PHILADELPHIA - REGULATIONS & PROCESSES FOR DEVELOPMENT IN THE SPECIAL FLOOD HAZARD AREA

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UPDATE: 12.2018
CITY OF PHILADELPHIA
FEMA FLOODPLAINS

Land Use | Sq. Mi. | %
---|---|---
Residential Low Density | 0.1 | 0%
Residential Medium Density | 0.2 | 1%
Residential High Density | 0.4 | 1%
Commercial | 0.6 | 2%
Industrial | 4.9 | 16%
Civic/Institution | 0.3 | 1%
Transportation | 5.5 | 18%
Culture | 1.3 | 4%
Park/Open Space | 3.8 | 12%
Water | 11.5 | 37%
Vacant Land/Other | 2.1 | 7%

Special Flood Hazard Area (SFHA)
0.2% Annual Chance Flood Hazard

5,756 EXISTING STRUCTURES

PUBLIC
11.35 ACRES

PRIVATE
253.46 ACRES

[Map and data sources: Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors, and the GIS user community]
"Living with floods involves two broad activities: better managing the risks and taking steps to reduce our vulnerability, and better managing the landscape to reduce the magnitude of destructive power of floods."

--Connie Mutel, A Watershed Year: Anatomy of Iowa Floods of 2008

Flood-prone areas are managed by restricting development in the floodway, but allowing development in the floodway fringe.

Rural areas produce flood causing runoff at a slower rate than do urban areas.

The ground water table is connected to rivers but experiences a delayed response to flood waters. Ground water rises in a flood event.
CITY OF PHILADELPHIA
CLIMATE CHANGE FLOODING

- Sea level rise
- Severe storm
CITY OF PHILADELPHIA
INFRASTRUCTURE FLOODING

- Stormwater
- Sewers
BACKGROUND - NATIONAL FLOOD INSURANCE PROGRAM [NFIP]

Created by the National Flood Insurance Act of 1968

- Participation is voluntary
  - Adopt and enforce regulations
  - Eligible for flood insurance

- Benefits of participation:
  - Flood insurance
  - Grants and loans
  - Disaster assistance
  - Federally-backed mortgages
COST OF FLOOD INSURANCE

WHY YOU NEED FLOOD INSURANCE

1 INCH of water damage = $21,000 in property damage
(2,000 sq.ft. home, on average)

$50 BILLION in economic losses are incurred each year due to flooding

FLOODS: #1 natural disaster in the US

$42,000 average flood insurance claim

26 major flood disasters in 2015

ONLY 14% of homeowners have flood insurance
COST OF FLOOD INSURANCE -
PHILADELPHIA EXAMPLE

• Above diagram is based on a 2,500 SF townhouse in Philadelphia located in the Special Flood Hazard Area.

• Buildings principally over water cannot get insurance through NFIP (IE. pier construction)
COST OF FLOOD INSURANCE -
Losses and Insurance

Repetitive Loss Properties

NFIP Policies (+/- 4,200)
NFIP ROLE: Federal and State

FEDERAL

• National program oversight
• Risk Identification (mapping)
• Establish development/building standards
• Provide insurance coverage

STATE

• State program oversight
• Establish development/building standards
• Provide technical assistance to local communities/agencies
• Evaluate and document floodplain
**NFIP ROLE:**
City of Philadelphia [Local]

**Local Officials and Floodplain Administrators**
[Licenses & Inspections, Planning Commission, Floodplain Manager]

- Adopt and enforce floodplain management ordinance compliant with Federal/State laws
- Issue or deny development
- Inspect development and maintain records
- Make substantial damage determinations
- Regulations apply to Special Flood Hazard Area (SFHA) on the Flood Insurance Rate Map (FIRM)
- Development oversight is a local responsibility our local regulations are located in the Zoning and Building Codes
FEMA COMMUNITY ASSISTANCE VISIT [CAV]

- Audit of the last 5 years of building permits issued in the special flood hazard area (SFHA)
- Tour of all SFHA’s throughout the City for non-permitted development
- Review of the City “floodplain program”

RESULT:
- Over 150 possible violations were discovered and additional documentation is required for full compliance with the regulations
- Violations may lead to the City being placed on Probation
  - $50 surcharge to policy holders (approx. 4,200 policy holders)

UPDATE:
- +/- 40 still in review/mitigation
- Mostly documentation requests (Elevation Certificates, cost estimates, etc)
Failure to adopt a compliant ordinance by map effective date or having non-compliant ordinance = easiest way to get suspended

• Serious ramifications:
  • Suspension of NFIP eligibility
    • No mortgages or home equity loans in floodplain areas
    • No renewals of existing flood insurance policies
    • Loss of most forms of Disaster Assistance
    • No federal grants or loans
    • Loss of subsidized insurance for Pre-FIRM structures
FLOOD HAZARD INFORMATION
FEMA FLOOD MAP SERVICE CENTER

msc.fema.gov

FEMA Flood Map Service Center: Search By Address

Enter an address, place, or coordinates:
philadelphia pa

Search

Search Results—Products for PHILADELPHIA, CITY OF

The flood map for the selected area is number 4207570183C, effective date 01/17/2007.

