

An aerial photograph of Governors Island, a lush green island in the New York Harbor. The island is covered in trees and has several buildings, including a prominent white cylindrical structure. In the background, the dense New York City skyline is visible, featuring numerous skyscrapers, with the Freedom Tower being the most prominent. The water of the harbor is a deep blue, and the sky is a light blue with some clouds.

# A Resilient Governors Island

Columbia GSAPP  
**Urban Planning Studio**  
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**A Resilient Governors Island**  
Urban Planning Studio

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# CONTENTS

Executive Summary	5
Project Background	6
Project Scope	14
Studio Mission	20
Proposal Development	24
Transportation	26
Resilience	38
Building Adaptation	44
Waterfront	54
Managed Retreat	72
Conclusion	82
References	84
Appendix	87



# EXECUTIVE SUMMARY

Hurricane Sandy was a call to action to protect New York City's low lying coastal areas. New York City has put forward extensive planning documentation and frameworks to address risks due to storm surge and sea level rise, and recent projects like Hunters Point South show a way forward of providing coastal resilience while simultaneously creating beautiful public spaces with views of the city's iconic skylines. With over 500 miles of coastline, New York City is vulnerable to a range of climate events, but protecting the coastline through a combination of green and gray infrastructure interventions affords the opportunity to rethink how the city incorporates the natural environment into the built environment.

Governors Island's location in the New York Harbor positions it right in the center of it all, making it vulnerable to coastal flooding while also serving as a test bed for coastal resilience strategies, public space, and education around climate change. This studio will focus on coastal resilience for Governors Island, employing several strategies that combine gray and green infrastructure to preserve the history and character of Governors Island while ensuring all New Yorkers can enjoy the public space and beauty it offers.

These recommendations include:

- 1. Expanded Accessibility:**  
By incorporating new piers into Governors Island's direct ferry service, a greater share of New Yorkers across the five boroughs can access Governors Island. By modernizing the fleet with vessels that can run more frequently, ferry services could support a greater number of visitors to Governors Island.
- 2. Building Adaptation:**  
Through several immediate building interventions, Governors Island's historic buildings can be protected from flood risks due to storm surge, lessening risks to new tenants to the island.
- 3. Waterfront Protection:**  
By strategically hardening portions of the island's perimeter, Governors Island's historic buildings can be protected from longer term risks due to sea level rise and worsening coastal storms.
- 4. Managed Retreat:**  
Through the strategic retreat of areas more difficult to protect, Governors Island can reincorporate nature into the island's coastline and serve as an educational opportunity by creating moments for reflection.

The above strategies will help to maximize the longevity of Governors Island for the enjoyment of all New Yorkers, and will serve as a model for coastal Resilience Strategies in New York City.



# PROJECT BACKGROUND

# LOCATION



Directly south of Manhattan and just off of Brooklyn’s waterfront sits Governors Island, a 172-acre island in the heart of New York City’s natural harbor. It is separated from Brooklyn by the 1/4 mile-wide Buttermilk Channel. Across the channel from the island is Brooklyn’s Red Hook waterfront, featuring several active industrial piers. 1/2 a mile to the north of Governors Island is the southern tip of Manhattan, the location of Battery Park, South Ferry, and the Financial District. To the west are historic Ellis and Liberty Islands.

Governors Island is currently open seasonally to the public from May through October, and is accessible

only by ferry. These ferries run regularly from the Battery Maritime Building in Lower Manhattan and from the Red Hook ferry terminal in Brooklyn. Passengers enter the island through Soissons Landing on the northern shore, and Yankee Pier on the eastern shore.

From 2005 onward, public access to the island was gradually expanded in concert with progress on development of a new park on the south part of the island. Today, Governors Island is open seasonally to the public and serves as a unique resource, offering New Yorkers a retreat within the city.



View of Downtown Manhattan from above Ft. Jay, Governors Island



View of the Statue of Liberty from the Hills in the Southern District



Governors Island was a seasonal fishing outpost of the Lenape people for most of its history. By the mid-17th century, it had been colonized by Dutch settlers, who used it for farming and recreation.



Early artwork depicting Governors Island and the invasion of Dutch Colonizers

Under British colonial rule, the island was given the name Governors Island. It was the site of colonial fortifications during the American revolution, and these temporary fortifications were eventually built up into Fort Jay and Castle Williams, which still stand today.



View of Downtown Manhattan from Castle Williams

During the 19th century, the island was used as an army garrison, serving as such during the War of 1812 and the Civil War. Many of the buildings constructed during this period, including barracks and a hospital, have been preserved as historic landmarks.



Fort Jay, as it stands today

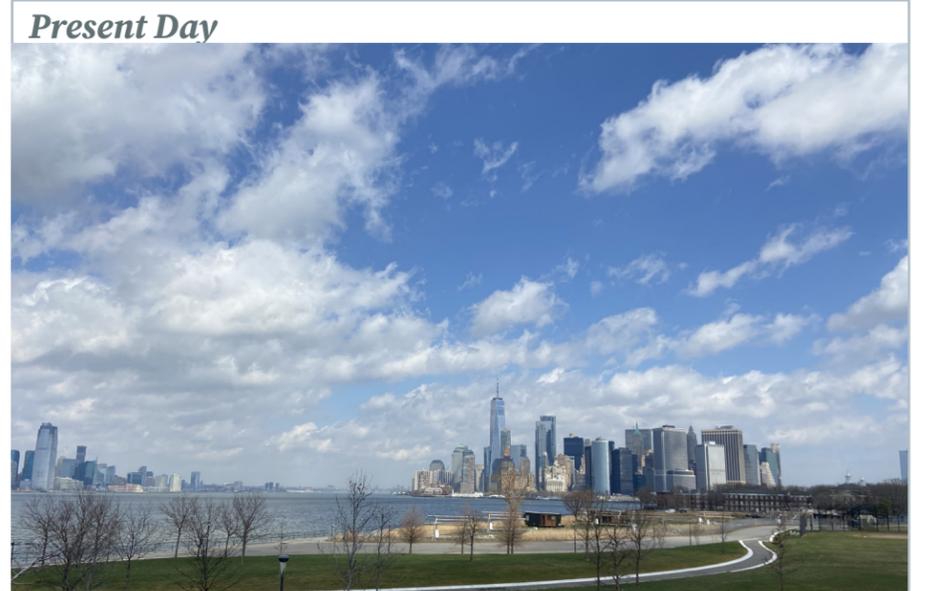
Until 1911, Governors Island was less than half the size it is today. Landfill from excavated subway tunnels was used to create the cone-shaped southern half of the island as it is today. This expansion allowed for further military construction during World War I.



Liggett Hall, the large building spanning the dividing line between the Northern and Southern District

By 1965, the army base was decommissioned, and the island was transferred to the Coast Guard. Residential buildings and amenities were built to support the island's Coast Guard community.

By 2003, all military operations on the island had ceased and ownership was transferred to a joint agency representing the city and state of New York.



# WHAT'S NEW?

The Park and Hills projects were completed in 2016, providing extensive resilience to the Southern half of Governors Island. In addition to creating several hills out of fill, the highest reaching over 70 feet, the new development replaced a large portion of the sea wall in the Southern District, adding in new rip-rap for added coastal protection. The old sea wall was used to create features and steps along the Hills development. This is part one of a broader redevelopment strategy on the southern half of Governors Island.



# THE TRUST'S VISION



In 2020, The Governors Island Trust, with the support of the New York City Mayors Office, unveiled plans to develop a Center for Climate Solutions on Governors Island. The Trust has three areas of focus for the future: public space and recreation, arts and culture, and climate change resilience. As part of this strategy, the Trust hopes to situate a Center for Climate Change Solutions on Governors Island, with an academic anchor as well as non-profit, cultural, and commercial institutions working on climate change strategies and solutions. There are ongoing development proposals and deliberations on the Southern District, but all proposals aim to combine seamlessly with a strategy of coastal resilience and adaptive reuse in the Northern District.

# PROJECT SCOPE

The scope of this project is focused on the historic Northern District of Governors Island, defined as the portion of Governors Island north of Division Road. The area is designated by the New York City Landmarks Preservation Commission as a Historic District, and it contains a national monument administered by the US National Parks Service.

This studio report will develop analysis of the current conditions on the island, including the risks posed by coastal storms and sea level rise. Using this analysis, this report will propose a site plan for different flooding scenarios, resilient waterfront typologies, adaptive reuse strategies, and flood resilience strategies for historic buildings, with consideration of the accessibility of Governors Island and its place as a unique public asset to New York City in the New York Harbor.



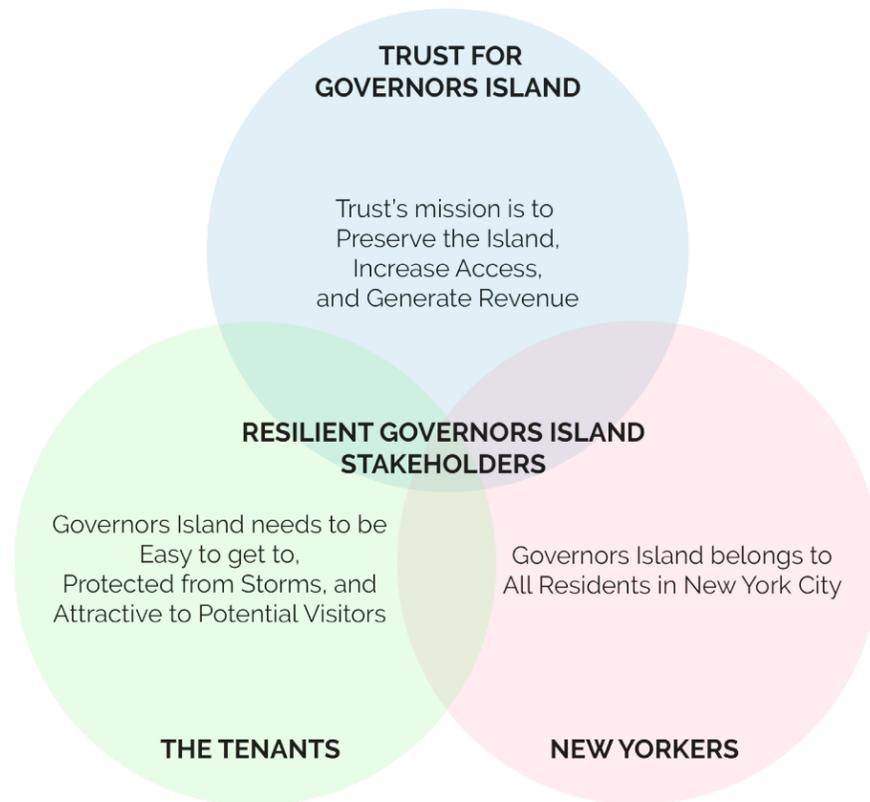
■ US Parks Service  
National Monument

■ Governors Island His-  
toric District

# KEY STAKEHOLDERS

## Client

Our client is The Trust for Governors Island. This non-profit organization formed by the City of New York is well-funded and well-connected. Headed by Clare Newman, the Trust's board includes real estate leaders, lobbyists and consultants. The Trust is concerned with increasing access to the Island and preserving the Island's longevity in the face of climate change.



