CHAPTER 7
GUIDELINES FOR CLIMATE ADAPTATION

Introduction

The guidelines for climate adaptation are intended to provide recommendations for the preservation and protection of existing historic buildings in the flood zones. These standards are a response to increased flooding and the potential for rising sea levels affecting Sullivan's Island's historic districts. Sullivan's Island has experienced repeated hurricanes and flooding during its history. One of the worst impacts to the historic districts was Hurricane Hugo which destroyed or damaged numerous homes in 1989. In 2024, Hurricane Debby also caused flooding in various parts of the community.

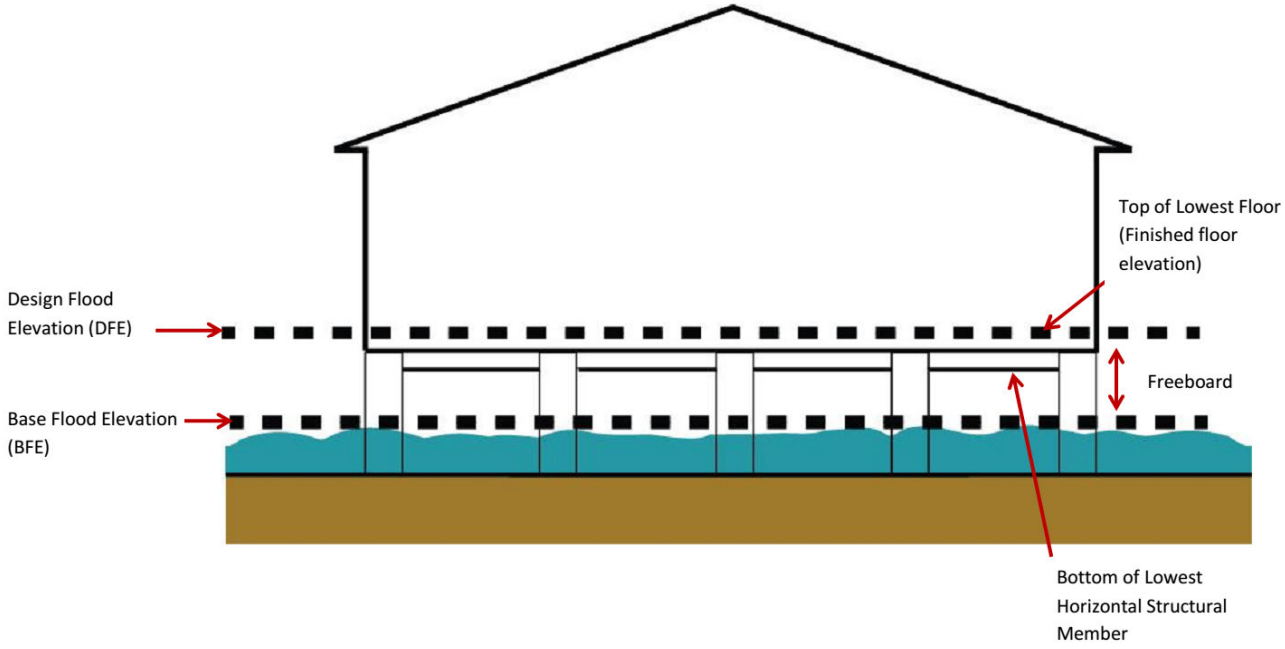
The Town of Sullivan's Island encourages property owners to make their historic buildings more resilient through elevation and hardening. **Resiliency** is the process by which properties are able to withstand, respond to, and recover from a flood or high water event. **Elevation** refers to the process of raising an existing building on its foundation to a height above projected future high water caused by storms and floods. **Hardening** is the term to describe making buildings more floodproof and windproof through exterior barriers, window shutters and other preventive techniques known as "dry-floodproofing."

Another approach to hardening is "wet-floodproofing" where water is allowed to flow through the building with no or minimal damage. The resilience standards seek to allow for increased height or hardening while resulting in the least adverse impact possible to a historic property's original design and its context within the streetscape. These adaptation guidelines have been developed in accordance with the National Park Service's "Standards on Flood Adaptation for Rehabilitating Historic Buildings" published in 2021. These Standards are referenced throughout this chapter and provide the basis for resiliency recommendations.