Dynamic Map
Print Map / Firmette

Create Firmette - 8.5x11" Print of property on FIRM Map
Firm Date
FIRM Panel #
FIRMette with mapped floodway

National Flood Hazard Layer FIRMette

- SPECIAL FLOOD HAZARD AREA - regulated by City of Philadelphia
- CROSS SECTION - w/BFE
- ZONE AE - FLOODWAY
- ZONE AE
- 0.2% (not regulated)
FIRMette w/o mapped floodway [Coastal Flood Hazard]

- areas mapped with a LiMWA, must comply with Coastal A Zone codes/regulations

National Flood Hazard Layer FIRMette

SPECIAL FLOOD HAZARD AREA - regulated by City of Philadelphia

COASTAL FLOOD HAZARD ZONE AE

0.2% (not regulated)

LiMWA - limit of moderate wave action
FLOOD INSURANCE STUDY [FIS]

Riverine flood profile to determine BFE

Legend

- 0.2% Annual Chance Flood
- 1% Annual Chance Flood
- 2% Annual Chance Flood
- 10% Annual Chance Flood
- Stream Bed
- Cross Section Location

Flood Profiles from Flood Insurance Study reports can be used to determine the BFE at a specific site. Profiles also show estimated water surface elevations for floods other than the 1% annual chance flood (100-year).

1. On the effective flood map, locate your site by measuring the distance, along the profile baseline of the stream channel, from a known point such as a road or cross section, for example, JM or JN.

2. Scale that distance on the Flood Profile and read up to the profile of interest, then across to determine the BFE, to the nearest 1/10 of a foot. (Answer: 123 feet.)

*New Jersey Flood Hazard Area Design Flood (NJFHADF) is equal to the Base Flood plus 25% in flow, not to exceed 0.2% annual chance flood.
FEMA FLOOD MAP SERVICE CENTER
Previous FIRM maps and Flood Insurance Profiles [FIS]

msc.fema.gov

Search Results—Products for PHILADELPHIA, CITY OF

The flood map for the selected area is number 4207570183G, effective on 01/17/2007.

Please Note: Searching All Products by county displays all products for all communities within the county. You can refine your search results by specifying your specific jurisdiction location using the drop-down menus above.

- Effective Products (89)
- Preliminary Products (0)
- Pending Product (0)
- Historic Products (139)
- Flood Risk Products (5)

SEE all effective and historic maps and profiles
Firmette
Print version (previous)
CODES + REGULATIONS

**TITLE 14. ZONING AND PLANNING**

Editor’s note: To view the historical version of Title 14 (repealed as of August 22, 2017), please click [here](#).

**Prelace** Bill No. 110865

**Chapter 14.100. General Provisions**


14.182. Citation and Title.

14.183. Authority.

1. Duty

2. Construction Authority

3. Department of Licenses & Inspections

4. Zoning Board of Adjustment.

14.184. Applies

1. Apply

2. Compl

3. Propo

14.185. Repeals

1. The C

2. Ams

3. Adop

14.186. Zoning

1. Zone

2. Offic

3. Boun

4. Mali

14.187. Review

1. File

2. Revis

3. Revise

14.188. Repeals

1. Confo

DEPARTMENT OF LICENSES AND INSPECTIONS

**CODE BULLETIN**

No. A-1000

DEVELOPMENT IN SPECIAL FLOOD HAZARD AREAS

**IBC**

INTERNATIONAL BUILDING CODE®

No. A-1010

FEMA NATIONAL FLOOD INSURANCE PROGRAM

No. A-1020

A-1030

A-1040

A-1050

A-1060

DATE: 04.24.17

PAGE 24 OF 6

PURPOSE

The purpose of this Code Bulletin is to establish the required documentation to be submitted for approval of permits and Certificates of Occupancy for any development in Special Flood Hazard Areas (SFHA).

**DISCUSSION**

The growing demand for Codes and supporting software for the National Flood Insurance Program (NFIP) has led to a significant increase in the number of permits and Certificates of Occupancy (COs) required for development in Special Flood Hazard Areas (SFHA). The National Flood Insurance Program (NFIP) is the only program in the United States that provides comprehensive flood insurance to homeowners and businesses in communities that participate in the NFIP. The NFIP is managed by the Federal Emergency Management Agency (FEMA).

In 2015, the National Flood Insurance Management Program (NFIP) was updated to include new requirements for development in SFHAs. These requirements include the submission of documentation to support the approval of permits and Certificates of Occupancy (COs) for development in SFHAs.

**SCOPED**

This Code Bulletin serves to address specific technical elements of the IBC as of the 2017 NFIP.

**FEMA-Indiana Guidelines**

The City of Indianapolis must submit their floodplain regulations to FEMA for approval. These guidelines must be consistent with the NFIP requirements. The City of Indianapolis must ensure that their floodplain regulations are consistent with the requirements of the NFIP for the approval of permits and Certificates of Occupancy for development in Special Flood Hazard Areas (SFHA).