## Tenants

The current tenants are interested in facilitating a well-protected and attractive Island. Their current assets need longevity, value, and utility. We want to attract future tenants to a thriving and unique island. To do this, we need to make Governors Island accessible while protecting land from coastal storms and rising sea levels.

## THE TRUST FOR GOVERNORS ISLAND



**Clare Newman,**  
President & CEO

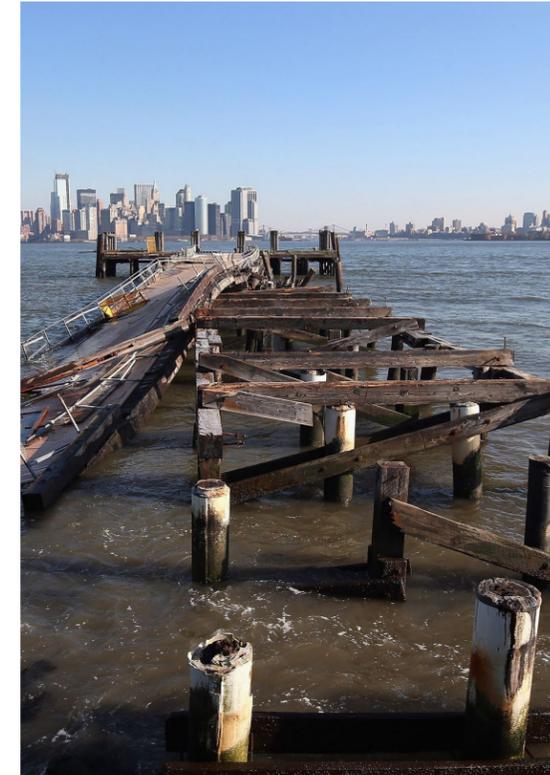


**Alex Brady**  
Director of Planning & Real Estate

## New Yorkers

Governors Island should serve as many New Yorkers as possible. The Island has potential to offer New Yorkers with limited access to green space, especially those living outside of 1/2 mile from the nearest park, an opportunity to enjoy the outdoors. Fundamentally, the Island is a public resource, but one that is difficult to get to for many New Yorkers in its current state.

# WHY NOW?



## Climate

The current context of climate change offers a narrow window of opportunity to protect Governors Island's historic structures and public spaces. The island is threatened by extreme weather events as demonstrated by 2012's Hurricane Sandy, which caused destruction across New York City. Additionally, the island is under the constant threat of sea level rise. With a 5-foot increase in sea level, almost half a million square feet of indoor real estate will be inundated. With a 10-foot rise, the loss increases to almost a million square feet. This loss would be compounded by the destruction of outdoor public spaces. In a worst-case emissions scenario, the NOAA predicts global sea levels to rise 8.2 feet by 2100.

A resilient Governors Island would feature site-level and building-level fortifications that allow the island to adapt to rising sea levels and to preserve as many historic structures and as much public space as possible. As rates of sea level rise accelerate and extreme weather events become more commonplace, climate adaptation becomes ever more urgent.

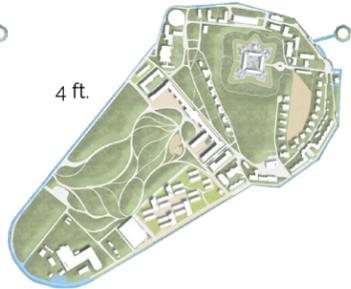
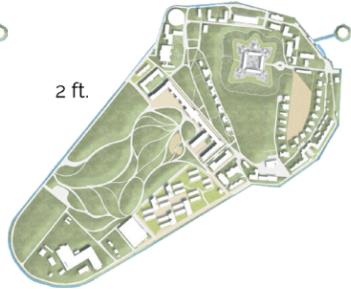
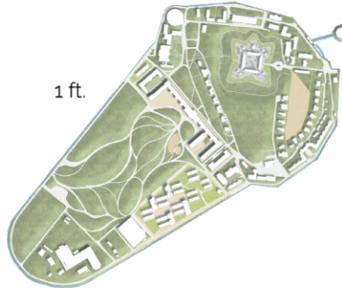
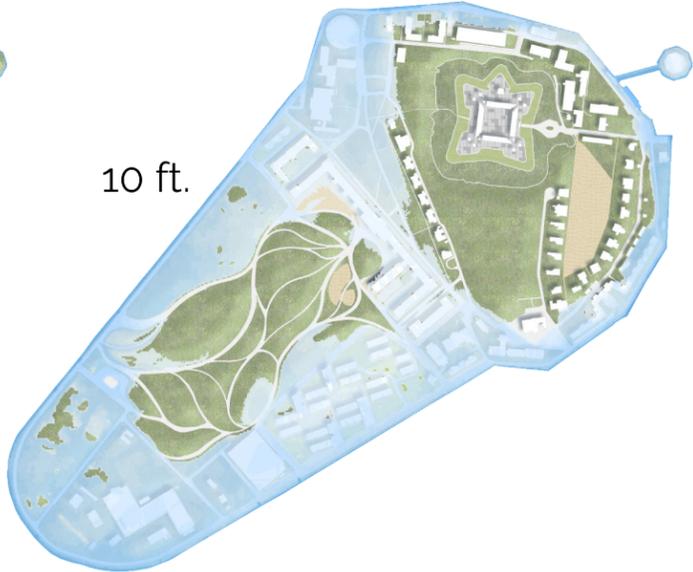
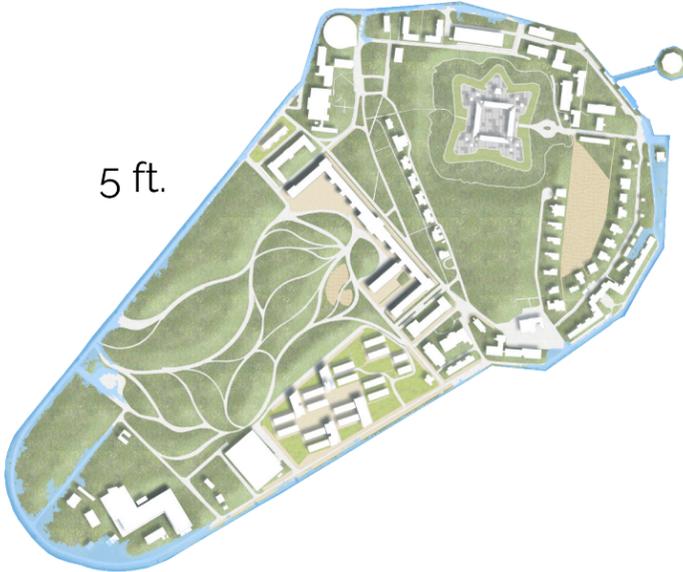
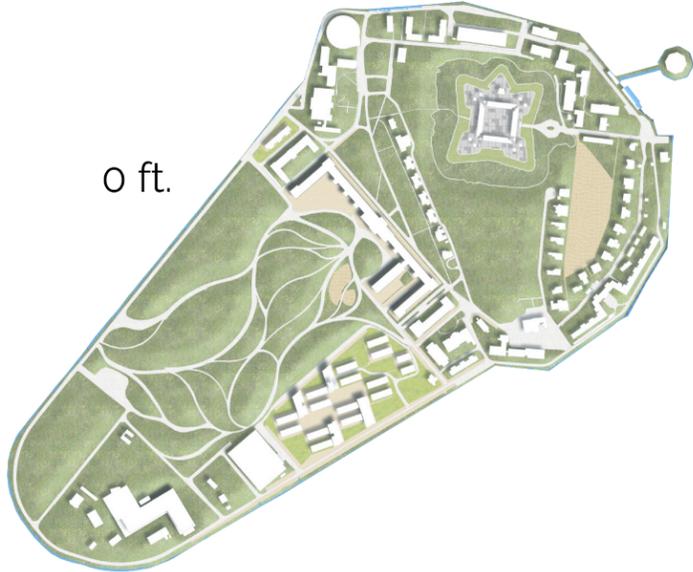
## COVID-19 and Public Space

The COVID-19 pandemic has brought the importance of access to public open space to the forefront of the planning field. The pandemic disproportionately affected minority and working-class populations across New York City, groups who often have little park space available to them. In the age of widespread restrictions on mobility and indoor activities, parks and open spaces have become more important than ever, allowing for vital recreation and safer socialization.

In the context of New York City's densely built urban environment, it is imperative not just to preserve a space like Governors Island, but to ensure it can be readily and routinely accessed by those who would benefit most, for as long as possible.



# SEA LEVEL RISE



Sea level rise poses minimal risks in the immediate short term to the historic buildings on Governors Island. At 2 feet of sea level rise, only buildings right on the sea wall are at risk to inundation. At 4 feet of sea level rise, none of the buildings at risk hold historic significance. However, even 2 feet of sea level rise paired with increasing coastal storm intensity and frequency begins to put more buildings on Governors Island at the acute risk of periodic flooding due to storm surge.

At 5 feet of sea level rise, several historic buildings start to experience chronic flooding, while the increased acute risk due to coastal storms starts to imperil a greater area of the Northern District. Buildings close to the waterfront would have to be abandoned and the pavement and infrastructure in this area would have to be relocated.

Under the NOAA's worst case scenarios, all of the Historic buildings along the waterfront would have to be abandoned by 2100, and much of the Northern District would be rendered uninhabitable without intervention, even without the added risk posed by coastal storms.



# MISSION

To maximize the longevity and enjoyment of the **public benefit** provided by Governors Island by equitably **increasing access**, **protecting** the island's physical geography, and **preserving** its historic character for future New Yorkers.