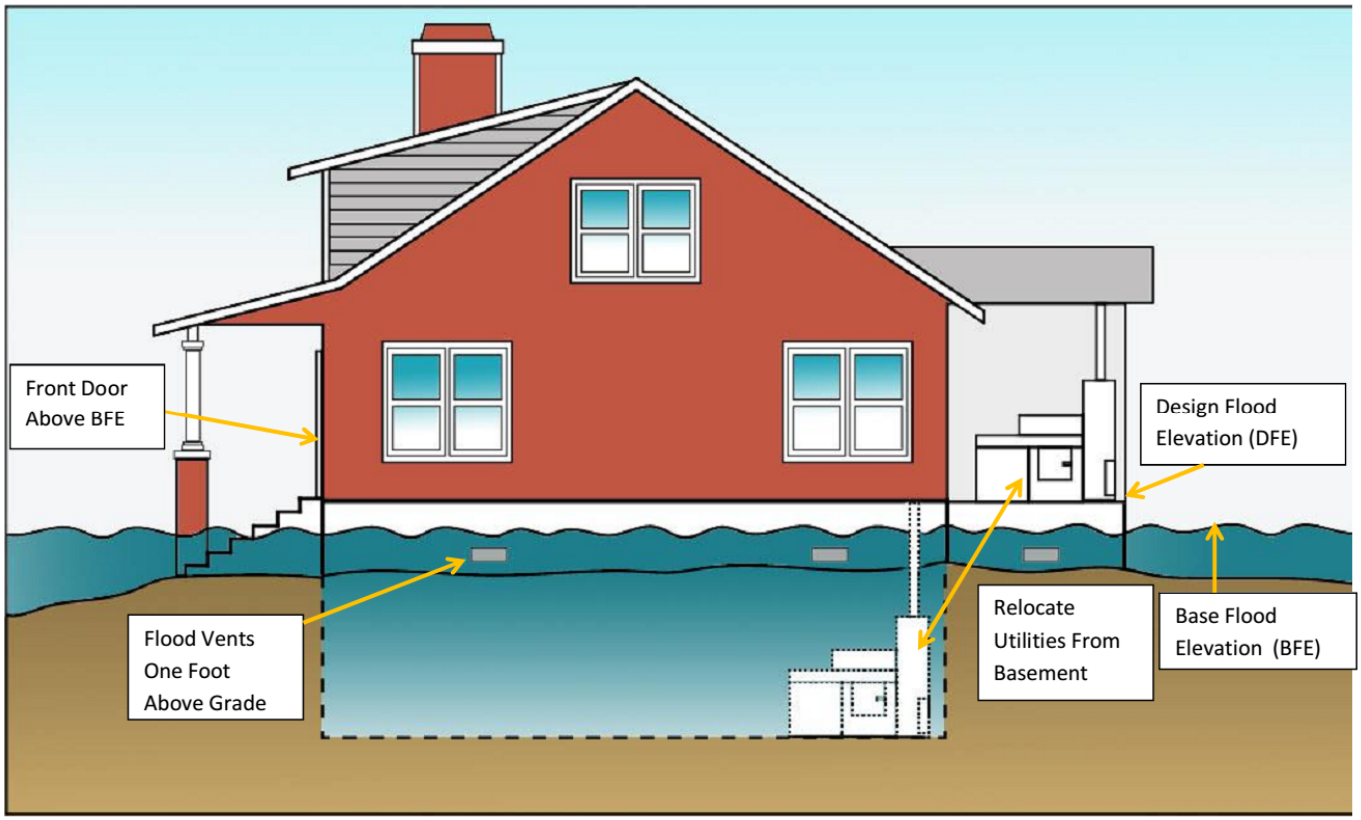
Evaluating Your Flood Risk

In order to obtain an accurate flood risk assessment for your property you will need to acquire an Elevation Certificate from a licensed surveyor, architect, or engineer. An Elevation Certificate will identify the height of the lowest floor relative to the Base Flood Elevation (BFE). The BFE is the elevation of flooding, including wave height, having a one percent chance of being equaled or exceeded in any given year (also known as "base flood" and "100-year flood"). The BFE is the basis of insurance and floodplain management requirements and is shown on Flood Insurance Rate Maps (FIRM). FIRMs are the official maps for Sullivan's Island on which FEMA has delineated the Special Flood Hazard Areas (SFHAs), the Base Flood Elevations (BFEs) and the risk premium zones applicable to the community.

The height of the lowest occupied floor, which may be the basement, can be used to calculate flood insurance rates and determine the height to which the building must be protected to comply with the Sullivan's Island floodplain management regulations. Note that the current FIRM does not address future threats such as sea level rise and land subsidence. The BFE in Sullivan's Island's flood zones vary from ten (10) to eleven (11) feet. In addition to the BFE, Sullivan's Island also has a Design Flood Elevation (DFE) and Regulatory Flood Protection Elevation (RFPE) which are both one (1) foot above the BFE. The DFE and RFPE are regulatory flood elevations adopted by Sullivan's Island to add an additional foot of elevation height as a protection option of safety. This additional amount of height is also called the "freeboard" which is the level at which a structure's lowest floor must be elevated or flood proofed to be in accordance with the Town's floodplain management regulations. Specific information on flood zones can be found on the Town's website.