**IBC Appendix G - Flood-Resistant Construction**

- Addresses flood-related administrative requirements
- The only place in the I-Code that addresses development other than buildings

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<thead>
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<th>G101 Administration</th>
<th>G501 Manufactured Homes</th>
</tr>
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<td>G601 Recreational Vehicles</td>
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<td>G103 Powers and Duties</td>
<td>G701 Tanks</td>
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<td>G104 Permits</td>
<td>G801 Other Building Work</td>
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<td>G105 Variances</td>
<td>G901 Temp. Structures &amp; Temp Storage</td>
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<tr>
<td>G201 Definitions</td>
<td>G1001 Utility &amp; Miscellaneous Group</td>
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</tbody>
</table>
DEFINITION OF DEVELOPMENT in Special Flood Hazard Areas [SFHA]

- development located in flood hazard areas, including the subdivision of land; installation of utilities; placement and replacement of manufactured homes; new construction and repair, reconstruction, rehabilitation or additions to new construction; substantial improvement of existing buildings and structures, including restoration after damage; temporary structures and temporary or permanent storage; utility and miscellaneous buildings and structures
NFIP
Key Dates

PRE-FIRM
BUILT BEFORE DECEMBER 31, 1979
or structures mapped into SFHA's post construction, see historical FIRM maps

POST-FIRM
BUILT AFTER DECEMBER 31, 1979

- December 31, 1979 to August 2012 = BFE+12”
- September 2012 to present = BFE+18”

Although NFIP was created in 1968 the City of Philadelphia joined on December 31, 1979

Regulations do not apply unless substantially improved, but mitigation is always highly suggested

MUST maintain compliance from date of initial construction and/or substantial improvement
BUILDING PERMITS

Lowest Floor

- Lowest Floor - lowest enclosed floor including: crawl space, basement, garage.

**Pre-FIRM** and **Post-FIRM** are insurance terms tied to a community’s initial FIRM. The terms are used to determine flood insurance rates. Although common, the terms should not be used to distinguish between new construction built before a community joined the NFIP and those built after, especially in communities where the FIRMs have been revised.

![Diagram of Lowest Floor Concepts]
Prohibited - Hospitals, group living uses housing the elderly or disabled persons with limited mobility, detention or correctional facilities, new or substantially improved manufactured homes

Floodway – development prohibited, unless dock, trail, roadway & bridges

Residential vs. non-residential

Placement of Fill

Changes to Special Flood Hazard
DEFINITIONS
Zoning Code vs. ASCE 24-14

• **RESIDENTIAL** - building or structures and portions thereof where people live or that are used for sleeping purposes on a transient or non-transient basis - including but not limit to 1-family, 2-family, townhouses, condominiums, multifamily dwellings, apartments, congregate residences, boarding houses, lodging houses, rooming houses, hotels, motels, convents, monasteries, dormitories, fraternity houses, sorority houses, vacation time-share properties and institutional facilities: halfway houses, social rehabilitation facilities, alcohol and drug centers, detoxification facilities (ASCE 24-14)

• **NON-RESIDENTIAL** – not mentioned above

• **NON-RESIDENTIAL** (required to have 24” freeboard) - Generally structures needed in emergency events (see ASCE 24-14 for full list)
ZONING APPLICATION

Process

1. Complete Flood Protection Form - ZONING
2. Site Plan w/ Special Flood Hazard Area

Refusals issued for:
- Prohibited uses
- Floodway development
- Placement of fill
- Changes to the Special Flood Hazard Area

NOTE:
Although you may receive Zoning Approval for a project located in the Special Flood Hazard Area, Building Permits will require further compliance based on building codes/regulations.
EXISTING STRUCTURES

Substantial Improvements

• means any reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which equals or exceeds 50 percent of the market value of the structure (or smaller percentage if established by the community) before the “start of construction” of the improvement. This term includes structures that have incurred “substantial damage,” regardless of the actual repair work performed.
EXISTING STRUCTURES
Substantial Improvements - Process

1. Complete Flood Protection Form - EXISTING BUILDINGS [FP-EX]

2. Attach Cost Estimate

3. Substantial Improvement Calculation

ESTIMATED COST

- Materials and labor, including the estimated value of donated or discounted materials and owner or volunteer labor, plus sales tax
- Site preparation related to the improvement or repair (e.g., foundation excavation or filling in basements)
- Demolition and construction debris disposal
- Construction management and supervision
- Structural elements and exterior/interior finishes
- Utility and service equipment

Items that can be excluded:

- Costs to obtain or prepare plans and specifications
- Land survey costs
- Permit fees and inspection fees
- Outside improvements, including landscaping, irrigation, sidewalks, driveways, fences, yard lights, swimming pools, pool enclosures, and detached accessory structures (e.g., garages, sheds, and gazebos)
- Costs required for the minimum necessary work to correct existing violations of health, safety, and sanitary codes
EXISTING STRUCTURES
Substantial Improvements - MARKET VALUE

2301 MARKET ST
Philadelphia, PA 19103-1338

OWNER
PECO

MAILING ADDRESS
2301 MARKET ST
Philadelphia, PA 19103-1338

REAL ESTATE TAX BALANCE
Real Estate Tax account balances have not yet been added to this application.