# PROPOSALS

# 1 ACCESSIBILITY



## ACCESSING THE ISLAND

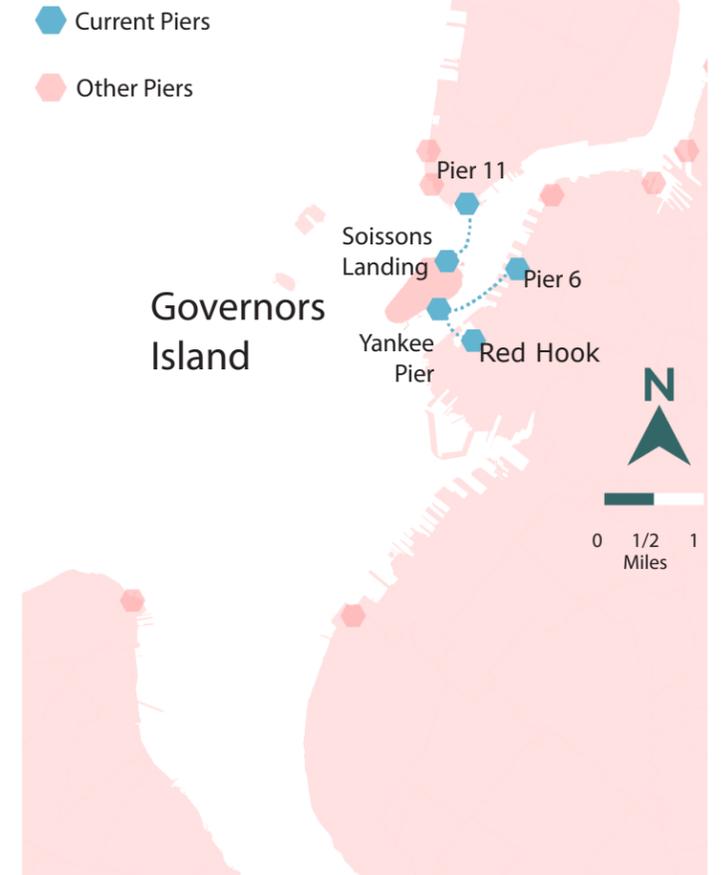
### **Current access to Governors Island**

Currently, Governors Island is only accessible by ferry. This is both a strength and a weakness, placing the island as a unique getaway option for New Yorkers, but making it difficult to get to.

For our research, we've conducted feasibility studies, and we believe that the best ways to increase access to the island is to simply increase ferry access up and down the East River. The East River ferry system has a major hub at Wall Street Pier 11 near the Battery in Manhattan.

By offering increased access to Pier 11, utilizing the city's pre-existing ferry stops, and allowing for transfers to the Governors Island ferry, we could create a more interconnected, citywide network of ferry access to the island.

Currently, NYCHA residents and NYC ID holders can come to Governors Island for free, but for many NYCHA residents, access to a ferry with direct access to Governors Island is limited. By expanding ferry access, we can also increase the reach of this program.

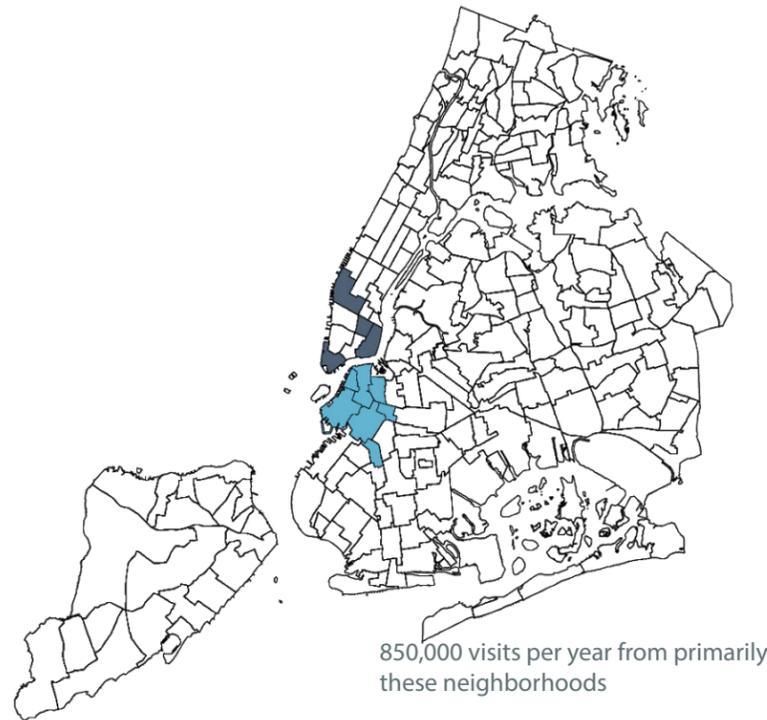


# PARK EQUITY IN NEW YORK CITY

## Focus

First, we believe Governors Island plays a critical role in advancing park equity city-wide, with a particular focus on nearby communities like Red Hook and Sunset Park, and more distant neighborhoods like Astoria in Queens and Soundview in the Bronx.

There are long standing inequities in park access for New York communities. During the pandemic we saw how essential park access was for New Yorkers. The Trust for Public Land estimates that during the pandemic 1.1 million New Yorkers did not live within a 10-minute walk of a park. And this is also against a backdrop in which many New Yorkers lack access to open space, one of the many parts of our built environment that disproportionately affects low income communities and communities of color.



## Equity and Open Space

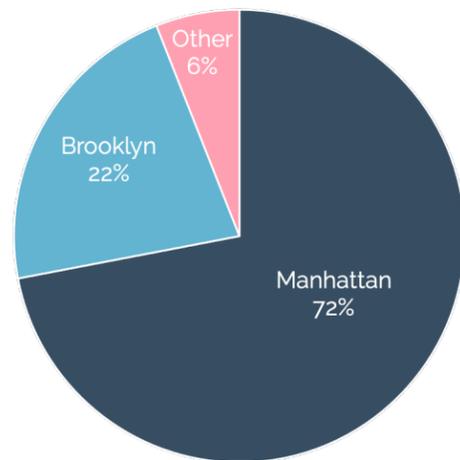
Governors Island sees visitors from all over but it is currently serving primarily more affluent neighborhoods like the Upper West Side and Park Slope. 72% of visitors come from Manhattan.

In predominantly white NYC neighborhoods, the average park size is 29.8, versus only 7.9 acres in predominantly black neighborhoods.

Of the city's neighborhoods with the highest asthma rates, many are low-income, predominantly people-of-color neighborhoods, such as Mott Haven in the Bronx and East Harlem in Manhattan.

We are interested in increasing the socioeconomic and racial diversity of Governors Island through increased accessibility.

With 172-acres of open, public space, the Island presents numerous opportunities for expanded equity in New York. While this does not substitute the need for greater park access closer to peoples homes, Governors Island can supplement that park access with beautiful outdoor spaces and unique experiences.



Visitors distribution per borough



## Why Increase Ferry Service and Access?

The Trust for Governors Island estimates that, in addition to providing \$1 billion in economic development for New York City, a rezoning of the island would create 8,000 jobs, which in turn would bring 8,000 more people to the island on a regular basis.

In order to make Governors Island economically self-sufficient, a viable jobs hub, and a year round attraction, it must be easier for New Yorkers to travel there.

In the interest of enhancing park equity in New York City, Governors Island serves a potentially important role. By expanding access to under-served communities in the outer boroughs and upper Manhattan, we could diversify the island's clientele and offer critical park space to under-served communities.

## Additional Interventions

Because new routes may add more cost onto the NYC Ferry system, we also propose different interventions:

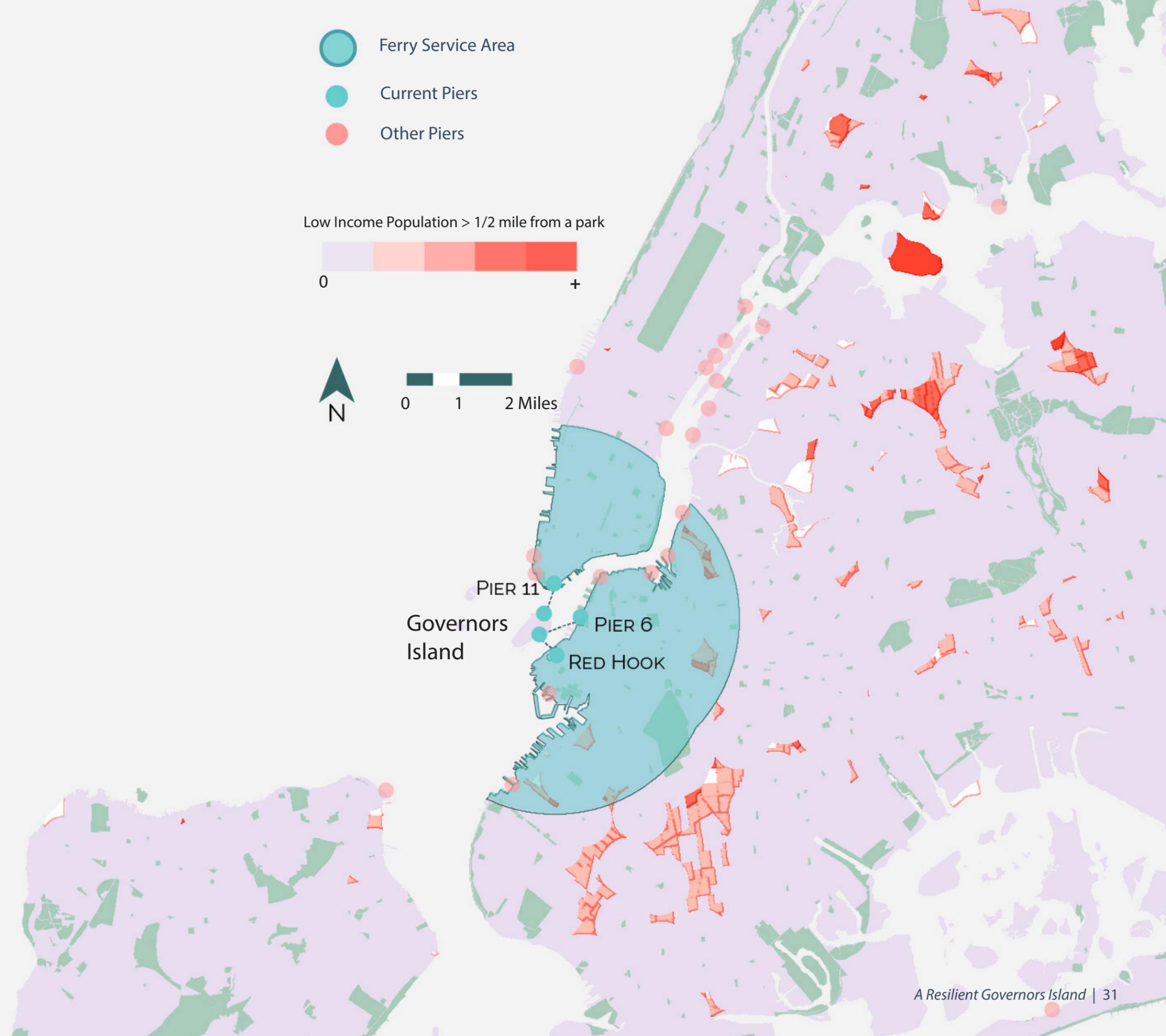
- **Fleet Modernization:** Replacing the Coursen ferries with a smaller ferry model that runs more frequently, ultimately increasing the frequency of visitors.
- **Rescheduling:** Offset the ferry schedule on the half hour by 5 minutes, to facilitate the a transfer from the Staten Island ferry.
- **Rearrange the piers:** Move vehicle and freight services from Soissons Landing to Lima Pier, allowing for greater capacity and flexibility at Soissons Landing.