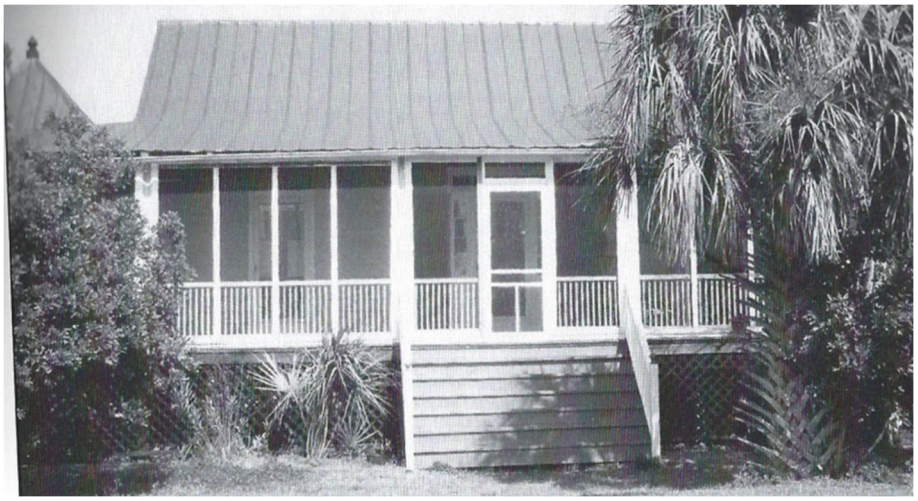


This illustration depicts differences between the Base Flood Elevation (BFE) and Design Flood Elevation (DFE) for A Zone Buildings in coastal communities.



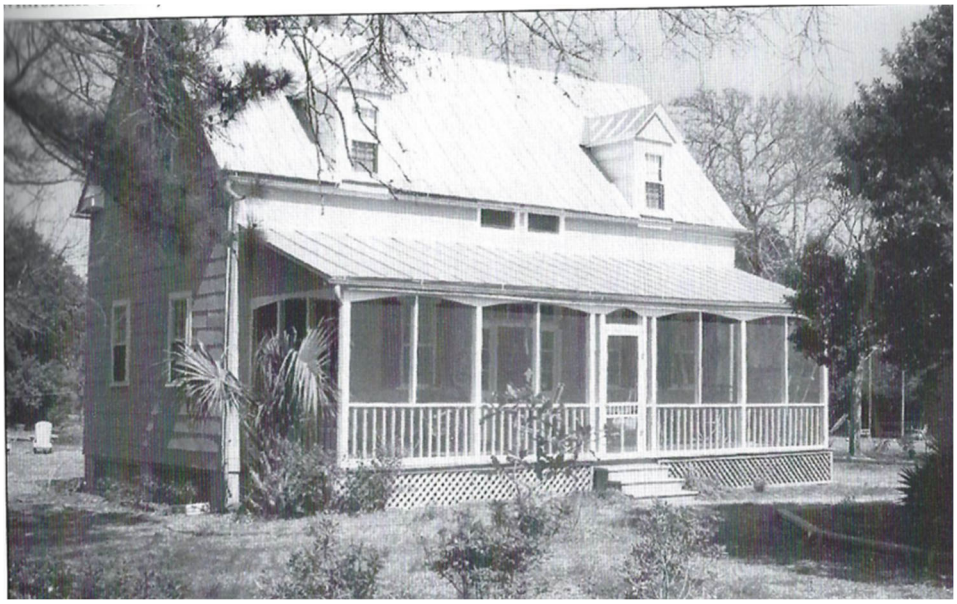
The BFE and DFE assist in determining the best approaches to wet floodproofing. These approaches may include the installation of flood vents and relocating utilities.

BEST PRACTICES EXAMPLES—ELEVATION



The dwelling at 2408 I'on Avenue was built ca. 1900 and is an example of a one-story cottage with a pyramidal roof wing. The elevation features horizontal slats in the foundation and a rebuilt stair.

BEST PRACTICES EXAMPLES—ELEVATION



Vertical slat foundation screening

Appropriate new stair with landing

Wide fascia board

The dwelling at 2508 Myrtle Avenue was built in 1893 and is an example of a one-story, side gable cottage and was elevated with appropriate detailing.

28.0 BUILDING ELEVATION INCREASE—FOUNDATIONS

POLICY

Sullivan's Island's historic dwellings display a variety of foundation materials and designs. Foundations may be open with piers or closed with continuous materials. Closed or continuous foundations may be of brick, poured concrete, or concrete block. Some foundations are composed of brick piers or piers covered with stucco. Open foundations with brick piers often have lattice, horizontal slats or vertical slats between the piers.

Foundations can either be closed or open in accordance with FEMA standards. Closed foundations are those with perimeter masonry walls sometimes used on building elevation projects. They must have flood vents to equalize water pressure during floods. Open foundations refers to the open space between raised piers.

New foundations should be based on the design of the original foundation to maintain its historic character. Original foundation materials such as brick should be salvaged and reused in the new foundation as much as possible, especially on the main façade. The new foundation should be constructed of the same material as the original foundation (e.g., concrete block). If a dwelling is on a pier foundation the visual appearance of piers should be maintained. Maintain the appearance of solidity in a foundation through the introduction of wood panels between the piers or posts.

Design Guidelines for Building Elevation Increase—Foundations

28.1 **The new foundation of an elevated building should replicate the design, materials and proportions of the historic foundation.** The existing foundation may be extended upward, though building codes will require the construction of new piers or continuous foundation walls and footings.