VALUATION HISTORY

<table>
<thead>
<tr>
<th>Year</th>
<th>Market Value</th>
<th>Taxable Land</th>
<th>Taxable Improvement</th>
<th>Exempt Land</th>
<th>Exempt Improvement</th>
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<tr>
<td>2015</td>
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<td>$22,057,600</td>
<td>$40,942,400</td>
<td>$0</td>
<td>$0</td>
</tr>
</tbody>
</table>
EXISTING STRUCTURES
Substantial Improvements - MARKET VALUE

IF 1 PARCEL & MULTIPLE STRUCTURES, THEN:

2018 MARKETVALUE OF TAXABLE IMPROVEMENT
(STRUCTURE/BUILDING ONLY)

IMPROVEMENT AREA (SQFT) \( \times \) PRICE PER SQFT

THEN:

PRICE PER SQFT

EACH STRUCTURE/BUILDING

EXISTING MARKET VALUE

DETERMINING EXISTING MARKET VALUE
(CONDO)

ADD ALL UNITS' MARKET VALUE TOGETHER FOR EXISTING MARKET VALUE OF STRUCTURE/BUILDING

TO CHALLENGE THE MARKET VALUE: CERTIFIED APPRAISAL

• Licensed Appraiser in Pennsylvania

• Report

  • Identify intended user (including property owner)

  • Completed less than 1 year before floodplain application

  • “Market Approach” is preferred - for structure only, land must be broken out (NOTE: to separate the market value of a structure from the value of the land on which it is located, appraisers may need to do more research than is normally undertaken in order to reasonably allocate the total value between the structure and the land) - for multiple buildings on one parcel, each must be assessed for existing market value

  • “Income Capitalization Approached” is not acceptable

  • All values must be for existing conditions, without any proposed improvements
When in a Special Flood Hazard Area:
• One or multiple EZ Permits could constitute “substantial improvement”
• The department, at its discretion, will ensure that phased improvements do not circumvent the substantial improvement requirements

Specific EZ Permits:
• Pools & Spas - ineligible for EZ Permit
• For Interior Alterations, Porch Enclosures, and Ductwork & Warm-air Appliances:
  • Additional documents are required. See the Flood Protection Form - EZ PERMITS (FP-EZ) for more information. These EZ Permits may only be submitted at Permit Services at 1401 JFK.
BUILDING PERMITS
Floodway

- New development is prohibited, unless dock, trail, roadway & bridges
- Docks, trails, roads & bridges must show a No Rise study must be completed
- Other local, state, and federal permits apply (DEP, USACE, Submerged Lands License)
FEMA uses existing information - not engineering studies - to draw Approximate Zone A boundaries. Information may have been provided by the USACE, other federal agencies, State and local agencies, and historic records.

For existing single family residential and accessory structures, the City may specify the BFE through contour interpolation, for all other development a Hydrologic and Hydraulic Study must be completed to determine a BFE.
Building Permits

Residential

• Lowest “livable” floor must be BFE+18”
  • Living room, office, bedrooms, bathrooms, etc.
• If spaces below BFE+18”, can only be used for: parking, building access, and incidental storage.
  • Fully enclosed spaces must be “wet-floodproofed” - allow the automatic entry and exit of floodwater, through Flood Vents
  • No bathrooms, offices, bedrooms, furniture, etc.
  • No basements or crawl spaces that are below-grade on all sides
• Non-conversion clause on Certificate of Occupancy for space(s) below BFE+18”
  • Space can never be converted to “livable” space
  • Future underpinning is prohibited
• Use of Flood Damage Resistant Materials
BUILDING PERMITS
Residential - w/ enclosures

Important Information

NOTE:
- Total net area of all total openings is 1 sq. in. per sq. ft. of enclosed area.
- A 25' x 45' building needs 1,125 sq. inches of openings.
- Standard ventilation units used in foundation walls must be disabled in the open position to allow water to flow in and out.
- A standard ventilation unit with screen, provides 42 to 65 sq. inches of opening.

ALTERNATIVE: Engineered openings are acceptable if certified to allow adequate automatic inflow and outflow of floodwaters.

Solid perimeter walls can enclose flood prone areas. A crawlspace is a good way to elevate just a couple of feet. In all cases the following are required: flood openings, utilities elevated to or above the BFE, flood resistant materials and limitations on use of enclosures below the lowest floor. Check with the local permit office for details and restrictions.
BUILDING PERMITS
Residential - townhouses w/ flood vents

- Townhouses/row-homes must be structurally independent
- Bottom of vent no higher than 12” above adjacent grade
- Vents on at least 2 sides of a structure
- 2 vents per enclosed space
- 1 sq/in for every 1 sq/ft of enclosed space
- Only vent openings below BFE count

DIAGRAM 7
All buildings elevated on full-story foundation walls with a partially or fully enclosed area below the elevated floor. This includes walkout levels, where at least 1 side is at or above grade. The principal use of this building is located in the elevated floors of the building.