# CURRENT REACH

Within the service area of the Governors Island ferries, which we define as a 3-mile radius, there are 1,101,332 New Yorkers who have easy access to a direct ferry to Governors Island. This population is mostly located in the South of Manhattan and around Red Hook, Brooklyn.

As the purpose is to not only increase the overall reach, but provide more equitable access, we wanted to analyze the number of people who are not within a 10 minute walk from parks and who have an income less than the median. The current ferry system to Governors Island serves only 172,879 people with those characteristics.

Our goal is to increase accessibility for those who are under-served by parks, so we will look at new ferry stops that could broaden the reach of ferries to Governors Island.



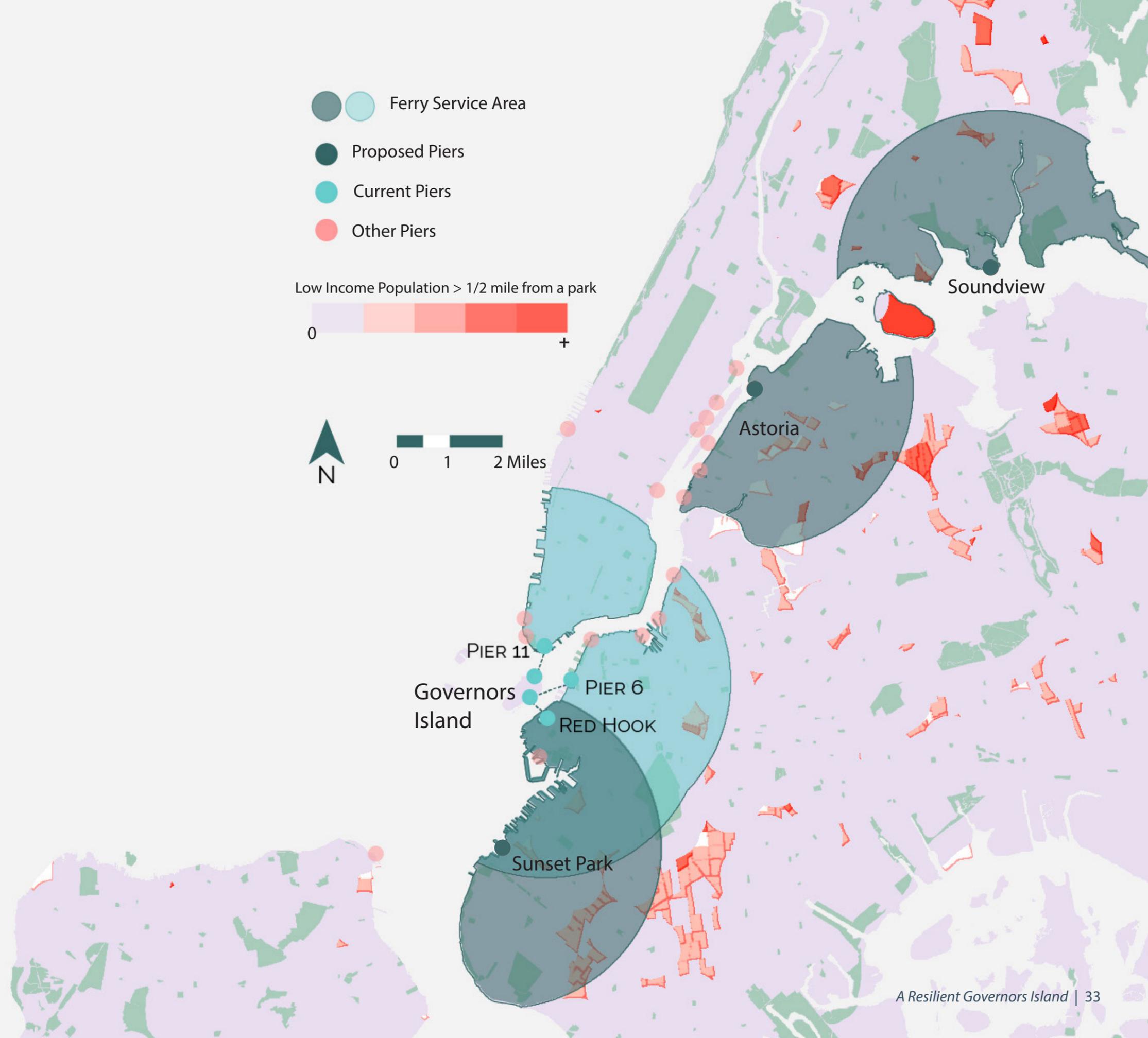
# INCREASED REACH

The red areas of this New York City map show low income areas who outside of a 10 minute walk from parks. With that in mind, we plan to build new ferry routes to expand equitable access to the Island. We have identified three landings that can serve to increase equitable reachability of the ferry system: Sunset Park, Astoria, and Soundview.

By doing so, the number of New Yorkers with easy access to Governors Island by Ferry can increase by 1,114,986, while the number of people under-served by parks' would increase by 397,670, more than tripling the number of people in this demographic.

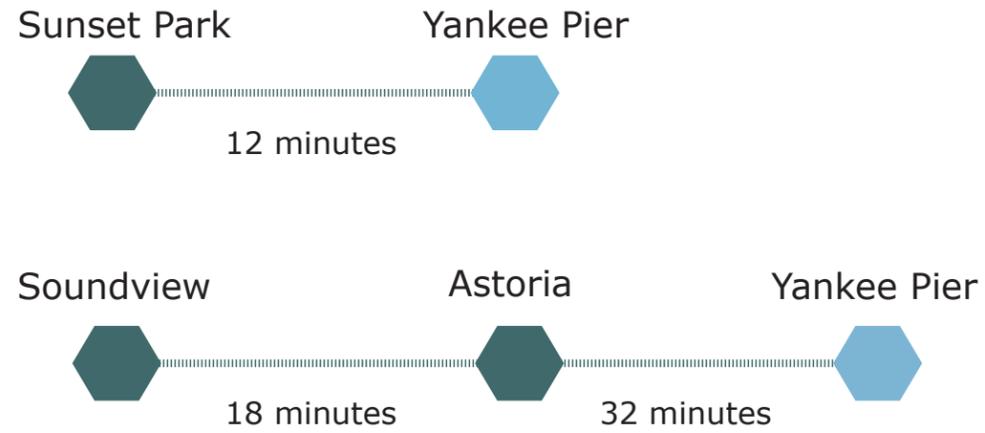
As a result of the previous improvement, the number of people who live within the area of influence of a ferry to Governors Island would significantly increase. In this regard, the total number of people served would increase to 2,216,318, while the number of low income people who do not live within a 10 minute walk from parks served by the ferry would increase to 570,549.

At the end of the implementation, the proposed ferry system would have, in total, 5 available landings in all boroughs except Staten Island. Even though neighborhoods like those in The Bronx are far away from the Island, we consider that Governors Island provides a unique service in term of open space and historical value, and the ferry ride to Governors Island is a unique experience on its own.



# INCREASED REACH

By following similar routes of the current NYC ferry system, we recommend Governors Island add two new routes. A north line from Soundview in The Bronx to Yankee Pier with a stop in Astoria in Queens, and a south line from Sunset Park in Brooklyn to Yankee Pier.



- Proposed landings
- Current landings
- Other landings



# MODERNIZE FLEET & SCHEDULE

## Fleet Update

The expansion should also include an update to the fleet of ferries. Eventually, we must replace the Coursen ferry with a more modern vessel. Given the high cost of constructing vessels as large as the Coursen, it makes sense to build a ship with a slightly lower capacity that runs twice as often with the objective of having a more commuter friendly schedule.

Even though capacity per trip would decrease, a smaller vessel running twice as often could increase the daily capacity by 33%,



**Lt. Samuel S. Coursen (Current Vessel)**

BOAT CAPACITY: 1,200 passengers  
 DAILY ONE-WAY TRIPS: 10  
 DAILY CAPACITY: 12,000 people a day

Compared to the current vessel, the Coursen, the smaller vessel has a capacity of 400 less passengers. However, with the increase of the service times, the number of daily one-way trips would

reduce wait times in between trips, and could smoothly disperse the planned increase in passenger traffic over the course of a day.

By starting ferry service earlier in the morning, and offering it later into the night, we would increase opportunities for evening activities on the island, such as film screenings and dinner service. A ship with a smaller capacity of 800 people would also require less funding for upkeep, would be better for the environment, and could be optimized for passenger use exclusively.



**Catamaran Ultramar II (Proposed Vessel)**

BOAT CAPACITY: 800 passengers  
 DAILY ONE-WAY TRIPS: 20  
 DAILY CAPACITY: 16,000 people a day

double (see Figure 1 in the Appendix) . As a whole, the daily capacity would increase by 4,000 passengers.

# REARRANGE PIER FUNCTIONALITY

## Soissons Landing

Use exclusively for passenger trips from the Battery



# 2 CLIMATE RESILIENCE



## OVERVIEW

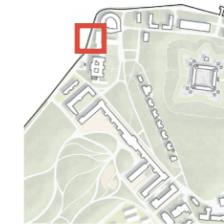
### *Vulnerable Shoreline*

As climate change raises sea levels and increases the intensity and frequency of coastal storms, Governors Island's position in the New York harbor makes the historic buildings that make up the northern district particularly vulnerable. With only a few feet of sea level rise, many of the lower lying areas around the edge of the northern district are at risk to periodic flooding. Even now, high tide causes water infiltration and standing water issues around the perimeter sea wall.



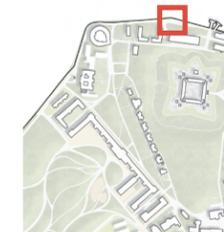
### *Sea Wall*

The sea wall around the northern perimeter is in need of repair even in its current state. When considering the future state, the current sea wall is wholly inadequate in providing defense for the northern island.



### *Drainage Issues*

The sea wall in the Northern District is still in its original state with some renovations to the esplanade, and the rip-rap revetments only provide modest protection.