28.2 **Raised brick foundations may be solid, pierced, open piers, or piers with underpinning.** Appropriate underpinning materials are those found elsewhere in the historic districts, including brick, concrete block. Stucco, lattice, lattice in front of concrete block and slatted wood panels. The underpinning should be inset from the exterior face of the adjacent piers at least two inches.

28.3 **Do not use enclosed areas under elevated buildings for living space.** The NFIP regulations specify that enclosed areas under elevated buildings may be allowed if the enclosed areas are used solely for:

- Parking of vehicles (attached garages or parking areas below elevated buildings)
- Building access (stairwells, foyers)
- Storage (recommended to be limited to low value items)

28.4 **Install flood vents which meet FEMA standards in solid foundation walls.** New vent materials should be as compatible as possible and painted to match the foundation color.

28.5 **The exterior face of the foundation piers and columns should align with the exterior face of the sill of the house and porch(es).**

28.6 **Underpinning should be designed to break free, if required by codes. Lattice and other wood screening panels should be hinged in order to retract during high water.**

28.7 **Dark colors for screen panels are preferred to light colors.**

28.8 **Concrete block used to increase a foundation height should be finished with brick veneer or stucco. Split-faced concrete block is not an appropriate material for new foundations in historic dwellings.**

28.9 **Original masonry pier materials should be salvaged and reused as much as possible in the elevation project.**

28.10 **Landscaping and vegetative screening can minimize the visual impact of an elevation increase project.** When installing landscaping for elevation increase projects use indigenous vegetation native to coastal South Carolina such as deciduous shrubs and decorative grasses. Consider plants that allow for moisture absorption.

28.11 **Consider the use of small amounts of fill, terracing, retaining walls, period appropriate fences or a combination of all of these approaches to mitigate the visual impact of elevating a foundation.** These approaches will depend on the site features of the property and storm water management. Care must be taken to not displace flood waters onto adjacent properties.

Lattice panels are appropriate treatments for screening between brick piers (2120 Middle Street).

These stuccoed concrete piers are appropriate for the dwelling and are aligned with the porch columns above (2018 Middle Street).

Landscaping is used to screen the foundations of these elevated dwellings at 1814 Central Street (left) and 950 Middle Street (right).

The use of vertical slats between pier foundations is a common and appropriate treatment in Sullivan's Island (1856 Central Street, top, 2508 Myrtle Avenue, center, and 1607 Middle Street, bottom).

Horizontal slats between foundation piers is also a common design element for elevated houses in the historic districts (2430 Ion Street, top, 2502 Myrtle Avenue, center, and 1607 Middle Street, bottom).

29.0 BUILDING ELEVATION INCREASE—FLOOD VENTS

POLICY

For properties that are elevated and rebuilt with solid foundation walls, flood water must be able to freely flow in and out of the crawlspace without requiring electrical, mechanical, or manual operation. This necessity applies to exterior walls as well as interior walls separating enclosed spaces.

To allow the free flow of water, a minimum of two flood openings are required and they must be located on different walls. Any modification to or covering of flood openings such as louvers or screens should be installed in a manner that does not impede the free flow of flood water.

Vents should not be placed on primary facades unless there is a precedent for the building. The visual impact of flood vents should be mitigated by concealing them with plantings.

Design Guidelines for Building Elevation Increase—Flood Vents

29.1 **Install flood vents that meet FEMA standards in solid foundation walls.** Reuse historic foundation vents where possible. New vent materials should be compatible with the historic foundation materials.

29.2 **The bottom of flood vents may not be higher than one foot (1') above the exterior grade.**