Distinguishing Feature – For all zones, the area below the elevated floor is enclosed, either partially or fully. In A Zones, the partially or fully enclosed area below the elevated floor is with or without openings** present in the walls of the enclosure. Indicate information about enclosure size and openings in Section A – Property Information.

1. Openings in garage door
2. Openings in exterior wall
3. Openings in interior wall/door
4. Openings in exterior door
BUILDING PERMITS

Flood Vents - crawl space

- The Lowest Floor Elevation must be at or above the BFE.
- The bottom of flood openings must be no more than 1 foot above the grade.
- Standard ventilation units must be permanently disabled in the "open" position to allow water to flow in and out.
- Interior and exterior grades should be equal on at least one side.

**Calculate Net Flood Opening:**
A building that measures 25' x 45' has 1,125 square feet of enclosed crawlspace. Flood vents must provide 1,125 sq. in. of net open area (or have certified engineered openings). If a standard air vent unit provides 60 sq. in. of net open area, then to satisfy the flood opening requirement 19 vent units are required (1,125 divided by 60).
• See A8 and A9 on Elevation Certificate

• Air vents and/or manually operated vents are not allowed
Flood Damage Resistant Materials

- any building product [material, component or system] capable of withstanding direct and prolonged (at least 72 hours) contact with floodwaters without sustaining significant damage
- See Table 2 in FEMA Technical Bulletin “Flood Damage-Resistant Material Requirements”

Option: **Wet-floodproofed** or **Dry-floodproofed**

If **Wet-floodproofed**, then spaces below BFE+18”, can only be used for: parking, building access, and incidental storage.

- Fully enclosed spaces must be “wet floodproofed” - allow the automatic entry and exit of floodwater, through **Flood Vents**
- **Non-conversion** clause on Certificate of Occupancy for space(s) below BFE+18”
- Use of **Flood Damage Resistant Materials**

If **Dry-floodproofed**, below BFE+18”

- structure, including utilities and equipment, being watertight with all elements substantially impermeable to the entrance of floodwater and with structural components having the capacity to resist flood loads.
- typical use up to 3 feet
- **Not** allowed in Coastal A Zones (along Delaware River)
BUILDING PERMITS
Mixed-Use Structures

Considerations:
• **Commercial portions:**
  - *Wet-floodproofed*, spaces below BFE+18”, use only as parking, building access, and incidental storage
  - or
  - *Dry-floodproofed*, commercial spaces below BFE+18”
• **Residential portions:** must be elevated BFE+18”, including lobbies with furniture, desk attendants, mailboxes, trash receptacles, and resident only facilities (gyms, game rooms, amenity spaces, etc)
  - *Wet-floodproofed*, spaces below BFE+18”, use only as parking, building access, and incidental storage
    - bicycle parking, stairwell enclosure, elevator vestibule, etc.
Dry-floodproofing Certificate & considerations

• Dry-floodproofed considerations:
  • Building strength
  • Warning time
  • Level of protection
  • Operational
    • Inspection/maintenance plans
  • Flood Emergency Operation Plan, see FEMA technical bulletin “Floodproofing Non-Residential Buildings”
  • Seepage
    • Sump pumps
    • Back-flow preventers
• Floodproofing Certificate
  • Must be submitted for Certificate of Occupancy
BUILDING PERMITS

Dry-floodproofing - examples

- Sliding
- Lift Out
- Modular Panel
- Bolt On
- Hinged
- Automatic / Passive
BUILDING PERMITS
Below-Grade Parking

• Must be **Dry-floodproofed**, to BFE+18”
  • **Not** allowed in Coastal A Zones (along Delaware River)
  • **Not** allowed in fully residential structures (IE. condominium and apartment buildings)
BUILDING PERMITS
Machinery/Equipment

- Mechanical
- Fuel Systems
- Electrical
- Water supply
- Elevator/escalators
- Plumbing
- Transformers
- Generators
- BFE + 18” unless designed to submersible/dry floodproofed/waterproof

- Systems and components emerging from underground shall be designed to be anchored to resist flood loads and debris impact
Utility Service Inside Enclosures

Appliances and mechanical equipment (including duct work) must be elevated to or above the BFE. Utilities (plumbing, electrical, gas lines, heating, ventilating & air conditioning) must be elevated or designed and installed to prevent intrusion of flood waters into their components.
Utility Service / Fuel Tanks

All utilities, appliances, and equipment must be elevated to or above the BFE. Utilities include plumbing, electrical, gas lines, fuel tanks, and heating, ventilating and air conditioning equipment.

Fuel and propane tanks can pose serious threats to people, property, and the environment during flood conditions. Even shallow water can create a large buoyant force on tanks. Videos on “Fuel Tank Flood Hazards” and “How to Anchor Home Fuel Tanks” are available from FEMA Publications at 1-800-480-2520 and “How-To Guides” on anchoring fuel tanks and other flood damage reduction techniques are available at: http://www.fema.gov/library/viewRecord.do?id=3262.

