



Chesterfield Heights Flood Retrofit Design Guidelines





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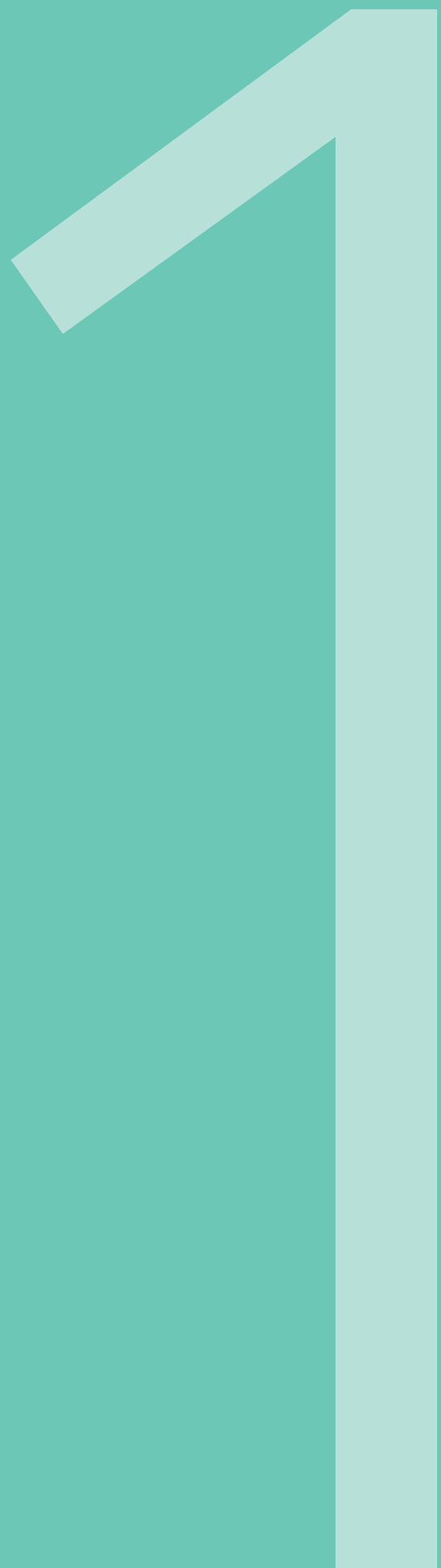
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CHAPTER ONE

Flood Mitigation and Historic Resources

Introduction

Flood mitigation is a concern that is impacting a growing number of historic resources and districts. The impact is a result of both increased risk and changing policies intended to protect communities from flood events. While flood considerations and retrofit alternatives guidelines for historic resources have not been adopted to date in Norfolk, it is important to have them in place as the impact of flooding on historic resources and historic districts continues to increase. Within the National Flood Insurance Program (NFIP) floodplain management minimum requirements, [Federal Emergency Management Agency](#) (FEMA) provides two relief options for historic structures located within the [Special Flood Hazard Area](#) that localities may choose to adopt into their floodplain ordinances.

EXEMPTION OPTION

The first option, referred to in this document as the “exemption option,” excludes [Historic Structures](#) from the definition of “[Substantial Improvement](#),” which would typically require a building to be brought into compliance with the floodplain ordinance.

EXCEPTION OPTION

The second option, referred to as the “exception option,” provides relief for historic structures through a [variance](#). In both cases, a building must meet the specific definition of a “Historic Structure” as defined by the Code of Federal Regulations (CFR) 44 Part 59 and a locality’s floodplain ordinance. FEMA has also begun to implement the new NFIP risk rating methodology known as [Risk Rating 2.0](#), which began for new policy holders on October 1, 2021 and for all existing policy holders on April 1, 2022. Previously, flood insurance rates have been determined using a Flood Insurance Rate Map (FIRM), which places emphasis on a property’s elevation within a designated flood zone.

With the new Risk Rating 2.0, FEMA is able to incorporate additional flood risk variables and equitably determine insurance premiums based on individual home values and the unique flood risks of individual properties.

The City of Norfolk has adopted the FEMA NFIP approved exemption option in the city floodplain ordinance for historic structures within Special Floodplain Hazard Areas. This relief option allows specifically defined historic structures to be exempted from floodplain ordinance requirements triggered by substantial improvements unless the proposed retrofits will result in a loss of character-defining features and historic designation. Although historic resources are provided an exemption, property owners are encouraged to incorporate resiliency measures to the extent possible utilizing alternate mitigation options that will not negatively impact the historic character of the building. **As always, it is important to coordinate with the City of Norfolk Department of City Planning to ensure compliance with the city zoning ordinance and other requirements.**

These guidelines are intended to assist property owners with retrofit designs that are compatible with and complementary to the major infrastructure work undertaken in the Virginia Landmarks Register and National Register of Historic Places Chesterfield Heights Historic District through the [Ohio Creek Watershed Project](#). The information provided herein incorporates data and priorities identified in the City of Norfolk’s resiliency documents, such as [Vision 2100](#) and [Norfolk’s Resiliency Strategy](#). In addition to following local objectives, these guidelines have been developed utilizing guidance provided by FEMA, which administers the NFIP and is a nationally recognized leader in regulatory practices for flood retrofit design. This chapter also follows guidance from the National Park Service Technical Preservation Services, [the National Center for Preservation Technology and Training](#) (NCPTT), and from emerging best practices as documented through research and fieldwork. The guidance is intended to assist design professionals, property owners and the Architectural Review Board (ARB) in efforts to protect resources within the Chesterfield Heights Historic District while minimizing impacts to the historic integrity and character of a property. It is important to underscore that non-contributing (i.e. non-historic) and contributing (historic) properties are addressed differently in this document owing to a wider array of options afforded to historic properties by regulatory agencies.

This document follows the direction presented in Vision 2100 and other city resiliency plans and policies by establishing priorities based on risk, geography, and topography to ensure that project design focuses on reducing the risk and extent of damage, positioning resources to be more quickly repaired post-storm event, and adjusting the resources to

new conditions to ensure that regular maintenance and renovations adequately account for and address anticipated future risk. In this document, we will collectively refer to mitigation, adaptation, and resilience planning for National Register of Historic Places and Virginia Landmarks Register designated historic resources as ‘retrofits’.

Prior to beginning project planning, please make sure to meet with the City of Norfolk Floodplain Administrator to determine if review is required.

Types of Inundation that Impact Historic Resources

FLOOD CONSIDERATIONS

Understanding the fundamental risks presented by flooding is a critical precursor to implementing any retrofit design. The types of water influences that impact historic resources include:

- Inland and tidal overflow
- Runoff and stormwater management
- Land subsidence and shoreline erosion
- Wave action
- Rising water tables
- Storm intensity and frequency

One publicly accessible resource available for Norfolk residents is the [Norfolk Flood Risk Learning Center](#), which provides individual property flood risk information for most single-family, duplex, and triplex homes in the city. Other resources available for assessing individual property risk for various types of water inundation and climate risks are [riskfactor.com](#) and [climatecheck.com](#). The scenarios presented above each present specific challenges and varying impacts to historic resources. Therefore, identifying the particular risk for an historic property is critical to planning a successful retrofit.