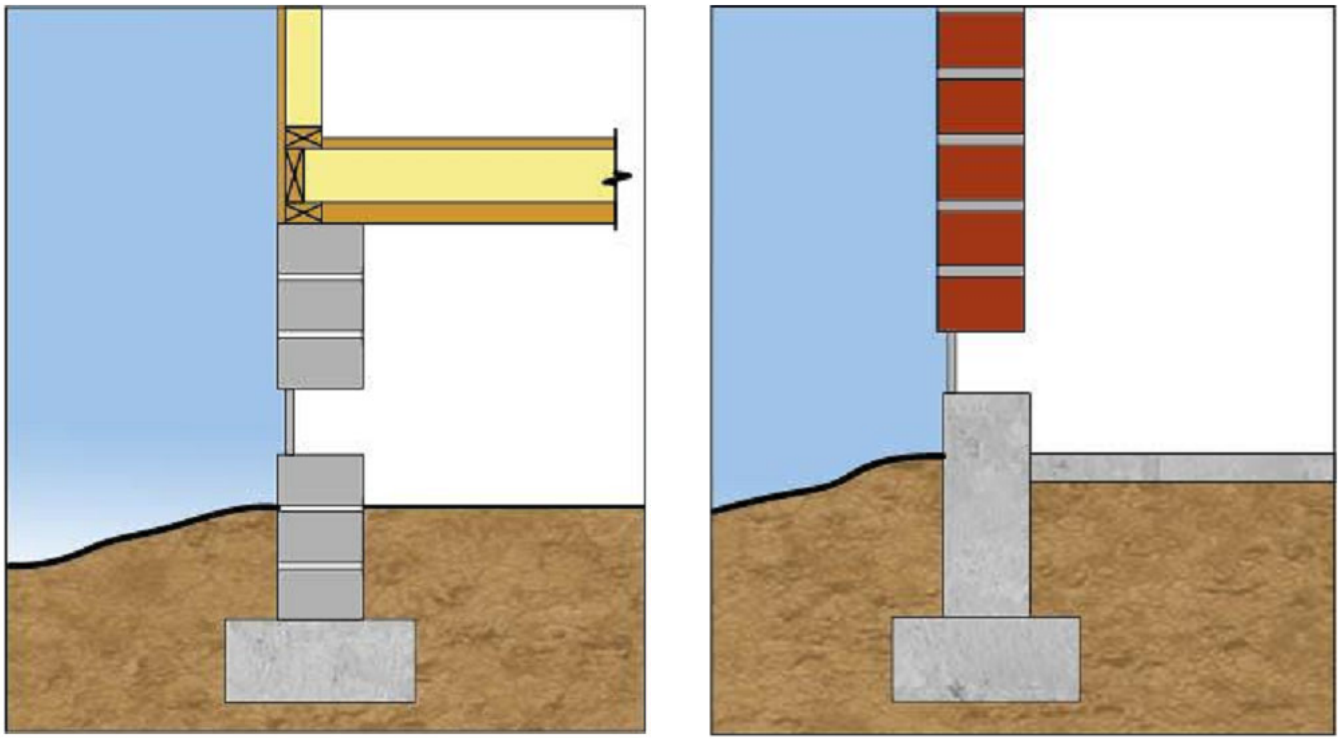
29.3 **Ensure vents are of proper size.** The size of a vent is determined by the size of the area being protected. The formula for this is one square inch of vent opening for every one square foot of enclosed space. For example one hundred (100) square feet of enclosed space would require one hundred (100) square inches of open vent space. Louvers in vents subtract from the area of open vent space. Only the open area - free from obstructions - can be counted toward the total number of square inches required.

29.4 **At least two (2) flood vents are required for each enclosed area.** A minimum of two (2) vents must be placed on at least two different walls.

29.5 **Manual closures are not permitted.** Vent operation should be automatic. If a vent comes with manual closures, this feature must be left in the open position.

29.6 **Modern flood vents should be painted to match the color of the foundation material to minimize their visual impact.**

Appropriate design flood vents located at the Town's Fire Station at 2050 Middle Street.



YES: *The bottom of flood vents must be placed no more than one-foot (1') above grade. The illustration at left shows a frame dwelling with a crawlspace and at right is a brick building on a poured concrete foundation.*

These examples of appropriate flood vents were retrofitted into existing brick foundations.

30.0 BUILDING ELEVATION INCREASE—PORCHES

POLICY

For dwellings, porch elements such as wood columns, railings, and floors should be kept intact in any building elevation increase. Bungalow-style porches with tapered posts on brick piers should retain their historic appearance above the porch sill. Below the porch sill, new brick foundation piers should extend straight down in alignment with the historic porch piers and match the historic materials as closely as possible.

For high increase building elevation projects, new porch piers may be required. The exterior face of the porch piers and the exterior face of the original porch columns should align with the exterior face of the porch sill. The porch piers and original porch columns should have the same centerline. The exterior face of corner piers should align with the exterior face of the porch's sill on the front and side. Porch piers should match the historic masonry columns or piers.

Design Guidelines for Building Elevation Increase—Porches

30.1 New porch railings should match the original stair design or be compatible with the style of the house.

30.2 Bungalow-style porch columns should be extended to the ground straight down from the porch floor structure

30.3 Increasing the porch's height may require the introduction of a new taller porch railing. If so, the railing should be compatible to the style of the house in materials and detailing.

30.4 Porch columns should align with the foundation piers below and not be offset.

30.5 Skirt boards at least four inches and a maximum of twelve inches should be added at the base of the porch's wall and above the foundation piers. The use of a wide skirt board helps to lessen the visual appearance of the new height. Addition of a skirt board may not be necessary in all cases (such as some low increase building elevation projects).

The porch on the elevated dwelling at 1856 Central Street has appropriate porch column and foundation pier alignments and railing.

***NO**: This high elevation project has misaligned porch columns and foundation piers. The front loaded parking is also inappropriate for this historic dwelling.*

***YES**: The elevated dwelling at 2101 Pettigrew Street has appropriately aligned columns and piers and retains its original railing.*

31.0 BUILDING ELEVATION INCREASE—STAIRS

POLICY

Stairs are often significant features leading to a front porch and the primary entrance. Elevating a dwelling will require a longer stair run to access the new living floor level. The new extended stairs should maintain the original orientation and design. There may be additional considerations, such as the historic setback of the dwelling to maintain the rhythm along the streetscape.