Important Information

For floodplain management purposes, a gas or a liquid storage tank that is principally above ground is considered a structure and must be elevated to or above the BFE.

Fuel and propane tanks may cause explosion and pollution risks during floods. Even shallow water can create significant buoyant forces on tanks so extra care must be taken to ensure that all tanks are appropriately anchored.
Elevators

Shafts below BFE+18”
- Flood vents no required in enclosed shafts
- All mechanicals elevated to BFE+18”
- Float switch
- Programed for cab to rest on the floor above BFE+18”

Figure 1. Direct Acting (Holed) Hydraulic Elevator
(Source: Otis Elevator Company)

Figure 2. Holeless Hydraulic Elevator
(Source: Otis Elevator Company)
Accessory Structures in a Special Flood Hazard Area:

- Cannot be modified for a different use in the future
- Must be used only for parking or storage
- Must have flood openings
- Must be built of flood resistant materials
- Must have elevated utilities
- Must be anchored to resist floating
- Must not be inhabited
- Must have a documented floor elevation

Even small buildings are considered “development” and permits or variances with noted conditions are required. **CAUTION!** Remember...everything inside is likely to get wet when flooding occurs.
In a Special Flood Hazard Area, a Recreational Vehicle (RV) must:

- Remain on site for fewer than 180 consecutive days, **and**
- Be fully licensed and ready for highway use; **or**
- Meet the permitting, elevation, and anchoring requirements for manufactured homes of the community's Flood Damage Prevention Ordinance.

A recreational vehicle is ready for highway use if it is on its wheels or jacking system, is attached to the site only by quick-disconnect type utilities and security devices, and has no permanently attached additions.

RVs that do not meet these conditions must be installed, elevated, and secured like a manufactured home, including a permanent foundation and tie-down.
BUILDING PERMITS
Seasonal/Temporary Structures

Non-enclosed
• Anchored to withstand the hydrostatic & hydrodynamic loads as well as not become buoyant
• Examples: event tents, pergolas, ice rinks, event stage, etc.

Enclosed
• Anchored to withstand the hydrostatic & hydrodynamic loads as well as not become buoyant
• Parking and Incidental storage use
  • Flood vents
• Use other than parking and incidental storage uses
  • See residential or non-residential standards
Prohibited, unless:

• designed to be easily movable (no equipment required for removing), in the event of a flood (IE. outdoor furniture, items on wheels, etc.),
• anchored to withstand the hydrostatic & hydrodynamic loads as well as not become buoyant
• elevated above BFE+18”
Licensed and Road-ready
• On site less than 180 days
• Must be on wheels/chassis
• No connected mechanicals (electric service, plumbing, etc)

More than 180 days and/or connected to mechanicals and/or not on wheels/chassis
• Anchored to withstand the hydrostatic & hydrodynamic loads as well as not become buoyant
• Elevated to BFE+18”
BUILDDING PERMITS

Fill

- If less than 12”, in-place dry density is not less than 90% of the max. dry density at optimum moisture content determined in accordance with ASTM D 1557
- If over 12”, then GEO-TECHNICAL REPORT (Section 1803 of IBC)
  - Requires Special Inspections
- Requires a Zoning Permit, and a Building Permit if over 5,000 SF
- Requires a Letter of Map Change [LOMC] if a Hydrologic and Hydraulic study shows any rise in the BFE

Floodplains are supposed to store floodwater. If storage space is blocked by fill material, future flooding may be worsened. Floodplain fill can alter other valuable floodplain functions, including wildlife habitat and wetlands. Your community may apply the same restrictions to fill in the floodway fringe as those applied in floodways.
• Analysis that elevating and/or floodproofing would remove it from historic designation
  • Singed and seal analysis from an Architect
• Variance required through Board of Building Standards
• Mechanicals should be elevated to BFE+18”
• Flood damage resistant materials should be used in areas below BFE+18”
REQUIRED 3 times: (see section C on Elevation Certificate)

- **Building Permit submission**
- During Construction
  - **Lowest Floor installation**
    - No vertical work can occur until submitted
- **Final completion, prior to Certificate of Occupancy**
**ELEVATION CERTIFICATE**

How to complete fully and correctly

**General:**
- All lines shall be completed, and when not applicable an “N/A” should be entered
- Should be signed and sealed by a licensed surveyor/architect/engineer
- **A8-9:** Flood Vents
  - Complete fully per design plans
- **B9:** Base Flood Elevation
  - Always in **NGVD 29 datum**
  - Rounded to nearest tenth degree, no whole numbers
  - Should be based from Flood Insurance Study [FIS] when cross sections are available. If, no cross section, then use the Flood Insurance Rate Map [FIRM]
ELEVATION CERTIFICATE
How to complete fully and correctly

• **C2.a-h:** Structure design elevations (must be in NGVD 29)
  - **C2.a** lowest floor elevation of lowest enclosed space (IE. crawlspace (rat slab), basement slab, garage slab (if attached - townhouse/rowhouse))
  - **C2.c** is N/A in Philadelphia (No velocity or wave action zones)
  - **C2.e** Lowest machinery/equipment should be identified
    - In “Comments” section at bottom of PG2, list lowest elevations of these mechanicals/equipment if applicable: HVAC, electrical, gas, plumbing, elevators, transformer pad, generator, etc.