### The Cost of Inaction

If we consider the following two scenarios, 5 feet of sea level rise and 10 feet of sea level rise, it becomes clear that many of the historic buildings along the east and west sides of the historic dis-

trict, as well as the Liggett Terrace which spans almost the entire width of the dividing line between North and South, are in danger of tidal flooding and eventually permanent inundation.



Buildings Vulnerable to 5 Feet of Sea Level Rise

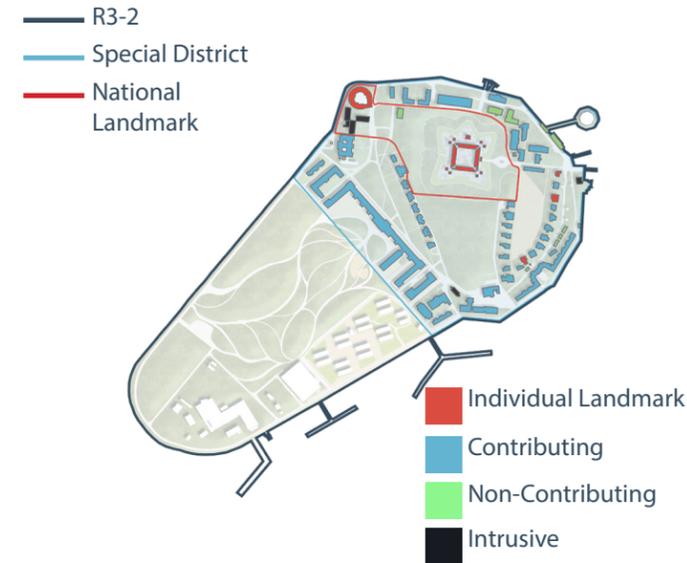
These buildings not only carry significant historical importance, they are also central to the Governors Island Trust's plans of adapting these buildings for use as a center for climate resilience. Without action, these risks would drastically cut the Trust's plans of generating \$25m a year in revenue from leases on historic buildings in the Northern District by 2050. Additionally, with no action, risk to public recreation and enjoyment is enormous. Flooding along the waterfront damages access to the island, prevents use of the wa-



Buildings Vulnerable to 10 Feet of Sea Level Rise

terfront esplanade and enjoyment of the views of Manhattan, Brooklyn, Ellis Island, the Statue of Liberty and more. A worthwhile waterfront intervention should seek to protect the building and waterfront esplanade from flooding and sea level rise, maintain and enhance public space, and maintain the look and feel of the historic district. The following proposal lays out a way of achieving these goals.

# CONSIDERATIONS



### Zoning and Landmarks Preservation

Most of the buildings in the Northern Historic District predate New York City zoning. As such, New York City created a special district for Governors Island. Additionally, there is a National Landmark, created by the Landmarks Preservation Commission, as well as individual landmarks on Governors Island. All this needs to be kept in mind when making any alterations to the island. For individual landmarks and buildings contributing to the historic district, any modifications cannot affect the facade and look of the buildings. There are limitations to any work that can be done to the area defined as a National landmark, however the intrusive buildings in the North West are scheduled for demolition.

Any modifications to buildings categorized as contributing to the historic district have to be approved by the Landmarks Preservation Commission. Our studio has discussed these the modifications proposed in this section with Landmarks experts and understand the parameters. We believe the following proposals do not alter the historic elements in the special district.

### Financing

While the cost of inaction will be far greater than any of the following proposed interventions, funding will still have to be accessed in order for these interventions to be implemented. There are several precedents that can be used as guidance.

In 2012, a total of \$260 million was invested in the redevelopment of Governors Island, including new infrastructure, the parks and hills projects, building demolition, and repairs to parts of the sea wall.

In 2015, Bloomberg philanthropies donated \$100 million to the development of Cornell Tech, which was aimed at bringing innovative strategies to technology and climate change.

Additionally, there are several grants that could aid in financing, like the FEMA Hazard Mitigation Assistance Grants and the Department of Defense's Design and Deployment of Engineering with Nature Solutions for Western Resilience Grant.

All of these financing options as well as additional public private partnerships can provide significant funding towards resilience strategies, and would go towards protecting and preserving one of New York City's most unique public assets.

# RESILIENCE STRATEGIES

## Building Adaptation



Start Date: Immediate  
Cost: Developer cost, varies by building

## Resilient Waterfront

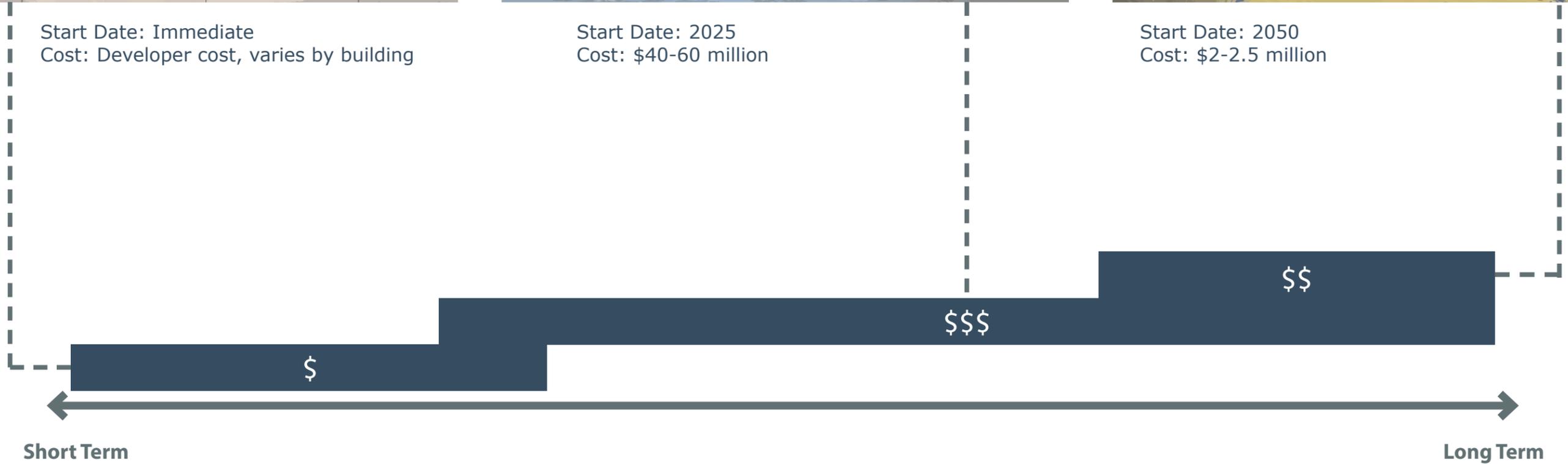


Start Date: 2025  
Cost: \$40-60 million

## Managed Retreat



Start Date: 2050  
Cost: \$2-2.5 million





# BUILDING-LEVEL ADAPTATION

# CATEGORY 1

## Highest Flood Risk

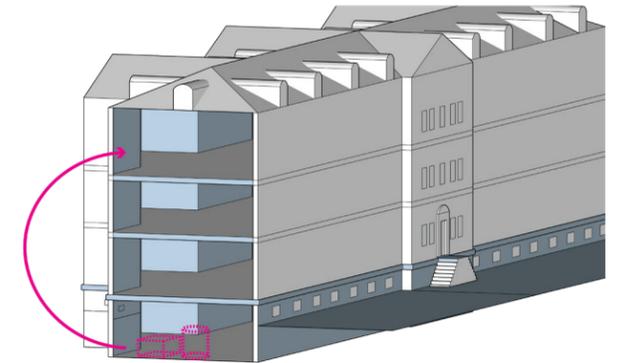
- 1. In Flood Zone
- 2. No Raised Ground Floor



## Recommendations

### 1. Raise Mechanical Equipment

Mechanical equipment like plumbing, electrical, and other critical infrastructure must be protected from potential flooding. New tenants in these buildings must ensure that mechanical equipment is raised to a higher floor above the flood line to prevent consequences from flooding.



### 2. Wet Flood-proof First Floor

Wet flood-proofing involves retrofitting buildings to allow water to flow in unimpeded. This ensures pressure does not build up on the walls of the buildings which could cause structural damage and collapse. For Category 1 buildings, we recommend wet flood-proofing the first floor.



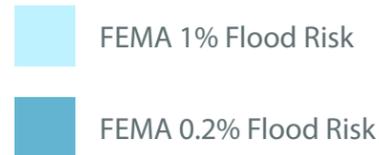
### 3. Low Risk Ground Floor Use

Given that the first floor will be wet flood-proofed, we recommend keeping the uses of the ground floor to low risk activities like common space and dining space. Once waterfront interventions are complete, which will be covered in the next chapter, the risk of flooding will be greatly reduced and as a result normal use of the ground floor can resume.

# CATEGORY 2

## High Flood Risk

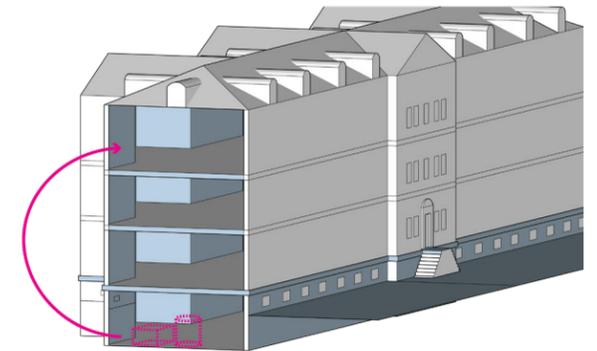
- 1. In Flood Zone
- 2. Raised Ground Floor



## Recommendations

### 1. Raise Mechanical Equipment

Like Category 1 buildings, mechanical equipment like plumbing, electrical, and other critical infrastructure must be protected from potential flooding. New tenants in these buildings must ensure that mechanical equipment is raised to a higher floor above the flood line to prevent consequences from flooding.



### 2. Wet Flood-proof Basement

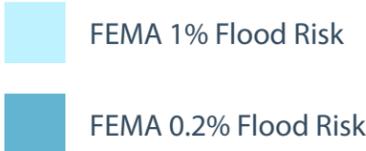
Like Category 1 buildings, we recommend wet flood-proofing the bottom floor of Category 2 buildings. However, given category 2 buildings have a raised first floor, providing some protection, use of the first floor can resume as normal. The basement will be made flood-able to protect the structural integrity of the building.



# CATEGORY 3

## Low Flood Risk

1. Outside of 1% flood risk zone



# Recommendations

## 1. No Immediate Actions

The Waterfront Strategy covered in the next chapter will address the risk to Category 3 Buildings. As such, there's no immediate need to protect Category 3 buildings through building retrofits.