Another important variable to account for is the frequency and duration of potential flooding:

NUISANCE FLOODING

- Sunny day events
- Storm drain blockage/overflow
- Infrastructure damage
- Rising groundwater levels/subsidence
- Impacts of development and/or retrofits from adjacent properties

EVENT-BASED FLOODING

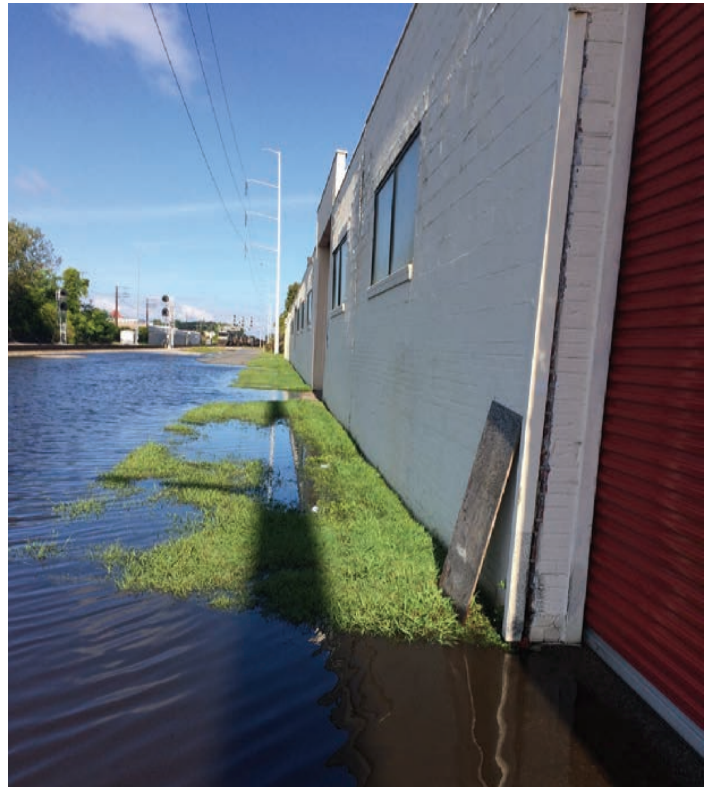
- Stormwater conveyance system overflow
- Storm surge
- Infrastructure failure
- Wave action
- Compound flooding (combined surge, tide, wave, and/or rain)
- Impacts of development and/or retrofits from adjacent properties

The City of Norfolk has undertaken the Ohio Creek Watershed Project to “*establish a resilient community capable of withstanding the influences of sea level rise, storm surge, and heavy rainfall that are expected to occur between now and 2065.*”¹ Major infrastructure and landscaping changes have occurred in Chesterfield Heights as a result of this project, which will result in changes to the character of storm and flooding events in the district. Flooding events in Chesterfield Heights have historically been caused by tidal flooding and/or precipitation, with the most significant flooding occurring during a confluence of events, such as winds, precipitation, and high tides, as seen during many Nor’easters. These events combined with antiquated stormwater systems result in significant flood risk for Chesterfield Heights.

¹ City of Norfolk, “Ohio Creek Watershed Project: Final Environmental Impact Statement,” (January 2019) 13.

Factors that Determine Necessary Mitigation Measures

The frequency and duration that water breaches a structure has a direct impact on the integrity of the resource, the budget and intensity of intervention warranted, the quality of life for owners and users of historic properties, and the planning horizon for the viability of the building. Incorporating these factors are critical to planning a successful retrofit. It is important to take knowledge of past flood drivers into account when planning for retrofits. In Chesterfield Heights, the changes to the neighborhood will likely reduce the frequency of flooding. This will require monitoring and analysis of conditions prior to retrofit design.



CHAPTER TWO

A large, stylized number '2' is rendered in a light green color, set against a solid medium green background. The '2' is composed of two concentric, thick curved lines that form the shape of the digit, starting from the top right and curving around to the bottom left.

Planning for Flood Mitigation

Considering Historic Materials in Mitigation and Adaptation Strategies

Typically, property owners follow FEMA best practices in development of retrofit designs. However, FEMA has acknowledged that the best practices may at times preclude a building from retaining its historic status or may undermine the physical and architectural integrity of the resource. The guidance documents below set forth FEMA's recognition of the special considerations for retrofitting historic buildings.

- FEMA. "[Reducing Risk to Residential Buildings That Cannot Be Elevated](#)." FEMA P-1037. September 2015.
- FEMA. "[Homeowner's Guide to Retrofitting: Six Ways to Protect Your Home from Flooding](#)." FEMA P-312, 3rd Edition. June 2014.
- FEMA. "[Flood Damage-Resistant Materials Requirements](#)." Technical Bulletin 2. August 2008.
- FEMA. "[Engineering Principles and Practices for Retrofitting Flood-Prone Residential Structures](#)." FEMA P-259. January 2012.
- FEMA. "[National Flood Insurance Program \(NFIP\) Floodplain Management Bulletin: Historic Structures](#)." FEMA P-467-2. May 2008.



Flood Damage-Resistant Materials Requirements

for Buildings Located in Special Flood Hazard Areas in accordance with the National Flood Insurance Program

Technical Bulletin 2 / August 2008



Reducing Flood Risk to Residential Buildings That Cannot Be Elevated

FEMA P-1037 / September 2015



Homeowner's Guide to Retrofitting

Six Ways to Protect Your Home From Flooding

FEMA P-312, 3rd Edition / June 2014



Engineering Principles and Practices

for Retrofitting Flood-Prone Residential Structures (Third Edition)

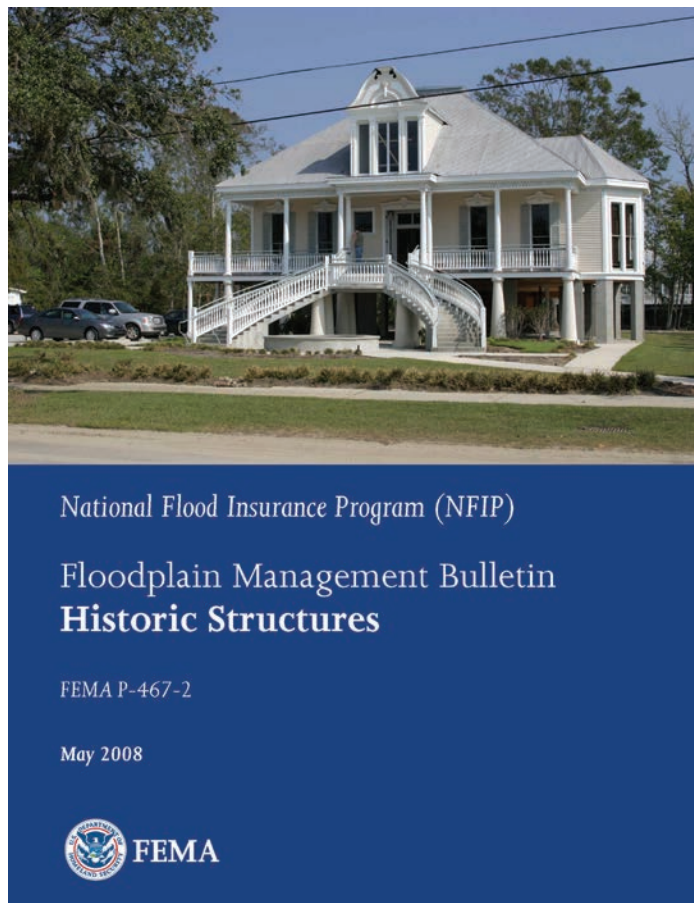
FEMA P-259 / January 2012



Historic Structures in the Floodplain Ordinance

The guidance provided by FEMA for appropriate retrofits acknowledges that historic properties perform differently and, as a result, are not always well served by recognized best practices. Therefore, they enable localities to either provide exceptions to typical compliance requirements for historic properties, or provide exemptions to compliance requirements. These guidelines have adopted the exemption alternative to be in alignment with the City of Norfolk Floodplain Ordinance. It is important to understand that the exemption option specifically exempts historic properties from FEMA requirements. In Norfolk, owners of designated historic structures are exempt from the typical floodplain ordinance requirements. However, it is important to pursue risk reduction even if the standard FEMA mitigation options are inappropriate for the historic property. In cases where an alternative retrofit design is warranted, it must be approved by the local flood plain manager as providing an adequate level of protection. After receiving approval from the floodplain manager, the retrofit designs for properties in the Chesterfield Heights Historic District must also be reviewed and approved by the ARB based on the guidelines below to ensure that the retrofit is appropriate and would not compromise the contributing historic designation of the resource.

Please contact the [City of Norfolk Floodplain Administrator in the Department of City Planning](#) for further information regarding the application process for retrofit alternatives.



