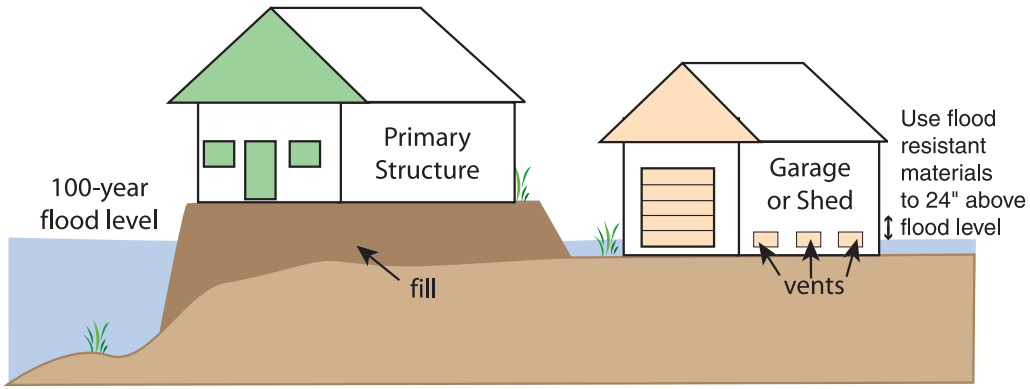
If a ***substantial improvement*** occurs, the lowest floor *(p. 12-13)* of a non-conforming structure, including the basement and all HVAC and electrical, must be elevated or floodproofed 24 inches above the flood elevation. After improvements, the structure will be protected from flood damage.

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 24 inches above the flood elevation. After improvements, the structure will be protected from flood damage.

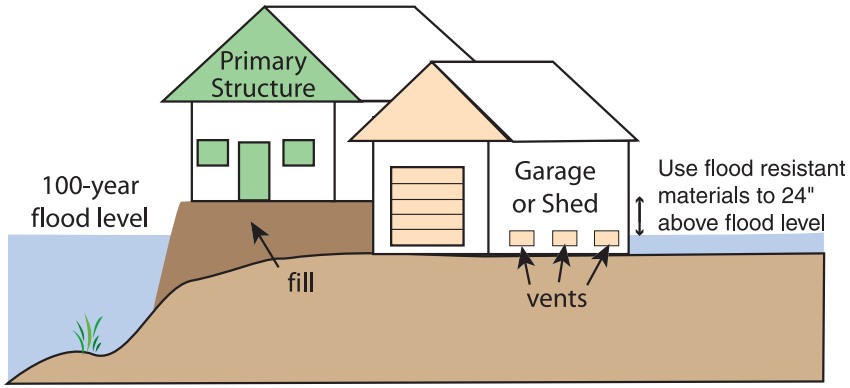


Example of non-residential and mixed-use substantial improvements or redevelopments

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;
- All HVAC and electrical must be elevated to the freeboard level *(p. 10-11)*;
- Can either elevate to freeboard level *(p. 10-11)* or be built at grade; and
- 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; and
  - Flood resistant materials must be used below 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

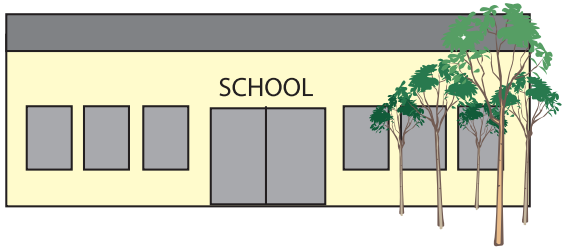
100-year floodplain:

- All critical facilities not allowed in the 100-year floodplain.

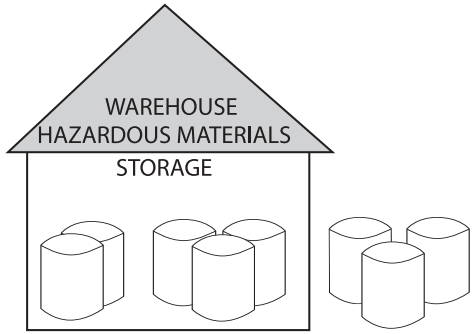
500-year floodplain:

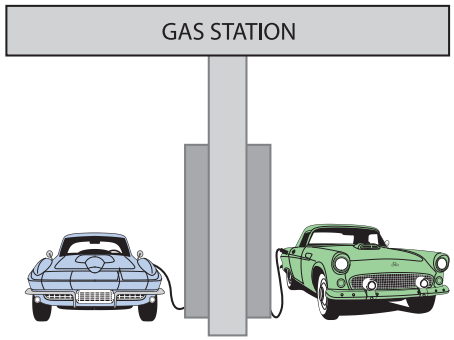
- Life-safety and Emergency Response critical facilities are not allowed in the 500-year floodplain.