# CATEGORY 4

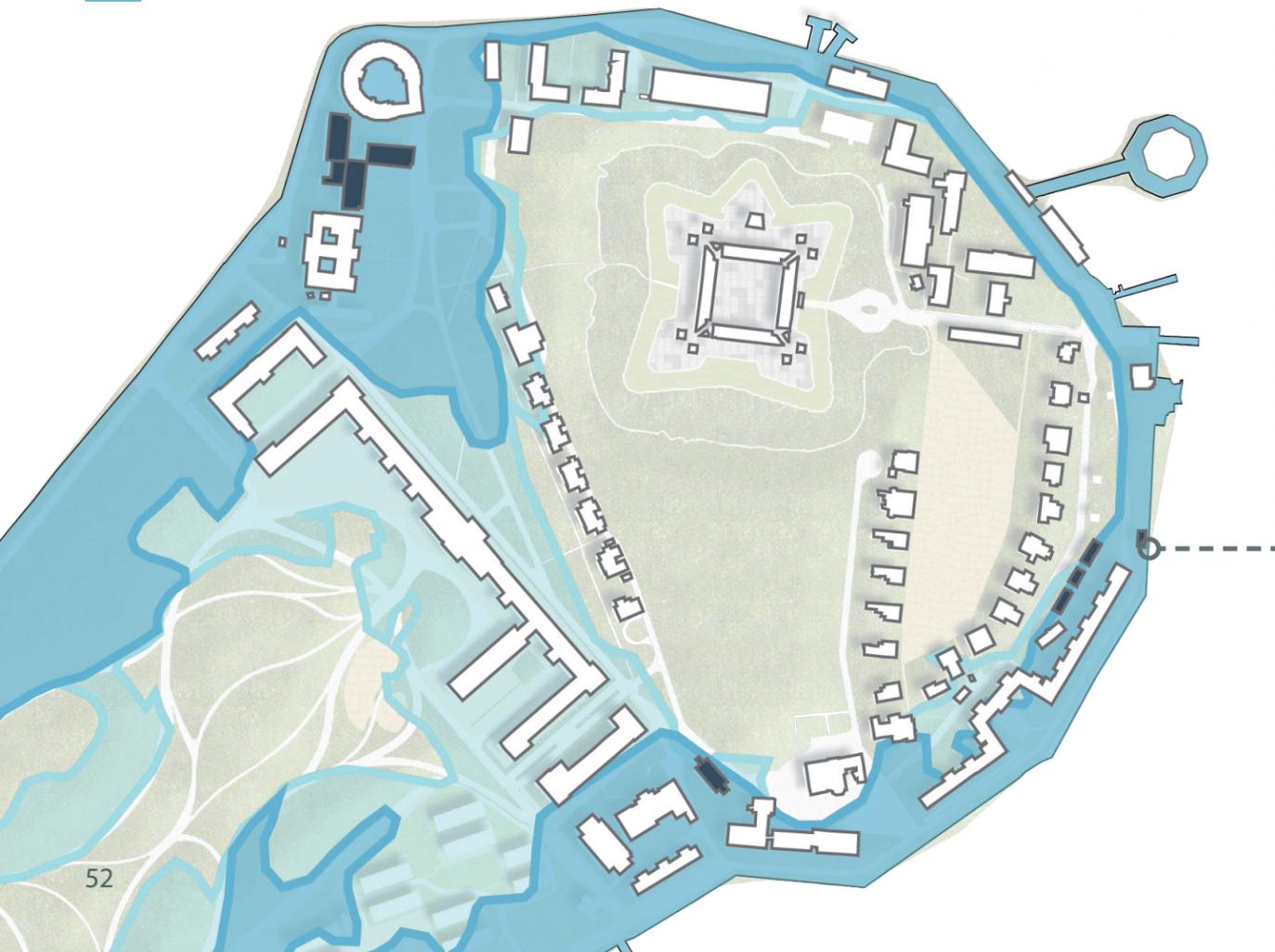
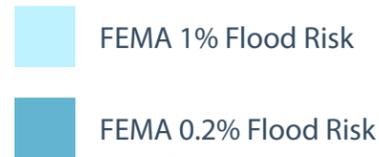
*Intrusive or Non-Contributing buildings*



## Recommendations

### 1. Disassemble

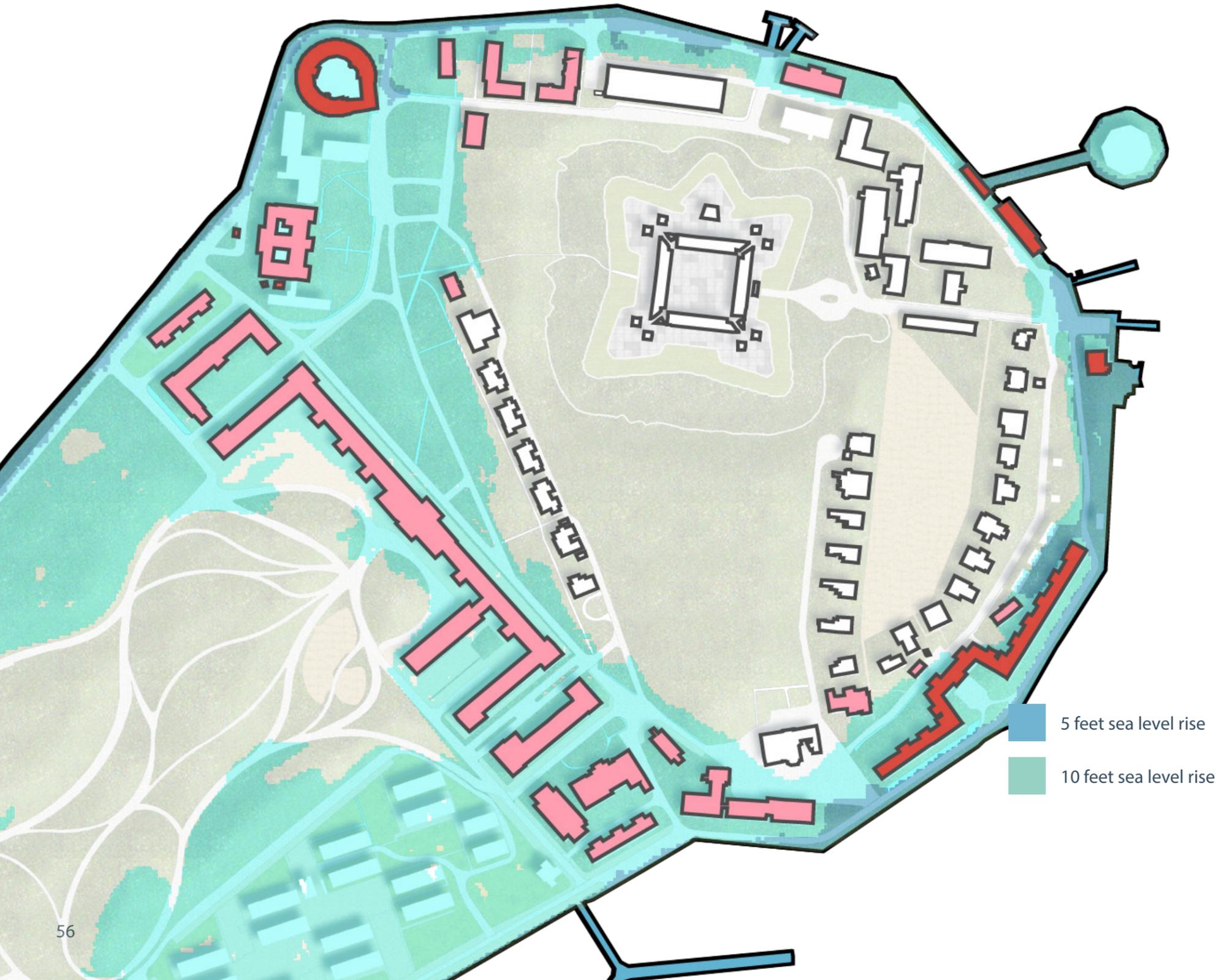
Category 4 Buildings have been identified by the New York City Landmarks Preservation Commission as either buildings that are intrusions on the Historic District, or are non-contributing elements on the Historic District. These buildings are also in the 1% flood zone, making them susceptible to flood damage. We recommend disassembling these buildings, and using the parts elsewhere on the island for creative public art or amenities like seating, or for creating walkways through rain gardens.