FEMA Technical Bulletin P-476-2 Historic Structures explains specific measures to be taken when working on historic buildings that are in a floodplain

NPS Guidance and Emerging Research

Both the public and private sectors have been involved in the emerging research and testing of the flood resiliency of historic building materials. The [National Park Service Technical Preservation Services](#) division has published “[Guidelines on Flood Adaptation for Rehabilitating Historic Buildings](#)” after their first round of materials testing, and will be undertaking additional testing in the near future. In the private sector, [RISE](#), a non-profit economic development organization, has funded Hampton Roads businesses such as Building Resilient Solutions (BRS),

which provides flood resiliency retrofits informed by testing in a controlled lab setting, and Resilient Enterprise Solutions (RES), which offers a Home Raising Academy to train contractors, engineers and plan reviewers on the means and methods of home elevations, including the complex project management, financing and public engagement components. The focus on retrofits for historic properties is relatively new so it is important to keep up to date as additional information is made available.



THE SECRETARY
OF THE INTERIOR'S
STANDARDS FOR
REHABILITATION &

GUIDELINES
ON **FLOOD
ADAPTATION** FOR
REHABILITATING
HISTORIC
BUILDINGS



U.S. Department of the Interior
National Park Service
Technical Preservation Services

CHAPTER THREE



Mitigation and Adaptation Options and How to Implement in Historic Properties

Factors to Consider in Design of Retrofits

The first step for initiating a retrofit design for a designated historic property is to consider the particular flood risks, property owner capacity and goals, and material composition and integrity of the subject resource. The property owner and design team should consider FEMA and NPS recommended retrofits, and alternative options, in the following context:

- Assess flood risks for subject property (current and future)
- Determine time frame and costs of desired flood protection solution
- Determine the current damage/deterioration from water inundation and flooding
- Evaluate the magnitude, frequency, and duration of future risk events for the property
- Consider the long-term outlook for property viability, public policy impacts, and financial capacity of property owner
- Establish whether the resource is contributing or non-contributing to determine whether it is eligible for a FEMA exemption



Dry floodproofing measures are intended to prevent flood waters from entering the structure by using a permanent or deployable barrier.

DRYPROOFING*

This path envisions protecting the building by preventing water infiltration. It requires the building to be sealed during flood events, and so is best deployed in scenarios with short and infrequent flood risk, and for properties where it is feasible to prevent water from breaching the exterior envelope.

WETPROOFING*

This option is available and encouraged for properties eligible for the FEMA exemption. It contemplates preventing or minimizing damage by allowing water to freely flow into a building, and ensuring the building materials are durable and resilient against short term water damage. This option is good for properties that are at risk for event-based flooding which cannot be properly dryproofed. Wetproofing is generally more acceptable for non-residential properties, or non-residential first floor spaces. In instances of limited flood exposure, some historic materials may be appropriate for wet floodproofing, as described below.



Wet floodproofing allows flood waters to enter the structure so that forces are equalized on both sides of the walls to prevent damage. Materials that are resistant to damage from flood waters are used inside the structure.

* Note that there are scenarios where a hybrid of wet- and dry-proofing has been utilized.



Flood logs as part of a dry floodproofing system



Deployable flood logs at the exterior entrance of a building as part of a dry floodproofing system

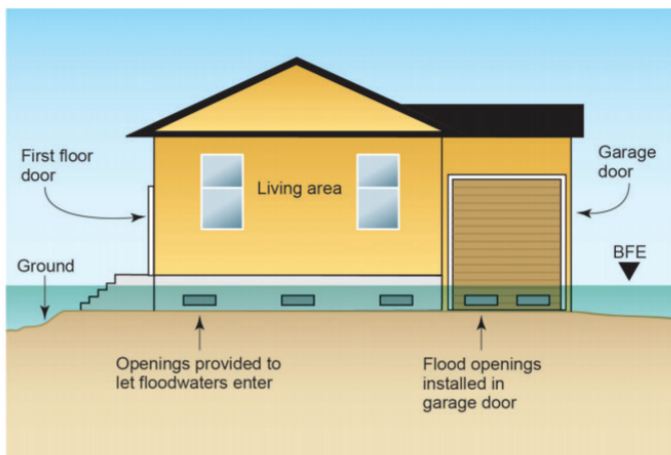


Figure 4: Flood openings and their placement

Flood openings are what allow water in to equalize forces on foundation walls in a wet floodproofing system

FEMA Compliant Options

Always begin project planning by considering FEMA NFIP endorsed strategies and approved retrofit options. These options are recognized by federal, state, and local governments as appropriate and are therefore eligible for flood insurance rate reductions and are considered the appropriate starting point for retrofit planning.

As these are FEMA compliant options, they do not trigger ARB review unless there is local, state, or federal funding or permitting involved. Please contact the City of Norfolk Floodplain Administrator to determine whether review is required. If review is required, below are the guidelines that should be used. Even if review by the ARB is not required, these are valuable recommendations to consider as a private property owner.

BASEMENT FILL

- Determine foundation and building walls possess sufficient structural capacity to accommodate lateral forces introduced with new fill.
- Determine source of flooding, confirm filling basement will not invite water to undermine integrity of foundation material.
- Assess ground water levels to ensure there is no risk of absorption of ground water into foundation walls.
- Ensure grading promotes runoff away from building (both on site and in larger geographic area).
- Ensure downspouts and leaders are proper distance from foundation walls.
- Avoid eliminating holding space for stormwater management (i.e. excess water) by infilling basement without compensating elsewhere on site.
- Ensure that infill material is reversible and can be removed from the building without causing permanent damage.
- Monitor foundation wall structural integrity and moisture levels for a minimum of 3 months post retrofit.
- Utilize existing openings in building to introduce infill material. If no openings exist, establish opening in minimally visible area. Utilize a simple hatch to seal and allow future access for visual inspection.
- If existing openings must be sealed as a result of basement infill, retain historic features and seal from behind to avoid altering the historic exterior of the building.
- Maintain a minimum of 18 inches of clearance between the new fill level and the bottom of girders.

- Ensure that the final fill level is not below the lowest adjacent exterior grade, so as to avoid constructing a subgrade crawl which will trap and pond standing water.
- Install flood vent(s) along the side wall with the lowest adjacent grade to ensure proper drainage of any standing water.

INSTALL FLOOD VENTS

- Evaluate topography to ensure the building is sufficiently high on the site or street to prevent ponding resulting in stagnant water under the building. Avoid installing flood vents on buildings located at a topographically low point, as that will invite standing water under the building.
- Ensure source of flooding is flowing water that can pass freely post event. Flood vents may not be an appropriate solution if flowing water is not the source of flooding at a property. Ensure proper grading under crawl and around foundation prior to installation of flood vents.
- Provide sump (if needed) to eliminate excess water below flood vents within crawl.
- Avoid undermining structural integrity of foundation wall when inserting flood vents by properly distancing vents from overhead load points and from other vents.
- Ensure vegetation is properly cut back (and regularly maintained) to prevent vegetative growth into flood vents.
- Ensure that vents are not clogged and will open properly upon application of modest pressure; field check annually.
- When sizing and locating flood vents, minimize visual impact by concealing flood vents behind existing site features and landscaping, or placing them in minimally visible areas.
- Purchase vents in a color to match or complement the surrounding features, such as coal chute plates, access doors, air vents, etc. Do not paint vents as the paint can cause the mechanical parts to stick over time and prevent proper opening.

RAISE MECHANICAL SYSTEMS

- Ensure mechanical systems are well protected above design flood elevation.
- When feasible, group all elevated mechanical equipment in one location.
- Situate elevated mechanical systems for minimal visual impact to historic resource(s) by locating them on secondary elevations and avoiding conflicts with windows, porches, or design features.

- When feasible, elevated mechanical systems should be cantilevered off the building, or located to a hidden area of a flat roof, rather than situated on high platforms extending from the ground. They should be mounted in a reversible manner that does not damage historic material.
- Ensure that access to elevated equipment for service and repairs is accomplished in a manner with minimal visual impact to the resource and surrounding district.
- Where feasible, screen elevated mechanical equipment such as air-conditioning units, satellite dishes, small cell facilities, water heaters, etc. with appropriate screening materials (i.e. live hedge, wood board, brick). Height should be no taller than necessary to conceal the appurtenance from the public right-of-way.