Any site plans illustrating flood elevations shall be in datum NGVD 29, if your converting City Datum to NGVD 29 - see conversion table as there are 7 survey districts with varying conversion factors. A note of which conversion factor must be placed on the plans.
- FEMA FIRM maps: NGVD 29
- US standard: NAVD 88
- City Philadelphia standard: City Datum

Since FEMA FIRM’s are in NGVD 29, then Elevation Certificates should be completed in NGVD 29. If surveying in City Datum, use chart to convert to NGVD 29. Plan drawings should clearly show datum used, and conversion factors used.
LETTER OF MAP REVISION [LOMC]

General

Common Reasons:
- Remove the mandatory flood insurance requirement
- To adjust flood insurance rate information
- To better understand the flood risk associated with a structure or property

Time-frames (estimated):
- LOMA’s, LOMR-F’s, CLOMA’s and CLOMR-F’s
  - FEMA - 60 days of receiving all required data
  - If additional data is requested, applicant has 90 days, before case is suspended
- LOMR’s and CLOMR’s
  - FEMA - 90 days of receiving all required data
  - LOMR’s require 4-6 month adoption period before becoming effective maps
<table>
<thead>
<tr>
<th>LOMC</th>
<th>CITY</th>
<th>FEMA DEFINITION</th>
<th>PROCESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONDITIONAL LETTER OF MAP AMENDMENT [CLOMA]</td>
<td>No</td>
<td>letter from FEMA stating a proposed structure that is not to be elevated by fill (natural grade) would not be inundated by the base flood if built as proposed</td>
<td>Submit Application to FEMA</td>
</tr>
<tr>
<td>LETTER OF MAP AMENDMENT [LOMA]</td>
<td>No</td>
<td>issued when the scale of the FIRM does not allow for small areas of natural high ground to be shown outside the SFHA</td>
<td>Submit Application to FEMA</td>
</tr>
<tr>
<td>CONDITIONAL LETTER OF MAP REVISION - FILL [CLOMR-F]</td>
<td>Yes</td>
<td>letter from FEMA stating a parcel of land or proposed structure that will be elevated by fill would not be inundated by the base flood if fill is placed on the parcel as proposed or the structure is built as proposed</td>
<td>1. CLOMR-F application submitted to FEMA 2. “Community Official” portion of the application may be filled out by the City of Philadelphia’s Floodplain Administrator 3. FEMA determination 4. If approved, Zoning/Building Permits to place fill. 5. Placement of fill, then continue to LOMR-F</td>
</tr>
<tr>
<td>LETTER OF MAP REVISION - FILL [LOMR-F]</td>
<td>Yes</td>
<td>similar to a LOMA, but instead of being based on natural ground elevations, the property or structure has been elevated by fill in order to elevate it above the flood elevation</td>
<td>1. LOMR-F application submitted to FEMA 2. “Community Official” portion of the application may be filled out by the City of Philadelphia’s Floodplain Administrator 3. FEMA determination 4. If approved, City’s Flood Insurance Rate Maps are changed and development can be permitted based on the new effective maps.</td>
</tr>
<tr>
<td>CONDITIONAL LETTER OF MAP REVISION [CLOMR]</td>
<td>Yes</td>
<td>letter from FEMA’s stating a proposed project that would, upon construction, affect the hydrologic or hydraulic characteristics of a flooding source and thus result in the modification of the existing regulatory floodway, the effective BFE or SFHA</td>
<td>1. CLOMR application submitted to FEMA 2. FEMA determination 3. If approved, Zoning/Building Permits to develop site 4. Development construction, then continue to LOMR</td>
</tr>
<tr>
<td>LETTER OF MAP REVISION [LOMR]</td>
<td>Yes</td>
<td>official revision to an effective FIRM map that may change flood insurance risk zones, floodplain and/or floodway boundary delineations, plain metric features, and/or BFE. Unlike LOMAs and LOMR-Fs, a LOMR usually results in reprinting a portion of a FIRM</td>
<td>1. LOMR application submitted to FEMA 2. “Community Official” portion of the application may be filled out by the City of Philadelphia’s Floodplain Administrator 3. FEMA determination 4. If approved, City’s Flood Insurance Rate Maps are changed and development can be permitted based on the new effective maps.</td>
</tr>
</tbody>
</table>
LETTER OF MAP REVISION [LOMC]
Conditional Letter of Map Amendment [CLOMA]

- letter from FEMA stating a proposed structure that is not to be elevated by fill (natural grade) would not be inundated by the base flood if built as proposed
LETTER OF MAP REVISION [LOMC]
Letter of Map Amendment [LOMA]