# RESILIENT WATERFRONT

# LONG TERM FLOOD RISKS

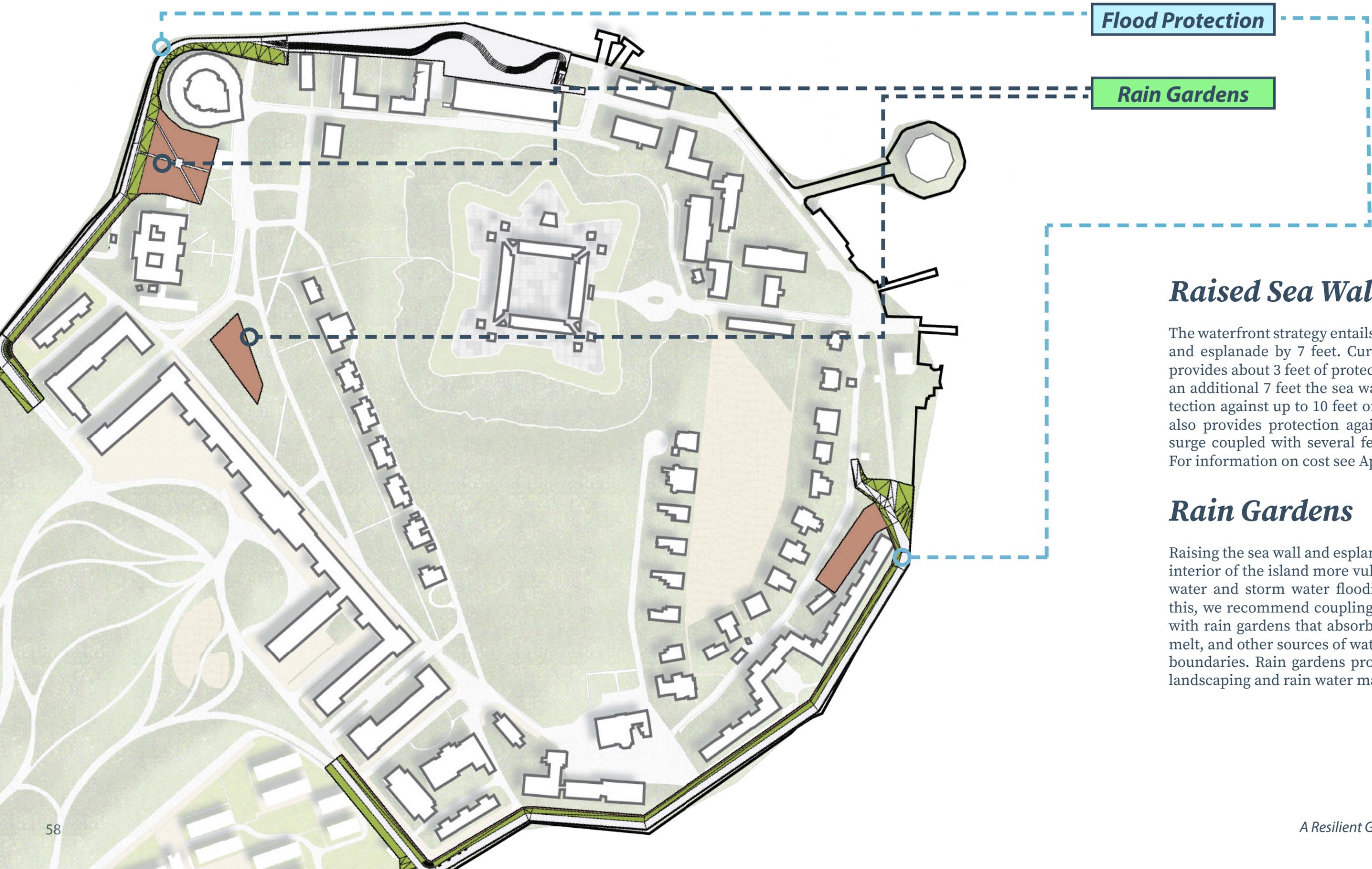


## *Background*

While protecting buildings most vulnerable in short term will reduce risks to tenants, Governors Island needs a long term solution to protect the Northern Historic District from flooding both from acute risks due to stronger and more frequent coastal storms, and chronic risks due to rising sea levels. While it is unlikely that we will face 10 feet of sea level rise in the next century, with most estimates predicting less than 5 feet by 2100, the combination of even a few feet of sea level rise, in addition to stronger and more frequent storms, will make flooding of the Northern District more frequent and more severe.

However, this also provides an opportunity to address some of the existing issues along the waterfront in the Northern District. The sea wall is in need of repair, and there are few opportunities for seating and recreation along the waterfront. The waterfront strategy will seek to combine flood resilience and public space enhancement.

# PROTECT THE NORTHERN DISTRICT



**Flood Protection**

**Rain Gardens**

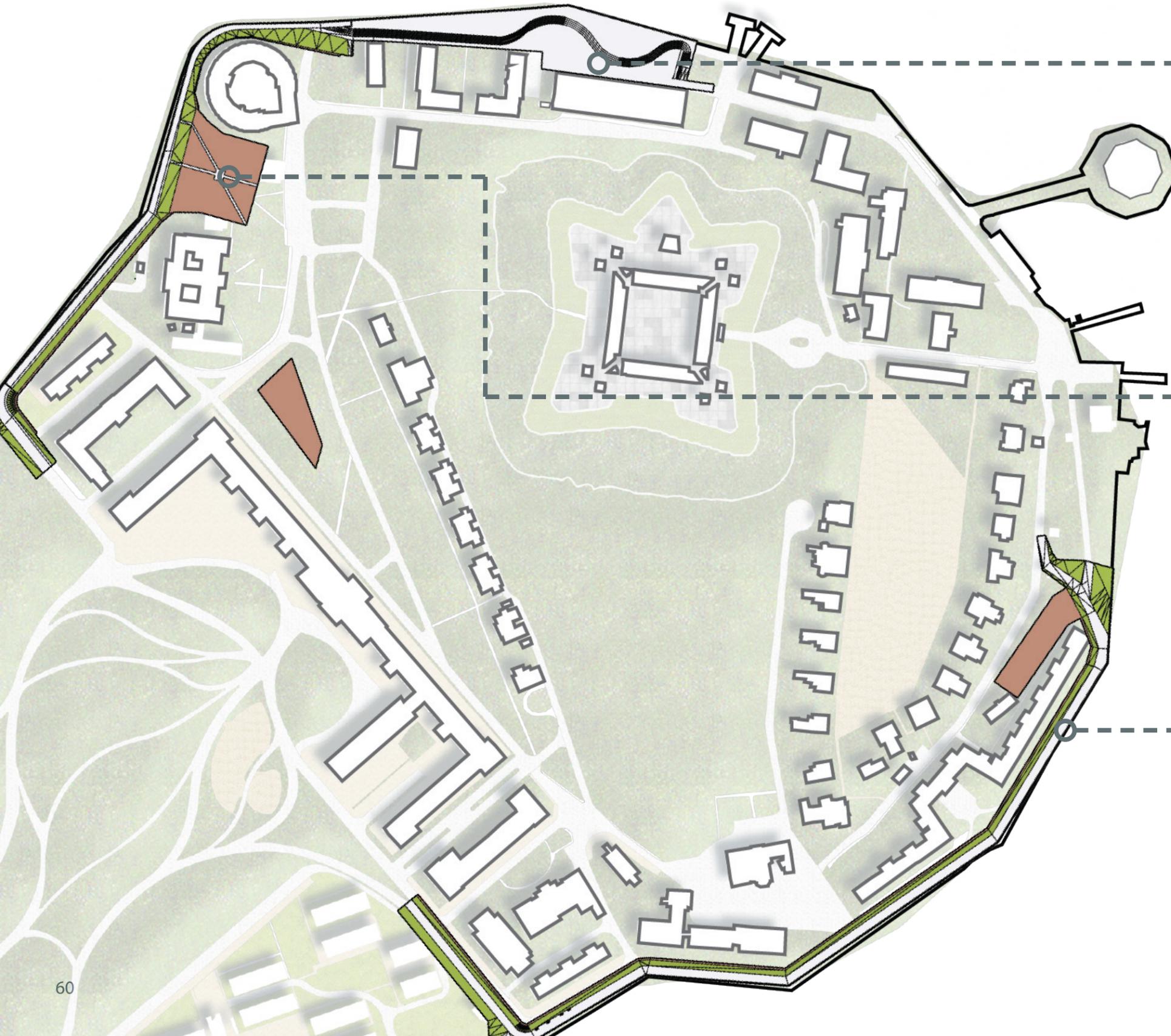
## ***Raised Sea Wall***

The waterfront strategy entails raising the sea wall and esplanade by 7 feet. Currently, the sea wall provides about 3 feet of protection, and by adding an additional 7 feet the sea wall will provide protection against up to 10 feet of sea level rise. This also provides protection against stronger storm surge coupled with several feet of sea level rise. For information on cost see Appendix Figure 2.

## ***Rain Gardens***

Raising the sea wall and esplanade could leave the interior of the island more vulnerable to standing water and storm water flooding. To account for this, we recommend coupling the raised sea wall with rain gardens that absorb storm water, snow melt, and other sources of water within the island boundaries. Rain gardens provide both beautiful landscaping and rain water management.

# MAXIMIZE PUBLIC SPACE



*Soissons Amphitheater*



*Rain Garden*



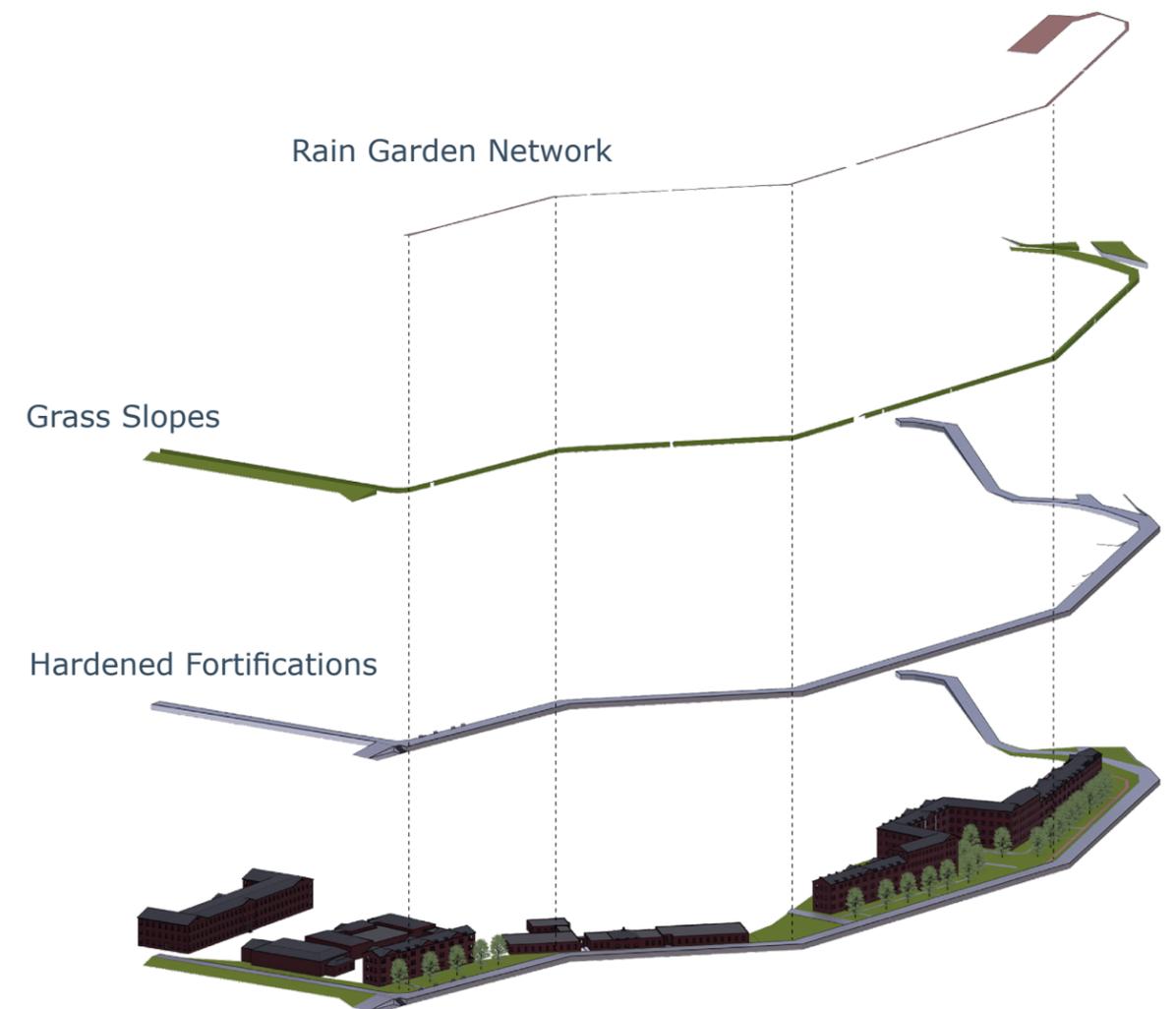
*Raised Esplanade*





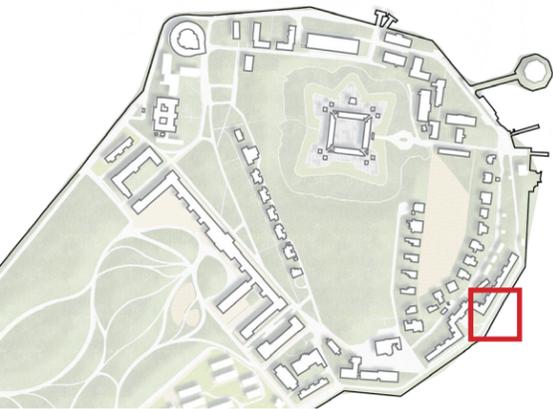
# EAST WATERFRONT

The East Waterfront provides protection through hardened fortifications like 7 feet of additional raised sea wall, a raised waterfront esplanade, gentle grass slopes away from the raised esplanade and a network of rain gardens culminating in a large rain garden in the northern section of this waterfront. Additionally, this raised esplanade provides the opportunity to improve public space in this part of the island, adding seating and other amenities along a waterfront that is currently an asphalt road with no amenities.