Elevated exterior mechanical systems should be cantilevered off the building when feasible, rather than situated on high platforms extending from the ground.



In this building, the mechanical systems in the basement level have been raised above the design flood elevation.

RAZE

Razing, or demolishing, an historic building that is structurally sound and does not present a life safety hazard is rarely appropriate, as it results in a permanent loss that diminishes the overall integrity of the district. Saving a structure is also far more sustainable than demolition, reducing the impact on landfills. Therefore, all alternatives must be exhausted before a structure is demolished. In such instances, the assessment of imminent flood risk to the building and justification for razing should be properly documented, utilizing the following guidelines.

Additionally, reuse of the structure may allow for more appropriate flood mitigation alternatives than what may be economically feasible or technically feasible for the existing use. An example might be to change the use of the structure from a residential use to a non-residential/commercial use. This will allow for a greater degree of dry floodproofing to be performed since engineers are guided by standards in ASCE 24 that recognize inherent risks to life associated with residential use (e.g. an engineer may be unwilling to certify a dry floodproofing concept for a residential use with greater than 3 feet of flooding anticipated, but may be willing to certify the concept for a nonresidential use with an evacuation plan). Some commercial uses may provide a greater economic justification to support the level of engineering and construction needed to properly protect the structure.

Another example may include a transition to a water-dependent use (sometime referred to as a “functionally dependent” use); a use which cannot perform its intended purpose unless it is located or carried out in close proximity to water (e.g. docking facilities, port facilities, water-related storage, kayak or boat storage, dock shower, etc.).

During the review process, the structure and its integrity should be evaluated to determine if it is still considered a contributing resource to the district. If a property suffering from recurring flood impacts is determined no longer contributing, then no further evaluation is necessary under these guidelines.

If, however, the structure is found to be contributing, the following factors must be considered before demolition can be approved.

Condition

- Is the structure structurally unsound or would it require unreasonable repairs to be deemed salvageable?
- Does the property have a track record of active flooding, maintenance violations or neglect?

Impact To Historic Integrity Of The District

- Will the removal of the structure negatively impact the historic integrity of the district?
- How rare is the style or type proposed for demolition?
- Is it in a visible or prominent location within the district?

GUIDELINES FOR SUBMITTING AN APPLICATION FOR DEMOLITION

Document the Condition

- Record the exterior and interior in its historic context with photography and scaled drawings.
- Salvage, or allow to be salvaged, historic materials from the structure, particularly significant features or materials.

Discuss Alternatives to Demolition

Discuss alternatives to demolition with Staff and the ARB. Alternatives could include:

- Redesigning the project to eliminate the need for demolition.
- Redesigning the project to incorporate the building.
- Selling the structure.
- Relocating the structure within the district.
- Relocating the structure outside the district.



DO — This elevated home utilizes landscaping to reduce the visual impact of the elevation.



DO NOT — These elevated homes have exposed concrete block and new stairs/decks that are disproportionate to the buildings. This is a dramatic and visually intrusive solution.

Identify the Impact to the Property and Adjacent Properties

- Identify the impact of the demolition on the subject property and any adjacent or surrounding properties.
- Preserve site features that are not connected with the demolished structure. Protect these features and minimize ground disturbance from heavy construction equipment during demolition and any subsequent construction.

ELEVATE

In some instances, elevating an historic building is appropriate. When evaluating elevation, consider the structural and functional viability of the building along with the frequency and duration of risk as well as economic analysis. Elevation should only be considered when no other less invasive solution will adequately protect the resource. The visual impact of elevating a building can be mitigated through careful design of the foundation, addressing impacts to first floor features, and consideration of landscape and site planning that reduces visual effects. Furthermore, the overall impact of elevation is related to the magnitude of the elevation. Therefore, carefully consider the extent of the proposed elevation change when considering elevation.

Proposals to elevate should demonstrate consideration of the relationship of the elevated resource to existing historic site features (adjacent structures, walls, fences, etc.). Consideration should also be given to adjacent streetscape, scale and building patterns.

Demonstrate Consideration of Other Alternatives:

- Wetproofing
- Dryproofing
- Relocating of building to another part of site
- Limited grading or introduction of offset retaining walls
- Green infrastructure solutions such as landscaping and grading

General Guidelines

- Maintain an appropriate relationship of primary building entrances to the site.
- Retain and continue the use of existing circulation patterns.
- Utilize design features and materials in keeping with the resource to minimize the impact of elevation on the overall visual character.
- Extend siding over the new foundation if appropriate
 - Maintain the relationship of windows to each other and the site.

- Employ design decisions to reduce visual impact of mass of new foundation wall.
- Utilize the site and implement landscape design to reduce required elevation and/or visual impact.
- Retain and preserve historic staircases, handrails, and porches.
- Retain and reuse foundation material and detailing.
- Ensure that the new foundation material and design is of comparable quality to the historic material and design.
- Consider the relationship of the elevated building to adjacent buildings, mitigate visual impacts resulting from elevation.
- Retain and extend chimneys.
- Retain gardens, walls, and site features.
- Retain and preserve historic fenestration patterns.
- Ensure eave heights are addressed and visually logical.
- Retain and preserve the historic stair configuration when such a feature is character-defining and its preservation is technically feasible.
- Account for floor-to-floor relationships between the subject building and adjacent buildings and structures.
- Parking

Consideration of Foundation Details

- Utilize material and detailing that is in keeping with the historic foundation.
 - Salvage and reuse historic foundation material wherever feasible.
- Ensure structural members are appropriately located for visual cohesion.
- Continue existing foundation design elements into the extended foundation design.
- When feasible, limit vent locations to secondary elevations and areas with minimal visibility.
- For foundations raised over 4'0", incorporate subtle relief in the foundation wall to break up its expanse.
 - Introduce reveals in brickwork.
 - Consider a water table or decorative detail.
 - If a vent is necessary on façade, consider a custom cover in keeping with the historic character of the resource.

Consideration of Site Features

- Incorporate terraced landscaping to break up the visual impact of the elevation.
- Consider vegetative screening to reduce the visual impact of the higher foundation.
- Retain historic site features, circulation patterns, and landscape materials.

Non-FEMA Compliant Options

When the FEMA/NFIP alternatives for retrofitting an historic building for flood resiliency do not adequately address the specific site conditions and building needs, there is an option to apply for an exemption to FEMA/NFIP requirements. The exemption application process is designed to evaluate the appropriateness and effectiveness of the proposed alternative retrofits for the subject property. In other words, it does not exempt a property owner from pursuing retrofits designed to reduce risk, rather it exempts the property owner from following FEMA recognized practices when they are inappropriate for an historic resource. Prior to considering an alternative retrofit, it is important to confirm that all appropriate preventative maintenance measures have been taken to protect the building from water and flood damage.

ARB review is triggered when a property owner requests an exemption and utilizes non-FEMA compliant retrofits to improve their property's flood resiliency. This review ensures that implementing the retrofit allows the property to retain its historic character, while still reducing risk.

MAINTENANCE AND REPAIR ITEMS

- Evaluate gutters and downspouts for effectiveness. Repair as needed.
- Ensure leaders are sufficient in length and pitch to direct water away from the building and its foundation.
- Evaluate grading to ensure water is directed away from the building.
- Ensure that there is an opportunity for groundwater and vapor to escape the crawl space and foundation walls.
- Properly seal and flash any openings in the basement or crawl space walls to prevent introduction of water.

- Ensure sump pumps are working properly.
- Ensure that there is sufficient (2' minimum) clearance of vegetation and impervious material from your foundation wall to facilitate evaporation.
- Ensure HVAC drainage is directed away from the building.
- Remove moisture/vapor barriers where they are inappropriate or failing.
- Where feasible, replace failing moisture barriers with vapor-permeable membrane.
- Install perimeter drain(s) where needed.