• issued when the scale of the FIRM does not allow for small areas of natural high ground to be shown outside the SFHA
LETTER OF MAP REVISION [LOMC]
Conditional Letter of Map Revision - Fill [CLOMR-F]

- letter from FEMA stating a parcel of land or proposed structure that will be elevated by fill would not be inundated by the base flood if fill is placed on the parcel as proposed or the structure is built as proposed

Required
- Recorded plat map or
- A recorded deed accompanied by a tax assessor’s map
- Community acknowledgment
- Processing fee
- Endangered Species Act (ESA) compliance

“No Effect” Statement for ESA Compliance

To avoid any direct or indirect effects to the Mead’s milkweed in Pretty Prairie, Big Tree will install the pipeline at least 6 feet deep under the prairie extending 50 feet on both sides using directional drilling. Big Tree has concluded that by using these drilling techniques the Mead’s milkweed will not be exposed to project.

For these reasons, we conclude the Stewart Branchline Extension Project will have “no effect” on listed species, their habitats, or proposed or designated critical habitat.
LETTER OF MAP REVISION [LOMC]
Letter of Map Revision - Fill [LOMR-F]

- similar to a LOMA, but instead of being based on natural ground elevations, the property or structure has been elevated by fill in order to elevate it above the flood elevation

Letter of Map Revision Based on Fill (LOMR-F) is an official revision to an effective FIRM that is issued to document FEMA’s determination that a structure or parcel of land has been elevated by fill above the BFE, and therefore is no longer in the SFHA. Lenders may waive the insurance requirement if the LOMR-F removes a building site from the SFHA.
LETTER OF MAP REVISION [LOMC]  
Conditional Letter of Map Revision [CLOMR]

- letter from FEMA’s stating a proposed project that would, upon construction, affect the hydrologic or hydraulic characteristics of a flooding source and thus result in the modification of the existing regulatory floodway, the effective BFE or SFHA
LETTER OF MAP REVISION [LOMCR]
Letter of Map Revision [LOMR]

- official revision to an effective FIRM map that may change flood insurance risk zones, floodplain and/or floodway boundary delineations, plain metric features, and/or BFE. Unlike LOMAs and LOMR-Fs, a LOMR usually results in reprinting a portion of a FIRM.

- Official Determination Document
- Accompanied by annotated FIRM panel(s) and Flood Insurance Study (FIS) tables and/or profiles.
**RESOURCES**

**Licenses + Inspections Website**

[Website Link](www.phila.gov/li/Pages/FloodplainManagement.aspx)

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**Floodplain Management**

**Floodplain Development**

The Flood Protection Forms below must be submitted with all Zoning and Building Permit applications in the Special Flood Hazard Area (SFHA) and/or floodplain.

- **Flood Protection Acknowledgement Form** - ZONING (FP-Z)
  - For zoning applications, the acknowledgement of all applicable floodplain regulations in the City of Philadelphia’s Zoning Code as well as building regulations (IRC 2010, IBC 2010, Administrative Codes, ASCE 24, Appendix G) associated with development site located in the Special Flood Hazard Area (SFHA).

- **Flood Protection Form** - EXISTING BUILDINGS (FP-EX)
  - For building permit applications of an existing building(s) in the Special Flood Hazard Area (SFHA) being renovated/added to or an addition being constructed. The form serves to determine whether the development will constitute a substantial improvement, as well as establish which floodplain regulations apply.

- **Flood Protection Form** - GENERAL (FP-G)
  - For building permit applications to confirm all development meets the City of Philadelphia’s Zoning Code as well as additional building regulations (IRC 2015, IBC 2018, Administrative Codes, ASCE 24, and Appendix G) associated with a development site located in the Special Flood Hazard Area (SFHA).

- **Flood Protection Form** - EZ PERMITS (FP-EZ) - Coming Soon
  - For building permit applications to confirm all development meets the City of Philadelphia’s Zoning Code as well as additional building regulations (IRC 2015, IBC 2018, Administrative Codes, ASCE 24, and Appendix G) associated with a development site located in the Special Flood Hazard Area (SFHA).

- **Flood Protection - KEY TERMS**
  - Definitions for terms found in the above forms.

The Code Bulletin: Development in Special Flood Hazard Areas serves to address recommendations from FEMA as they relate to the enforcement of code provisions through the issuance of zoning and building permits by clarifying and improving upon the collection of compliance documentation regarding development in the floodplain.
RESOURCES
FEMA Technical Bulletins

Floodproofing Non-Residential Buildings
FEMA P-936 / July 2013

Openings in Foundation Walls and Walls of Enclosures
Below Elevated Buildings in Special Flood Hazard Areas in accordance with the National Flood Insurance Program
Technical Bulletin 1 / August 2008

Elevator Installation
for Buildings Located in Special Flood Hazard Areas in accordance with the National Flood Insurance Program
Technical Bulletin 4 / November 2010

www.fema.gov/nfip-technical-bulletins
THANK-YOU!

Questions and/or comments?

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