It may be preferred to reconfigure the stairs in order to have the required number of steps rather than moving the dwelling back on the lot to maintain the front setback. Along with increased height, it may also be necessary to extend or add handrails where they did not previously exist and increase the width of the stairs.

New stairs should match the width of the original stair and retain the same orientation to the front door. For long stair runs adding landings may be appropriate.

There may be some instances where an elevation project may not have sufficient setback to accommodate a strait run stair. If this is the case, a center/split linear staircase which provides access from the sides rather than front may be appropriate. Another alternative for a limited setback situation is to add an interior staircase to access the porch from below.

Design Guidelines for Building Elevation Increase—Stairs

31.1 Retain the historic entrances and the traditional approach to the dwelling.

31.2 A long run of stairs may need a break with a landing. If a stair run is more than the BFE height, the addition of a landing may be appropriate.

31.3 New stairs should be at least as wide as the original stairs. The width of the new stairs may need to be increased to complement the overall appearance of the elevation increase. To-scale drawings of the historic and proposed new stairs should be submitted with the COA.

31.4 Match new stairs and railings with the style and features of the historic design. Salvage and reuse the original stair, balustrade, and railing materials where possible. If the increased building height requires installation of a metal guardrail above the historic handrail height, the guardrail should be simple in design and not detract from the historic stair and railing design.

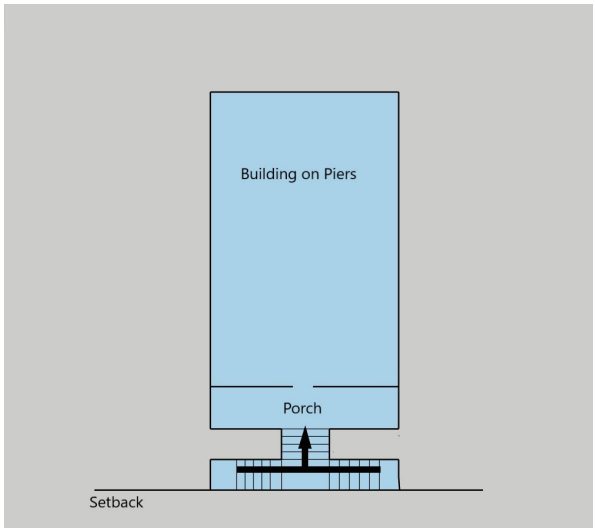
31.5 If the stair did not originally have a handrail, new handrails should be designed to be appropriate to the building's age and style. New handrails or balustrades should be simple in design. If constructed of wood, simple painted balusters and a top and bottom rail are recommended. Metal components can be painted black as not to stand out. A combination top rail of wood and bottom rail of metal, with balusters in between, may be an appropriate alternative.

31.6 Construct railings with traditional proportions, or, if a taller rail is necessary to meet building codes, retain a horizontal rail at the traditional railing height.

31.7 Adding new stair access to the side, rather than the front, of the house is appropriate. In cases where the setback is limited, the addition of new center/split or interior porch staircases may be appropriate.

31.8 Rebuild new stairs to match the historic alignment and orientation to the front door.

31.9 New railings and balustrades should be painted to match historic ones.



Example of a center/linear split staircase for a high increase building elevation project (2408 I'on Avenue).

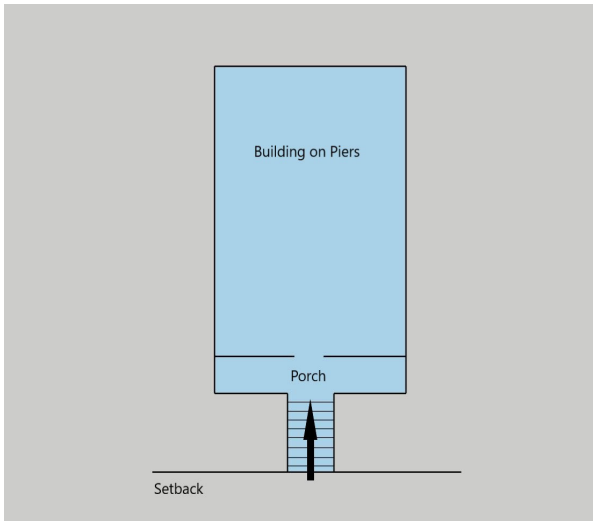
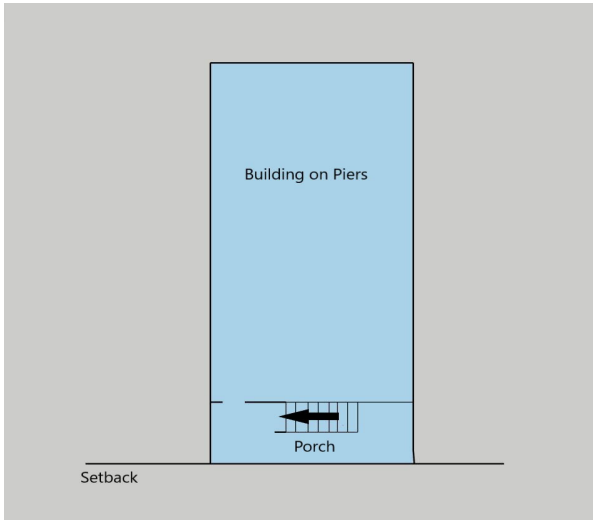


Illustration of a straight-run staircase for a low increase building elevation project (1820 Central Street).