DESIGN GUIDELINES FOR ALTERNATIVE RETROFITS

- Document the local, state and or national register designation of the historic resource.
- Document the flood zone and base flood elevation for the resource.
- Document the flood risk and or damage occurring to the historic resource.
- Document the detrimental impacts or inadequacy of FEMA/NFIP approved retrofits to address specific flood risks and damage for the historic resource.
- Provide proposed alternative retrofits, including design details, materials, and anticipated outcomes.
- Provide a justification for how the proposed retrofit specifically addresses documented risk to the resource.
- Provide a justification for how the design of the retrofit protects the historic integrity and character of the resource.
- Provide information about how the proposed retrofit meets the building treatment design guidelines according to the proposed project plan. If any elements deviate, address why those incongruencies are necessary to address flood risk.
- Using the Table of Stillwater Elevations (Table 2) from the FEMA Flood Insurance Study for Norfolk and an elevation certificate, extrapolate the annual exceedance probability from the finished floor elevation of the structure to determine the anticipated frequency of flooding to occur above the finished floor or any particular historic material in question of repair/replacement.
- Calculate the difference between the base flood elevation and finished floor elevation to determine the anticipated height of flooding above the finished floor during a 1% annual chance flood event.

Building Treatment for Contributing Properties

By following these guidelines, the historic resources seeking an exemption for flood retrofit requirements will continue to retain their form, integrity, and materials while addressing existing and future flood risk.

General Preservation Principles

The preservation principles have been adapted and simplified from the **Secretary of Interior Standards for Rehabilitation (SOIS-Rehab)** ([see APPENDIX D](#)). The building treatment recommendations are worded to give flexibility in their application in order to protect the integrity and significance of a wide variety of resource types.

Maintenance, Repair, and Replacement Guidelines for Historic Properties

MASONRY

MAINTENANCE AND REPAIR GUIDELINES

1. **Inspect the masonry and mortar for signs of damage or deterioration. This includes exterior wall surfaces and chimneys.**
 - a. Make note of areas where masonry or mortar is deteriorating, as this is often a sign of moisture infiltration.
2. **Preserve Historic Materials**
 - a. Only replace areas of damaged or deteriorated historic material. Do not remove historic material that is in salvageable condition.
 - i. Brick, Natural Stone, Concrete Block
 1. Hire a qualified mason to undertake any masonry repairs or repointing.
 2. Unpainted masonry should remain unpainted; if previously painted, it may be

repainted.

- a. Remove any remaining flaking or peeling paint to a sound substrate and lightly sand, if necessary, to achieve a good paint bond.
 - b. Clean the wall surface using the gentlest means possible. If power-washing, do so with less than 300psi.
 - c. Repaint with appropriate products. The applicant should ensure paint type is compatible with existing paint or properly primed to avoid failure of the new paint. Follow the manufacturer's recommendations for a number of applications to ensure proper adhesion.
 3. Install chimney caps that do not change the character of the historic chimney.
3. **Preserve and restore the visibility of historic materials**
 - a. If historic materials are found underneath modern materials, remove modern materials and re-expose the historic exterior finish.
 - b. If the historic material would be damaged by removing modern materials, the modern finish may be retained.
 - c. Do not install modern materials on top of historic materials.
 - d. Do not remove historic materials to facilitate the installation of modern materials.

REPLACEMENT GUIDELINES

1. If masonry units require replacement, new brick should match the historic in color, texture, size, and composition.
2. If the historic masonry requires replacement, but is no

longer available, use a new material that replicates the dimensions, profile, and texture of the historic material.

3. When mortar requires repointing, new mortar should match the historic in color, texture, composition, strength, joint profile, and tooling pattern.

- a. Refer to the [National Park Service Preservation Brief 2](#) for instructions on repointing mortar.

WOODWORK

MAINTENANCE AND REPAIR GUIDELINES

1. Inspect woodwork and finishes for signs of damage or deterioration.
 - a. Make note of areas where paint is peeling or wood is deteriorating, as this is often a sign of moisture infiltration.
 - b. Look at siding, porches, doors, trim and decorative ornament for: mold/mildew, rot, termite and insect infestation, squirrel and other animal infestations, vegetation and infiltration.
2. Preserve Historic Materials
 - a. Only replace areas of damaged or deteriorated material; replacement material should match the historic in material, dimensions, and profile (See “Replacement” section for further guidelines). Do not remove historic materials that are in salvageable condition. In particular, follow the below guidelines for specific woodwork types:
 - i. Wood Siding
 1. Prime exterior wood siding prior to repainting to ensure adhesion. Provide adequate drying time prior to repainting.
 2. Back-prime new wood before installing to give more longevity and protect against moisture infiltration.
 3. Select moisture resistant replacement wood to prevent premature deterioration. Source old-growth wood for increased durability wherever possible (such as pine, spruce, fir, redwood, & cedar).
 - ii. Porches
 1. Maintain the character-defining features of front porch, including the height, width, roof pitch, columns, railings, decorative details, and materials.
 - iii. Doors and surrounds
 1. Retain original doors and features

including moldings, transoms, sidelights, trim, mail slots, hinges, glass, and any other decorative or utilitarian features (including screen doors if present).

2. Weather strip historic doors to reduce air infiltration; utilize flood logs to prevent seepage from standing water during major storm events.
- iv. Preserve and restore the visibility of historic materials.
 1. If historic woodwork is found underneath modern materials, remove modern materials and re-expose the historic exterior finish.
 2. If the historic woodwork would be damaged by removing modern materials, the modern finish may be retained.
 3. Do not install modern materials on top of historic materials.
 4. Do not remove historic materials to facilitate the installation of modern materials.

REPLACEMENT GUIDELINES

1. If the historic woodwork requires replacement, but is no longer available, new material should match the historic woodwork.
 - a. Use appropriate moisture and rot resistant replacement materials as they are available; if historic materials are not available, utilize a new material that imparts the same visual characteristics.
 - b. Only replace areas of wood siding that cannot be repaired; match the dimensions, profile, and appearance of the surrounding wood siding.

- c. When an alternate material is proposed, the applicant must demonstrate why the replacement material is suitable for use in a flood prone environment and also on a historic resource.
- d. Replacement of any woodwork should match the historic material, design, and profile in order to retain the character of these features.

WINDOWS AND ASSOCIATED FEATURES

In limited instances, historic windows on the lowest level of a building may be impacted by flooding and therefore require a retrofit. This guidance is intended to assist property owners in making retrofit decisions which minimize the impact to the overall building, even in instances where windows must be abandoned or replaced to prevent damage from inundation and flooding.

REPLACEMENT GUIDELINES

1. Where feasible, retain existing historic windows and provide for proper maintenance.
2. If windows are regularly admitting water, consider temporary solutions such as flood logs, which can be installed and removed easily.
3. If a window requires replacement, use flood safe replacement windows in generally the same configuration as the historic window being removed.
 - a. Where feasible, install landscaping, louver(s) or grille(s) to obscure the visual impact of the new window(s) on the overall dwelling.
4. Limit flood retrofit replacements to those windows that absolutely must be retrofitted, for example those that are regularly admitting water into the building.
5. If a window opening must be sealed, remove the window and inset masonry so that the original window opening is evident.
 - a. Minimize visual impact by selecting a brick color compatible to the surrounding building materials;
 - b. Alternately, parge and paint the inset panel.
 - c. Where feasible, landscape to obscure the infilled opening from view.

A large, stylized number '5' in a light teal color, positioned on the right side of the page. The '5' is composed of a thick vertical bar and a curved bottom section, with a horizontal bar at the top. The background is a solid teal color.

CHAPTER FIVE

Process for City Review (if necessary)

After reviewing these guidelines, if the most appropriate path forward for a contributing property in the Chesterfield Heights Historic District is to pursue a Special Flood Hazard Area exemption, a property owner must complete a Request for Review. This form is located in [Appendix B](#).