Life-safety And Emergency Response Critical Facilities Examples



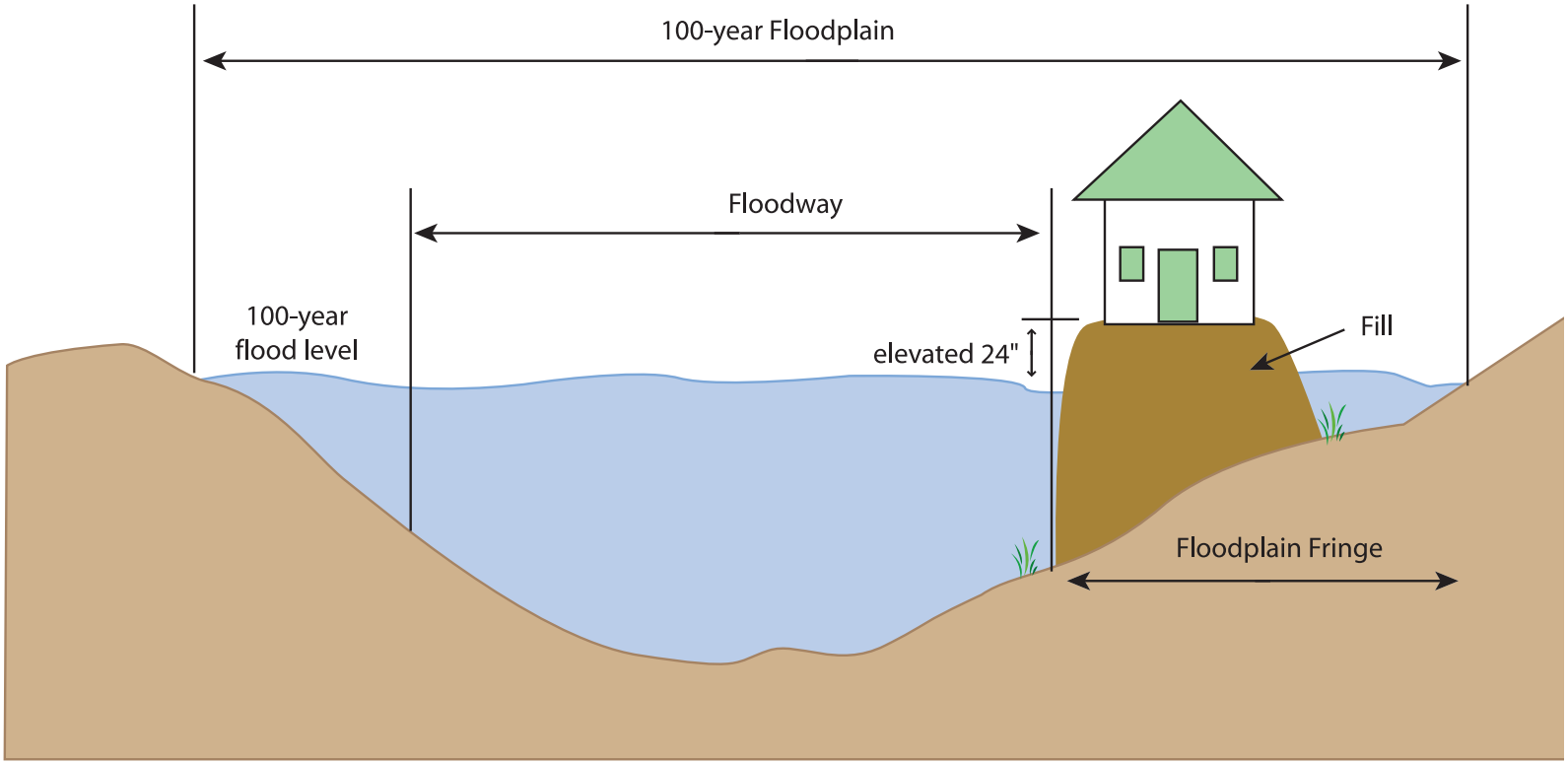
Hazardous Materials Critical Facilities Examples





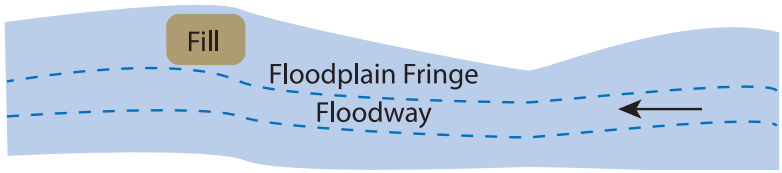
Letter of Map Revision Based on Fill

- 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

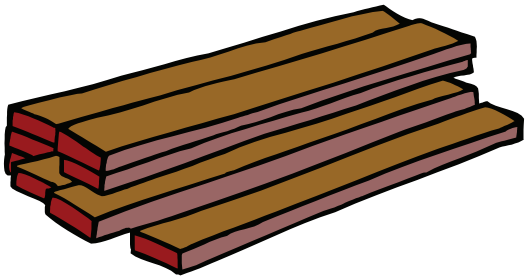
Plan View:



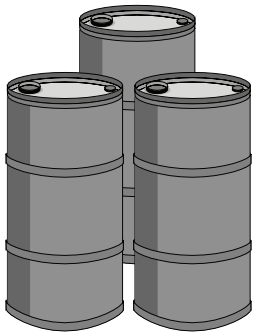
Outside Storage of Materials or Equipment and Floatable Materials

- "Floatable material" is defined as material that is not secured in place or completely enclosed in a structure so that it could float off-site during a flood and potentially cause harm to downstream property owners or that could cause blockage of a culvert, bridge or other drainage facility.
- In the floodway, all outside storage of material or equipment, including floatable materials, associated with any non-residential use is not allowed.
- In the flood fringe, floatable materials associated with any non-residential use is not allowed.
- In the flood fringe, outside storage of material or equipment that is not considered "floatable material" is allowed.

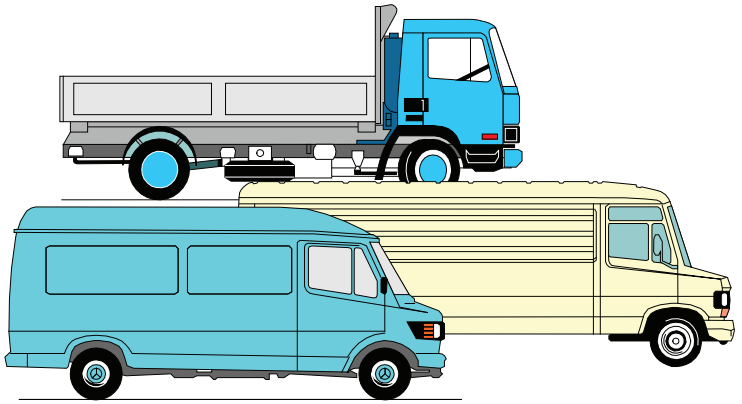
Stacks of Lumber



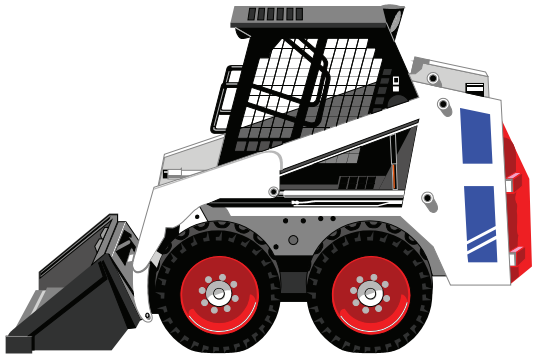
Containers and Drums



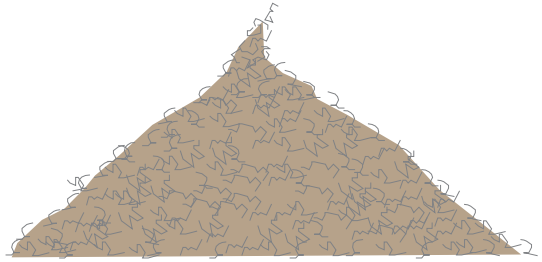
Fleet Vehicles



Equipment



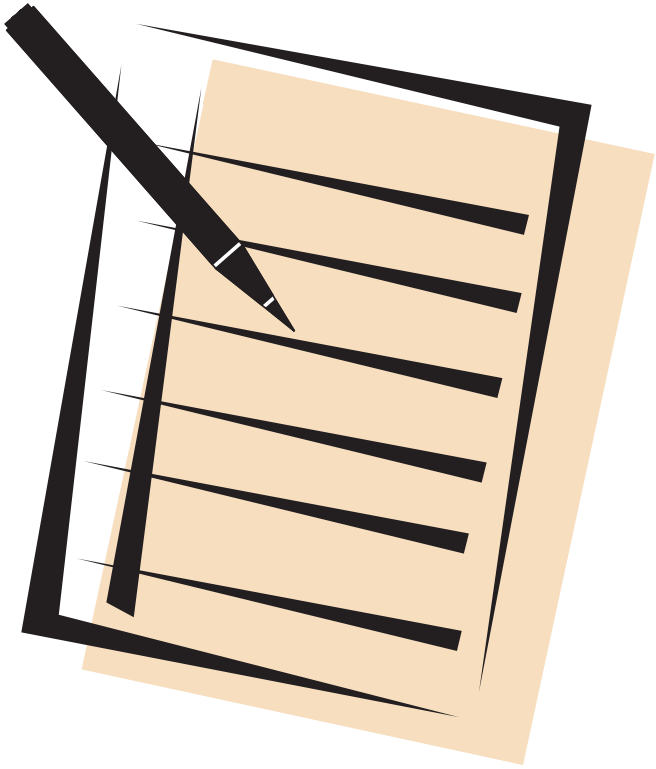
Material Stockpile



All of these examples are floatable materials if not adequately secured.