The addition of interior staircases may also be appropriate for some high increase building elevation projects (1856 Central Street).

32.0 BUILDING ELEVATION INCREASE—CHIMNEYS

POLICY

The majority of historic chimneys in Sullivan's Island are of brick construction and are located in the interior of the dwelling rather than along outer walls. In most elevation projects it will be required to detach interior chimneys from their foundations.

Chimneys should be retained, elevated along with the house and be at the original height above the roofline. If any new brick is required for an exteror wall chimney, the brick must match the original in size, texture, color, color variation, bond pattern, and other visual qualities. The mortar must match the historic in color, texture, joint width, and joint profile.

Design Guidelines for Building Elevation Increase—Chimneys

32.1 **Chimneys should be retained, elevated along with the house, and maintain the original height above the roofline.** The historic relationship between the chimney and roofline and/or eaves should be maintained, as will the interior relationship between the firebox and the floor level

32.2 **A new chimney base to support the elevated chimney shall be constructed to match the historic configuration of the of the historic chimney base if visible from public view.**

32.3 **The brick of the new chimney base must match the historic brick.** New brick should match original brick in size, texture, color, color variation, bond pattern, and other visual qualities.

32.4 **The mortar in the new chimney base must match the historic mortar in color, texture, joint width, and joint profile.**

32.5 **It is appropriate to restore any missing of the historic chimney, such as shoulders, caps, based on photographic or physical evidence.**

Elevation projects should have the chimneys preserved and elevated with the dwelling as at 950 Middle Street.

33.0 BUILDING ELEVATION INCREASE—ACCESSIBILITY

POLICY

Some buildings in the historic districts may need to be adapted to accommodate the accessibility needs of its occupants. The conversion of a residence into office or commercial use will generally require compliance with state building codes and Americans with Disabilities Act (ADA) for accessibility. Wooden ramps are recommended at side or rear elevations and should be screened with landscaping or wooden screen panels.

In elevated dwellings, achieving ADA compliance without significantly impacting the historic appearance of a property can be a challenge. Even in low increase situations, an ADA ramp can compromise the integrity of a historic dwelling if the ramp becomes a prominent architectural feature.

Appropriate alternatives for high increase building elevation projects include chair lifts and elevators. These should be sited on rear elevations, or on side elevations not readily visible from the street.. Added ADA features should be appropriately screened.

Design Guidelines for Building Elevation Increase—Accessibility

33.1 **Provide accessibility solutions of the highest level of access and the least impact on the building's historic character, including no damage to the historic fabric.** Avoid damage to significant features and materials. Ramp placement should not create moisture problems for the historic dwelling. Install gutters, drip caps, or other watering-diverting measures to prevent splash back of water on the historic buildings. ADA ramps, lifts, and elevators should be free-standing structures, not physically attached to the dwelling. Their installation may minimally conceal, but not damage or destroy, historic architectural features.

33.2 **Install accessibility ramps, chair lifts, or elevators on side or rear elevations to minimize their visual impact.** When an accessibility structure must be installed on a front elevation, it should be concealed with landscaping, retaining walls, or lattice underpinning..

33.3 **Ramps, guardrails, and balustrades should be simple in design, constructed of wood or metal, and painted in colors that are compatible with the house. Metal guardrails are best painted black to minimize their visual impact.**

This chair lift at 2602 Jasper Street is appropriately sited at the rear elevation and recessed within the two wings to reduce visibility.

ADA compliance can be achieved for low elevation buildings through adding chair lifts. This example shows an ADA-compliant parking space and a lift screened with landscaping. Only a small section of this porch railing was removed and can be reinstalled when the lift is no longer in use.

For high increase elevation buildings, chair lifts should be placed on rear or side elevations where they are less visible. This design has minimal structural framework and the porch can be viewed behind it.

34.0 BUILDING ELEVATION INCREASE— UTILITIES

POLICY

Technological advances since the early to mid-20th century have introduced modern heating and cooling units and other utilities into most buildings on Sullivan's Island. Traditionally these types of utilities are located in a basement, on the first floor level, or on the exterior slab-on-grade.

Utilities can be ruined even if they are exposed to floodwater for just a short period of time. This can delay recovery after a flood as well as require additional expense for replacement. In any elevation increase project the utilities will be required to be relocated to at least the Design Flood Elevation (DFE). Utilities should be placed on rear or non-readily visible side elevations and screened with landscaping, wooden panels, or other screening elements.

Design Guidelines for Building Elevation Increase—Utilities

34.1 **Elevate HVAC units or any other exterior equipment as inconspicuously as possible**. Side and rear yards are appropriate locations.