**Note: Within the Chesterfield Heights Historic District, only contributing properties are eligible for this exemption. Non-contributing properties are not eligible and must conform to the City of Norfolk's Floodplain Ordinance requirements. See [Appendix C](#) for a map of Contributing and Non-Contributing properties within the Chesterfield Heights Historic District.*

Filling out the Request for Review: Historic Structures in a Special Flood Hazard Area Form

The Chesterfield Heights Historic District is listed in the **National Register of Historic Places and the Virginia Landmarks Register**, and as such, property owners of contributing resources within the Chesterfield Heights Historic District should **select option 2 on the Request for Review form: "Certified or preliminarily determined by the Secretary of the Interior as contributing to the historical significance of a registered historic district or a district preliminarily determined by the Secretary to qualify as a registered historic district."**

Following the requirements of the form, property owners should include references to any portions of the floodplain ordinance that are applicable to their property, as well as reference to the Substantial Improvement exemption for Historic Structures (City of Norfolk Zoning Ordinance Article 3.9.7 ([FPCH-O: Floodplain/Coastal Hazard Overlay](#)), Definition 36(b)). Under "Proposed Project Development," owners should document how and why the applicable floodplain ordinance requirements are not feasible for their property and details of the proposed alternate retrofits. All of the required attachments must be included with the application.

Once the property owner has completed and signed the application, it must be submitted to the City of Norfolk Floodplain Administrator for review and approval. Applications should be submitted to the Norfolk Department of City Planning.



CHAPTER SIX

Appendix A — Glossary

BASEMENT FILL: A treatment measure for historic buildings that involves filling the basement with material such as gravel, soil, sand or grout. The material must reach the same level as the ground surrounding the building. This method can only be used for a basement that is below ground level on all sides and of masonry construction.

CONTRIBUTING RESOURCE: A building, site, structure, or object adding to the historic significance of a property.

DESIGN GUIDELINES: Criteria which provide direction to projects regarding design, and help to ensure that rehabilitation projects and new construction respect the character of designated buildings and districts and appropriately manage change.

DRYPROOFING: This path envisions protecting the building by preventing water infiltration. This is the default approach for residential structures that are not eligible for a FEMA exemption. It requires the building to be sealed during flood events, and so is best deployed in scenarios with short and infrequent flood risk, and for properties where it is feasible to prevent water from breaching the exterior envelope.

ELEVATION: A treatment measure that involves raising the height of the building by lifting the building from the existing foundation, constructing a higher foundation, and resetting the building on the new base.

EVENT-BASED FLOODING: Event-based flooding may be caused by waterway overflow, storm surge, infrastructure failure, or impacts of development and/or retrofits from adjacent properties.

FEMA: The Federal Emergency Management Agency is an agency of the United States Department of Homeland Security whose purpose is leading the Nation's efforts to prepare for, protect, and mitigate against, respond to, and recover from the impacts of natural disasters and man-made incidents or terrorist events.

FLOOD VENTS: A treatment measure that allows water to flow under and through a building during a flood event, relieving hydrostatic pressure buildup that can destroy walls and foundations.

FUNCTIONALLY DEPENDENT USE: Also known as water-dependent use, a use which cannot perform its intended purpose unless it is located or carried out in close proximity to water.

HISTORIC CHARACTER: The sum of all visual aspects, features, materials, and spaces associated with a property's history.

HISTORIC DISTRICT: A geographically definable area, urban or rural, possessing a significant concentration, linkage, or continuity of sites, landscapes, structures, or objects, unified by past events or aesthetically by plan or physical developments. A district may also be composed of individual elements separated geographically but linked by association or history. Within these design guidelines, Historic District refers to a district that has been listed on the National Register of Historic Places and Virginia Landmarks Register, such as Chesterfield Heights. It does not refer to locally designated historic districts.

HISTORIC SIGNIFICANCE: The meaning or value ascribed to a structure, landscape, object, or site based on the National Register criteria for evaluation. It normally stems from a combination of association and integrity.

HISTORIC STRUCTURE: As defined by the City of Norfolk Zoning Ordinance Article 3.9.7 (FPCH-O: Floodplain/Coastal Hazard Overlay), Section G. Definitions, a "Historic Structure" is *any structure that is:*

- d. *Listed individually in the National Register of Historic Places (a listing maintained by the Department of Interior) or preliminarily determined by the Secretary of the Interior as meeting the requirements for individual listing in the National Register;*
- e. *Certified or preliminarily determined by the Secretary of the Interior as contributing to the historical significance of a registered historic district or a district preliminarily determined by the Secretary to qualify as a registered historic district;*
- f. *Individually listed on the Virginia Landmarks Register; or*
- g. *Designated individually as a landmark or as a contributing structure within a locally designated historic district, to the extent such designation is permitted under and done in accordance with provisions of this Ordinance.*

INTEGRITY: The authenticity of a property's historic identity, evidenced by the survival of physical characteristics that existed during the property's historic period.

NATIONAL PARK SERVICE (NPS): A bureau of the U.S. Department of the Interior which is responsible for the preservation of natural and cultural resources.

NATIONAL PARK SERVICE PRESERVATION

BRIEFS: Preservation Briefs provide information on preserving, rehabilitating, and restoring historic buildings. Preservation Briefs can be accessed [online](#).

NATIONAL REGISTER OF HISTORIC PLACES (NRHP):

The United States' official list of buildings, structures, sites, objects, and districts that embody the historical and cultural foundations of the nation, established in 1966 and managed by the National Park Service.

NON-CONTRIBUTING RESOURCE: A building, site, structure, or object that does not add to the historic significance of a National Register of Historic Places or Virginia Landmarks Register listed Historic District.

NFIP: The National Flood Insurance Program provides flood insurance to property owners, renters, and businesses, and having this coverage helps them recover faster when floodwaters recede. It works with communities required to adopt and enforce floodplain management regulations that help mitigate flooding effects.

NUISANCE FLOODING: Flooding that typically does not cause major property damage or threats to public safety, but can disrupt daily activities, place added strain on infrastructure such as roads and sewers, and may cause minor property damage. Nuisance flooding may be caused by sunny day events, storm drain blockage or overflow, infrastructure damage, rising groundwater levels or subsidence, or the impacts of development and/or retrofits from adjacent properties.

PRESERVATION: The act or process of applying measures necessary to sustain the existing form, integrity, and materials of an historic property. Work, including preliminary measures to protect and stabilize the property, generally focuses upon the ongoing maintenance and repair of historic materials and features rather than extensive replacement and new construction. New exterior additions are not within the scope of this treatment; however, the limited and sensitive upgrading of mechanical, electrical, and plumbing systems and other code-required work to make properties functional is appropriate within a preservation project.

RAISE MECHANICAL SYSTEMS: A treatment measure that involves raising mechanical systems above the design flood elevation to protect them from damage during flood events.

RAZE: Complete demolition of an historic building to clear the site. Razing, or demolishing, an historic building that is structurally sound and does not present a life safety hazard is rarely appropriate, as it results in a permanent loss that diminishes the overall integrity of the district. All alternatives must be exhausted before a structure is demolished, and the assessment of imminent flood risk to the building and justification for razing should be properly documented.

REHABILITATION: The act or process of making possible an efficient compatible use for an historic structure or landscape through repair, alterations, and additions while preserving those portions or features which convey its historical, cultural and architectural values.

RISK RATING 2.0: Risk Rating 2.0 is FEMA's update to the National Flood Insurance Program, replacing the previous flood insurance rate methodology based on Flood Insurance Rate Maps (FIRMs). This new system incorporates a variety of flooding variables to equitably distribute premiums across all policyholders based on home value and a property's unique flood risk.

SECRETARY OF INTERIOR'S STANDARDS FOR REHABILITATION (SOIS-Rehab): The set of standards that are regulatory for historic rehabilitation tax credit projects and are applied to all certified historic structures (interior and exterior) as well as the site and related new construction.

SPECIAL FLOOD HAZARD AREA (SFHA): An area having special flood, mudflow or flood-related erosion hazards. The SFHA is the area where the National Flood Insurance Program's (NFIP's) floodplain management regulations must be enforced and the area where the mandatory purchase of flood insurance applies. In Norfolk, this is defined as the land in the floodplain subject to a one percent or greater annual chance of being flooded. These are designated as AE, AH, AO, VE, and Coastal A on the Flood Insurance Rate Map (FIRM).