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.

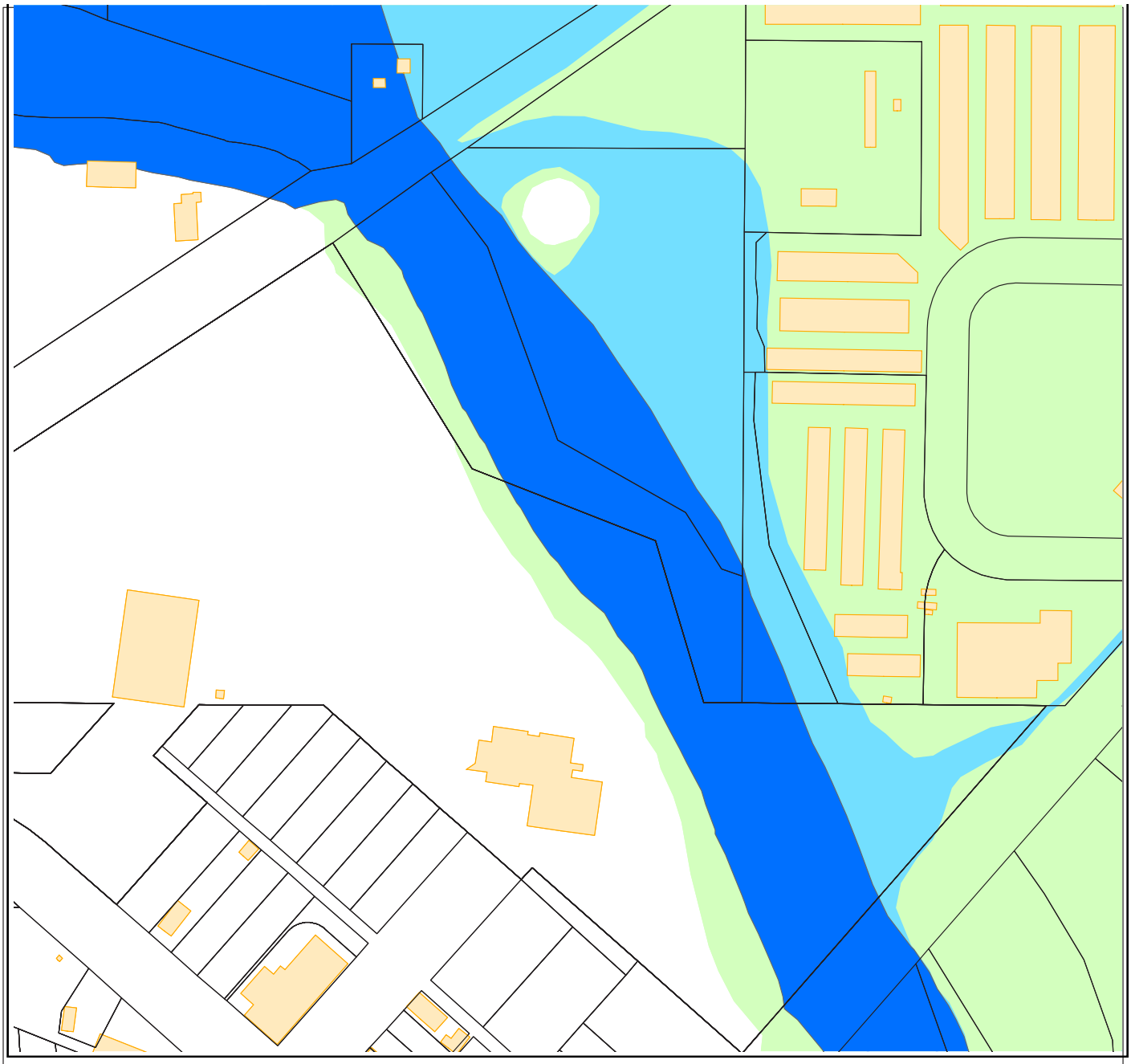
Variances

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

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 floodplain (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 of 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 from reliance on this information.

All floodplain boundaries are approximate.

N

0 60 120 240 Feet