34.2 **In addition to HVAC units, secondary elements such as electrical outlets, service panels, and meters, hot water heaters, generators, switches, junction boxes, and wiring must also be raised above the BFE.** When elevating a dwelling's plumbing system, installation of a backflow is recommended to block drainpipes and prevent flow into the building.

34.3 **HVAC units should be screened with landscaping, wooden lattice or slats or other screening elements.**

34.4 **If raised on platforms consider ladders and moveable screen panels for access and servicing.** The platform should be a free-standing structure, not physically attached to the historic building, which could result in lagging of sills and possible water entry.

34.5 **All utilities which are placed on elevated platforms must be securely anchored to meet wind-resistant requirements.**

34.6 **Propane and other fuel tanks should be screened and anchored so they do not float and become a hazard during a flood.**

These elevated mechanical units are screened with lattice panels (left. 1744 I'on Avenue) and horizontal slats, (right, 1856 Central Street).

35.0 BUILDING ELEVATION INCREASE—PARKING

POLICY

In limited circumstances with high increase building elevation projects, parking beneath the building may be acceptable when the historic vehicular access pattern to the property is maintained (typically along the side of the property); when access to the parking is loaded from the side or rear elevation of the house; and when appropriate underpinning is installed to screen vehicles and access the living space above. Access to parking shall never be accommodated from the front of the house. The only allowance of front-loading parking would occur where there is historic precedent, as on some slab-on-grade homes with

Design Guidelines for Building Elevation Increase—Parking

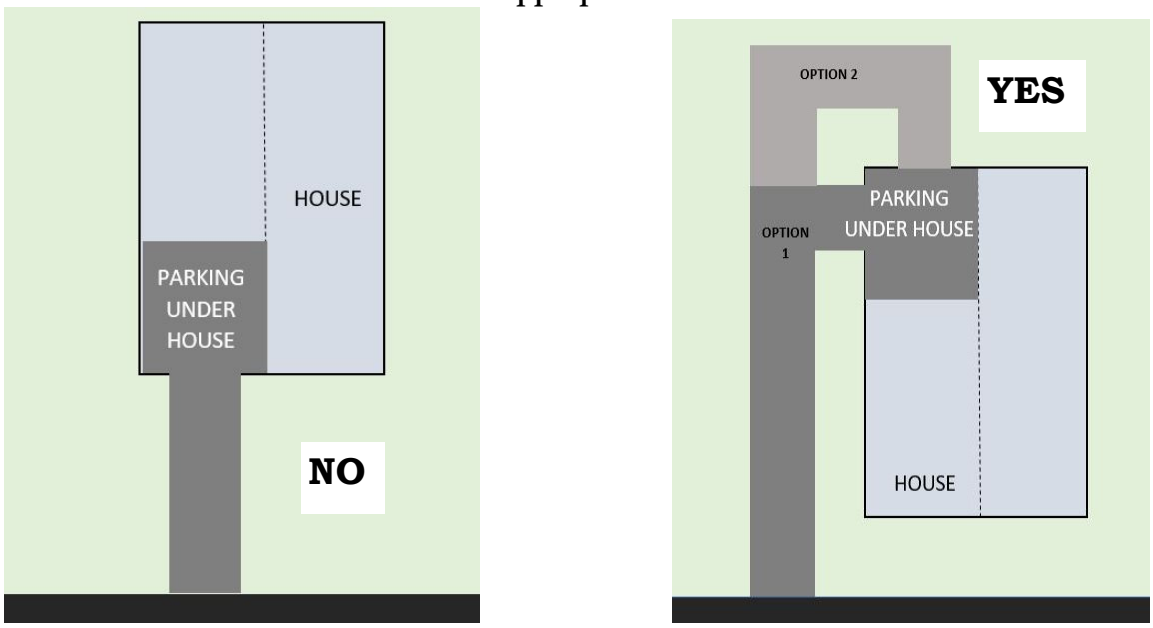
35.1 **Parking beneath a building should not be accessed directly from the street on the main façade.** Driveways should be located at either side of the building when rear access or alleys do not exist. Garage doors should not be placed on the main façade or readily visible side elevations. Where side yards are too narrow to accommodate a vehicle, and front-yard parking occurred historically, this pattern may be continued.

35.2 **A grid system may be installed in the soil to allow vehicular access without compacting the soil and allow for grass to be planted in the front yard.**

35.3 **Pervious paving materials may be substituted when they convey the same visual appearance as the historic material, such as pervious concrete for historic concrete and brick set in a permeable base for brick.**

35.4 **New driveways should be of traditional paving materials that are appropriate for the period of the house, such as brick, concrete, crushed oyster shell, sand, or gravel.** Alternative materials which resemble these materials may also be appropriate. Black asphalt driveways are not appropriate.

35.5 **Paving in front yards for parking areas is not appropriate.**



Parking for high increase building elevation projects should not be at the front of the house accessed directly from the street (left). It is more appropriate to provide parking at the rear of the house or beneath the house via a side driveway (right).