SUBSTANTIAL IMPROVEMENT: As defined by the City of Norfolk Zoning Ordinance Article 3.9.7 (FPCH-O: Floodplain/Coastal Hazard Overlay), Section G. Definitions, a "Substantial Improvement" includes *any reconstruction, rehabilitation, addition, or other improvement of a structure the cost of which either:*

- a. *Equals or exceeds 50 percent of the market value of the structure before the "start of construction" of the improvement. This term includes structures which have incurred "repetitive loss damage" regardless of the actual repair work performed; or*
- b. *Over a ten-year period, equals or exceeds 50 percent of the market value of the structure at the time of the most recent proposed improvement.*

Notwithstanding the above, the term does not include any of the following:

- a. *Any project for improvement of a structure to correct existing violations of state or local health, sanitary, or safety code specifications which have been identified by the local code enforcement official and which are the minimum necessary to assure safe living conditions;*

- b. *Any alteration of a “historic structure” provided that the alteration will not preclude the structure’s continued designation as a “historic structure”; or*
- c. *Any improvements associated solely with elevating a structure above the DFE or DFE-AO.*

VARIANCE: The Variance option as defined by the NFIP and the Code of Federal Regulations (CFR) 44 Part 60.6, allows for variances to be issued for the repair or rehabilitation of historic structures upon a determination that the proposed repair or rehabilitation will not preclude the structure’s continued designation as a historic structure and the variance is the minimum necessary to preserve the historic character and design of the structure. As of the date of this document, the City of Norfolk does not utilize the Variance Exception for historic structures in Special Floodplain Areas.

VIRGINIA LANDMARKS REGISTER (VLR): Virginia’s official list of properties important to state history, established in 1966 and managed by the Department of Historic Resources (DHR).

WETPROOFING: This option is available for properties eligible for the FEMA exemption. It contemplates preventing or minimizing damage by allowing water to freely flow into a building, and ensuring the building materials are durable and resilient against short term water damage. This option is good for properties that are at risk for event-based flooding which cannot be properly dryproofed. Wetproofing is generally more acceptable for non-residential properties, or non-residential first floor spaces.

Appendix B — Request for Review — Historic Structure in a Special Flood Hazard Area

Applicant Information

Name: _____

Address: _____

City: _____ State: _____ Zip Code: _____

Email: _____ Phone: _____

Property Information

Property Owner Name: _____

Email: _____ Phone: _____

Name of Structure: _____

Address: _____

City: _____ State: _____ Zip Code: _____

Latitude and Longitude: _____

Select the definition this historic structure falls under (select all that apply).

Supporting documentation must be included (see required attachments below).

1	<input type="checkbox"/>	Listed individually in the National Register of Historic Places (a listing maintained by the Department of Interior) or preliminarily determined by the Secretary of the Interior as meeting the requirements for individual listing on the National Register.
2	<input type="checkbox"/>	Certified or preliminarily determined by the Secretary of the Interior as contributing to the historical significance of a registered historic district or a district preliminarily determined by the Secretary to qualify as a registered historic district.
3	<input type="checkbox"/>	Individually listed on a state inventory of historic places in states with historic preservation programs which have been approved by the Secretary of the Interior.
4*	<input type="checkbox"/>	Individually listed on a local inventory of historic places in communities with historic preservation programs that have been certified either: <ul style="list-style-type: none">• By an approved state program as determined by the Secretary of the Interior or• Directly by the Secretary of the Interior in states without approved programs.

**Number 4 applies to historic structures listed on a local inventory in a Certified Local Government. These structures should also be reviewed by the local preservation program. For a list of Certified Local Governments in Virginia, please visit this website: <https://www.dhr.virginia.gov/certified-local-government/list-of-clgs-in-virginia/>*

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Community & Floodplain Information

Community Name: _____

Local Floodplain Administrator Name: _____

FIRM Panel: _____ Flood Zone: _____ Base Flood Elevation: _____

Structure Use (select one): Residential Non-residential

A mixed-use building in which the total floor area devoted to non-residential uses is less than 25% of the total floor area within the building, the structure is considered residential. Likewise, if the total floor area devoted to residential uses is less than 25% of the total floor area within the building, the structure is considered non-residential. ([FEMA NFIP Definitions](#))

Local Floodplain Ordinance Requirements

Please provide a detailed description of the requirements this structure must meet to be compliant with the local floodplain ordinance. If there is more than one option for compliance (e.g. elevate or dry-floodproof), please include in the description. Please identify the local floodplain ordinance sections that address these requirements. If additional space is needed, please attach additional pages.

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Proposed Project Development

Please provide a detailed description of the proposed work to meet the local floodplain ordinance requirements identified above. If there is more than one option for compliance (e.g. elevate or dry-floodproof), please include the proposed work for each option in the description. If specific products will be used, such as flood vents, these should also be described. Design plans, photos, etc. must be attached. If additional space is needed, please attach additional pages.

Required Attachments

<input type="checkbox"/>	Documentation of Historic Designation
<input type="checkbox"/>	Property deed
<i>Current Photos</i>	
<input type="checkbox"/>	Outside photos of the structure, from all sides
<input type="checkbox"/>	Contextual photo of the structure on the lot
<input type="checkbox"/>	Inside photos of the structure, as applicable
<i>Maps</i>	
<input type="checkbox"/>	Aerial Map of Property
<input type="checkbox"/>	Topographic Map of Property
<i>Building Plans/Designs</i>	
<input type="checkbox"/>	Design of proposed work for each available option for compliance
<input type="checkbox"/>	Photos of proposed products (e.g. flood vents)
<input type="checkbox"/>	Products information (brochure, fact sheet, specifications, etc.) for proposed products (e.g. flood vents) – brochure, fact sheet, etc.

Local Floodplain Administrator Acknowledgement

I have read the Local Floodplain Ordinance requirements and the Proposed Project Development descriptions outlined in this application. As the local floodplain administrator for _____, I have determined that the Local Floodplain Ordinance requirements described are correct. Additionally, the Proposed Project Development accurately reflects the work that would be needed to bring this structure into compliance with the Local Floodplain Ordinance.

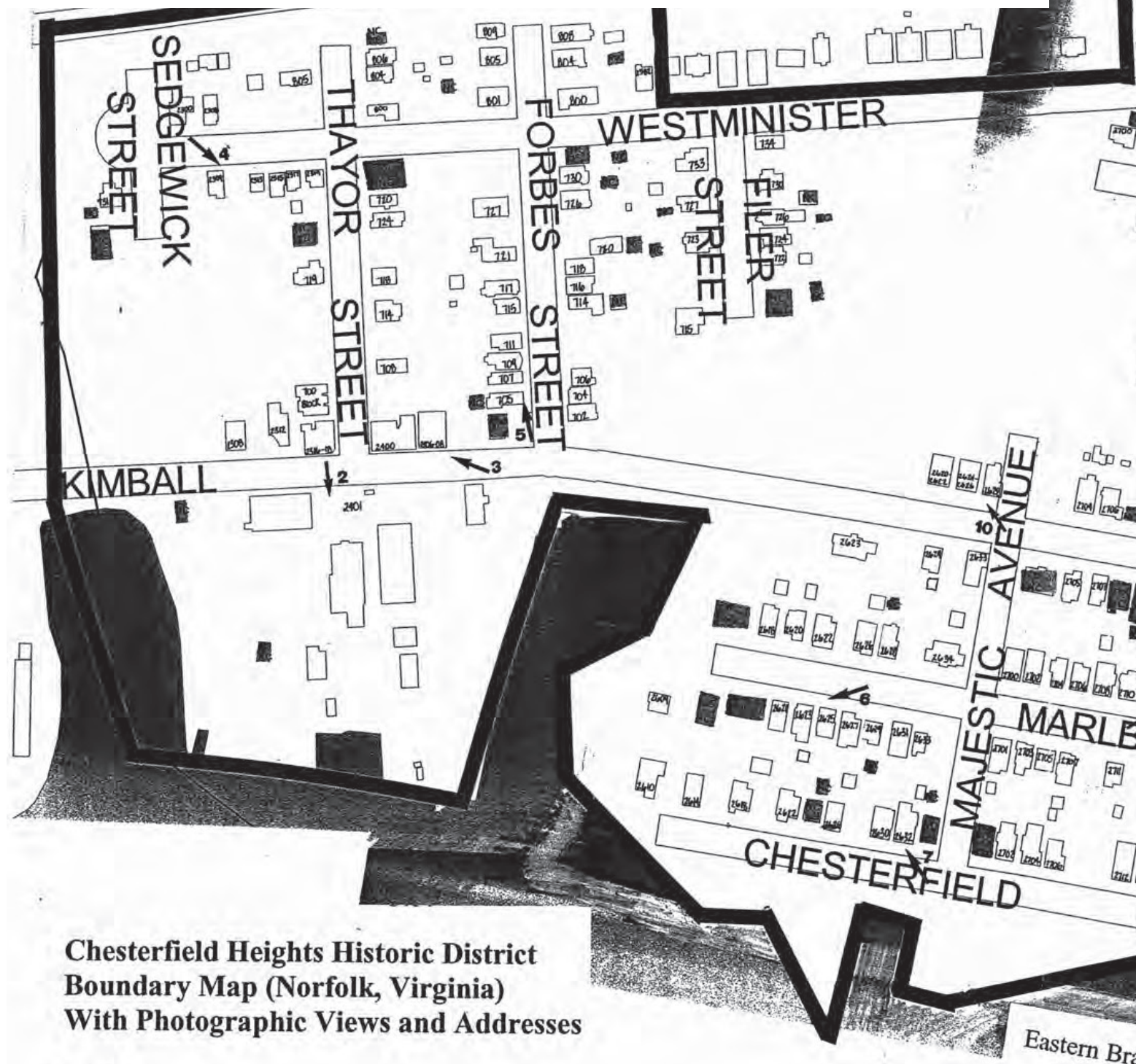
Signature

Print Name

Date

Draft

Appendix C — Contributing/Non-Contributing map for Chesterfield Heights HD



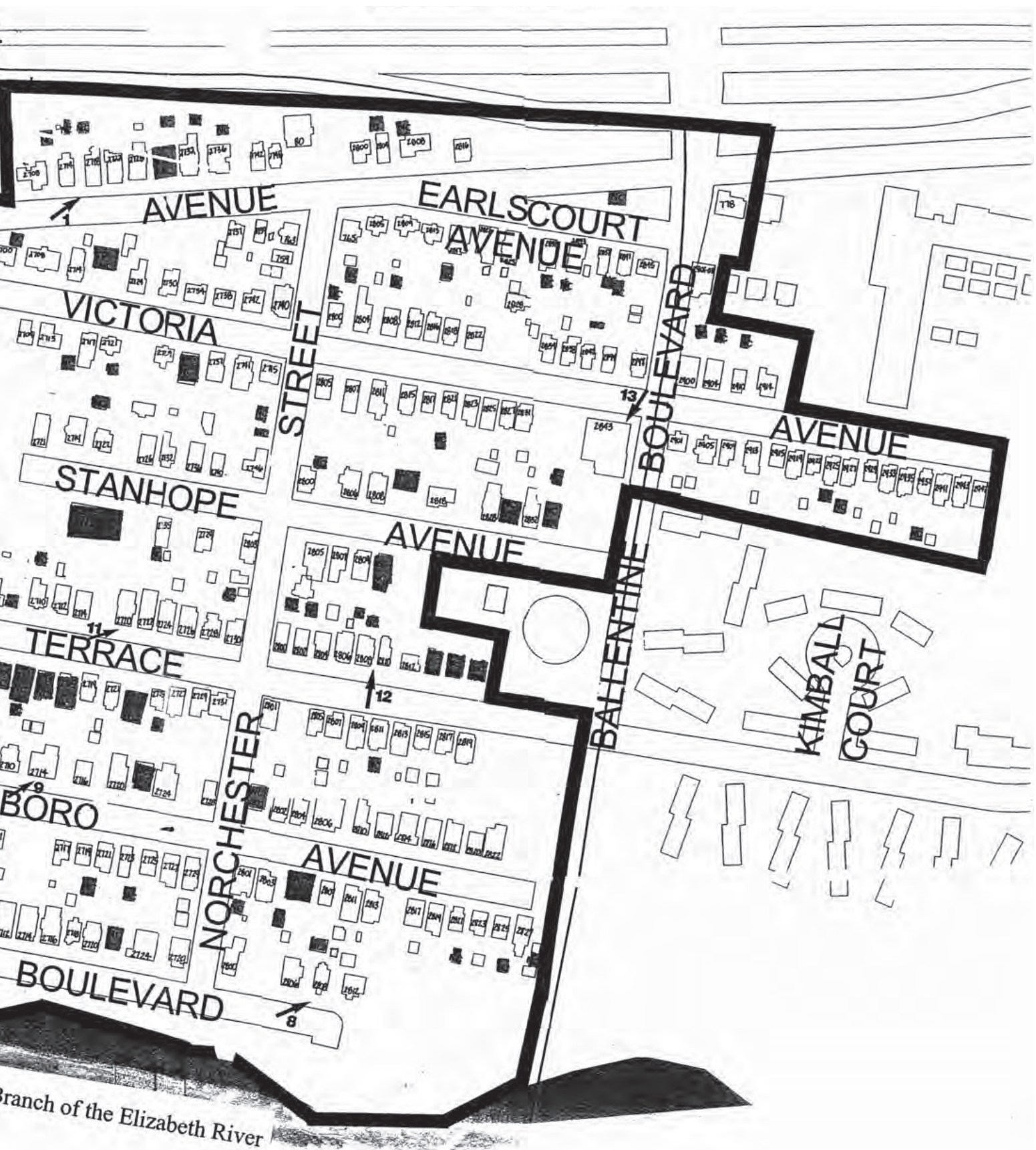
**Chesterfield Heights Historic District
Boundary Map (Norfolk, Virginia)
With Photographic Views and Addresses**

KEY

■ = Non-Contributing Resource

^

N Not To Scale



Appendix D — Secretary of the Interior Standards for Rehabilitation

The following Standards for Rehabilitation are the criteria used to determine if a rehabilitation project qualifies as a certified rehabilitation. The intent of the Standards is to assist the long-term preservation of a property's significance through the preservation of historic materials and features. The Standards pertain to historic buildings of all materials, construction types, sizes, and occupancy and encompass the exterior and the interior of historic buildings. The Standards also encompass related landscape features and the building's site and environment, as well as attached, adjacent, or related new construction. To be certified, a rehabilitation project must be determined by the Secretary to be consistent with the historic character of the structure(s) and, where applicable, the district in which it is located. The following Standards are to be applied to specific rehabilitation projects in a reasonable manner, taking into consideration economic and technical feasibility.

1. A property shall be used for its historic purpose or be placed in a new use that requires minimal change to the defining characteristics of the building and its site and environment.
2. The historic character of a property shall be retained and preserved. The removal of historic materials or alteration of features and spaces that characterize a property shall be avoided.
3. Each property shall be recognized as a physical record of its time, place, and use. Changes that create a false sense of historical development, such as adding conjectural features or architectural elements from other buildings, shall not be undertaken.
4. Most properties change over time; those changes that have acquired historic significance in their own right shall be retained and preserved.
5. Distinctive features, finishes, and construction techniques or examples of craftsmanship that characterize a historic property shall be preserved.
6. Deteriorated historic features shall be repaired rather than replaced. Where the severity of deterioration requires replacement of a distinctive feature, the new feature shall match the old in design, color, texture, and other visual qualities and, where possible, materials. Replacement of missing features shall be substantiated by documentary, physical, or pictorial evidence.
7. Chemical or physical treatments, such as sandblasting, that cause damage to historic materials shall not be used. The surface cleaning of structures, if appropriate, shall be undertaken using the gentlest means possible.
8. Significant archeological resources affected by a project shall be protected and preserved. If such resources must be disturbed, mitigation measures shall be undertaken.
9. New additions, exterior alterations, or related new construction shall not destroy historic materials that characterize the property. The new work shall be differentiated from the old and shall be compatible with the massing, size, scale, and architectural features to protect the historic integrity of the property and its environment.
10. New additions and adjacent or related new construction shall be undertaken in such a manner that if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired.