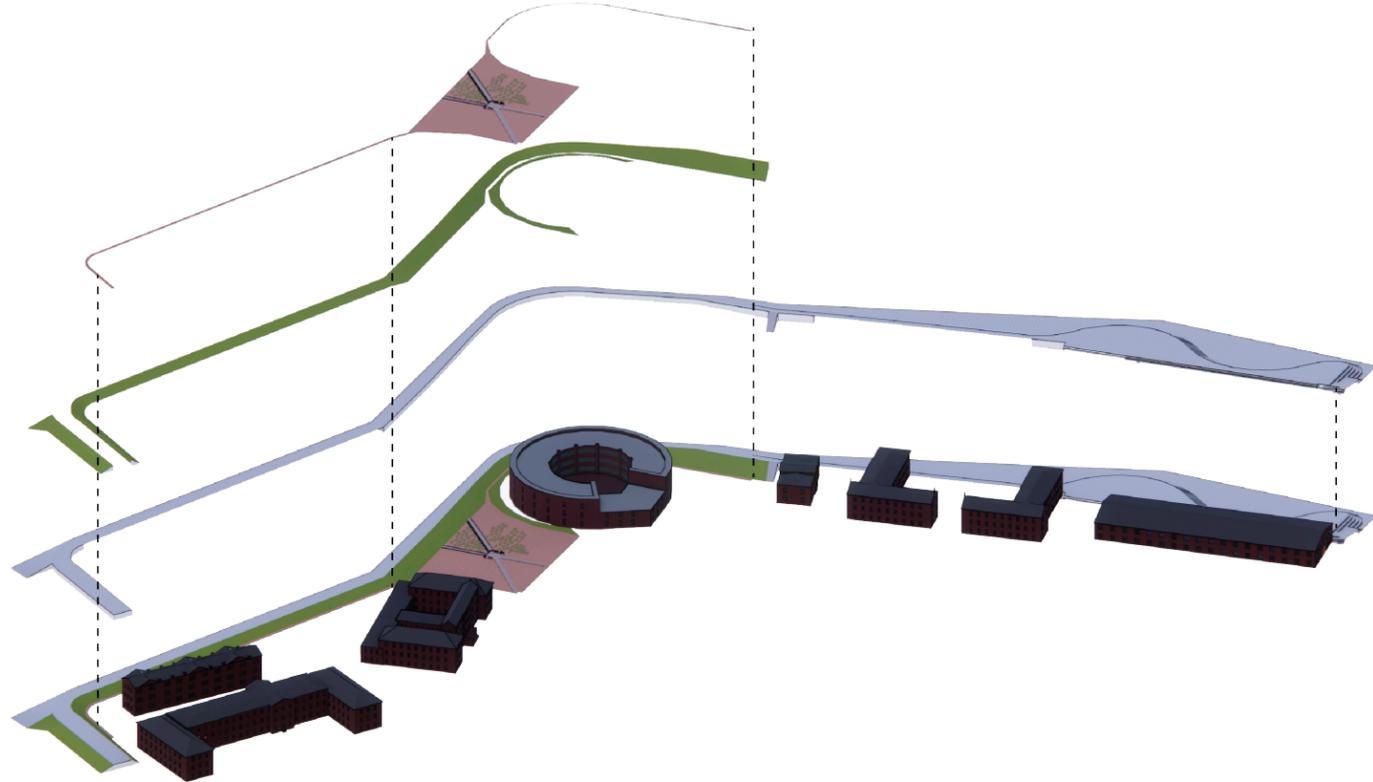


# RAISED ESPLANADE

With the raised sea wall and esplanade, there is an opportunity to improve on public space in the Northern District. New seating to sit, relax and enjoy the views of Manhattan and Brooklyn, improved handrails and amenities along the waterfront, additional lighting and more would provide improvement over the current situation, where the asphalt is in need of repair. There is also an opportunity to use materials from disassembled buildings in the walkways, combining the new with the old.



# WEST WATERFRONT

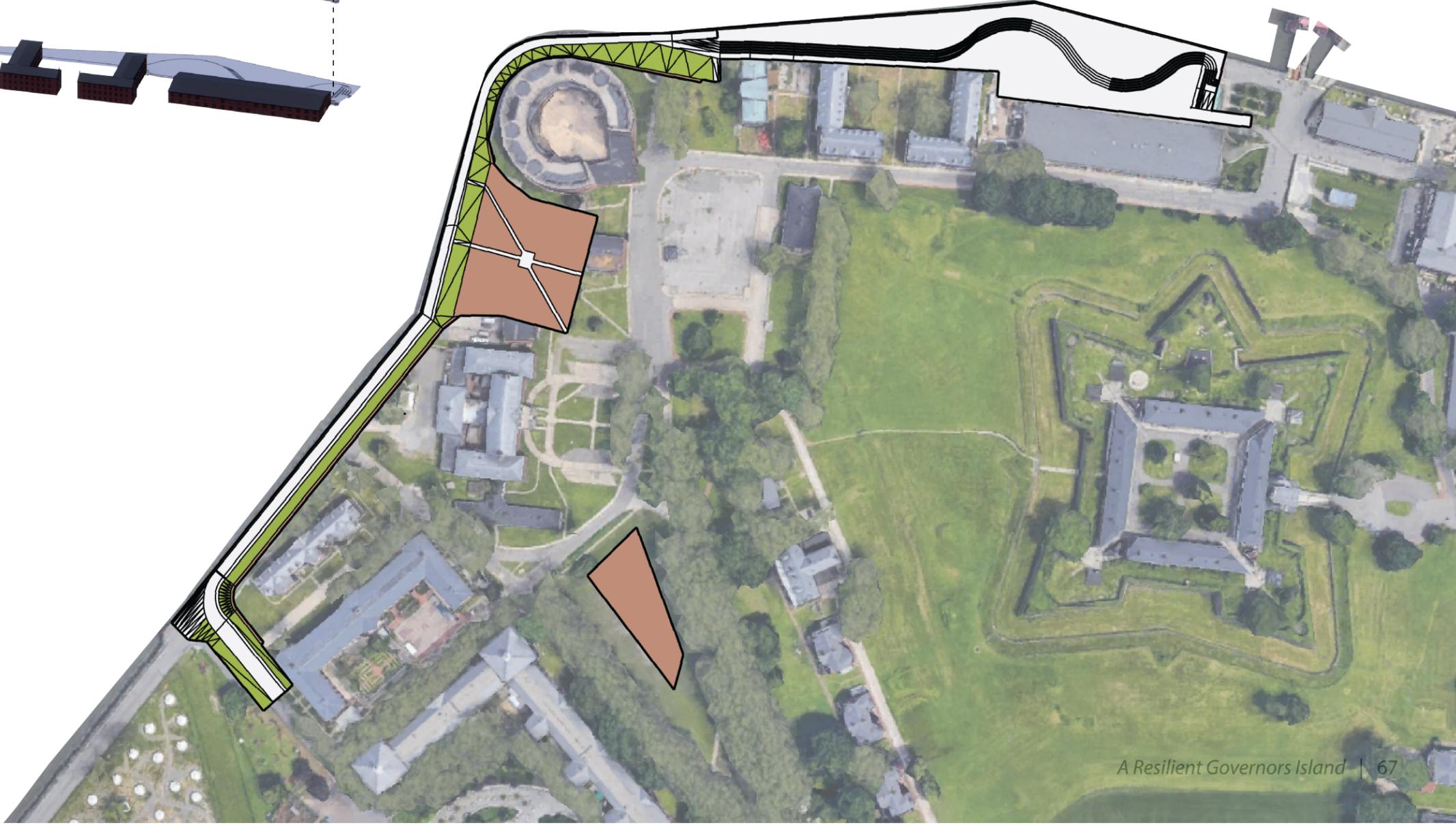


The West Waterfront recommendation similarly includes 7 feet of additional sea wall and raised esplanade. This provides protection around important historical buildings like Castle Williams, and provides protection along a part of the island with low lying buildings vulnerable to flooding.

To the South of Castle Williams, we recommend re-purposing the space in place of the intrusive buildings with a large rain garden which would serve to manage storm water and snow

melt and would also provide beautiful public space.

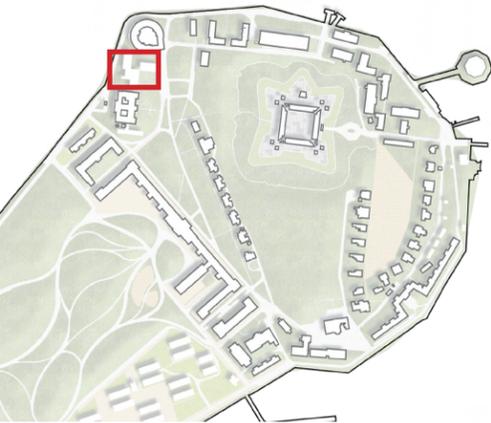
Additionally, we recommend utilizing the public space to the west of Soissons landing to make an amphitheater that provides flood protection while offering public space and ample seating for multi-purpose uses like the continued use of the Oyster Bar or event space for concerts, movies, or other activities.



# RAIN GARDENS SOUTH OF CASTLE WILLIAMS

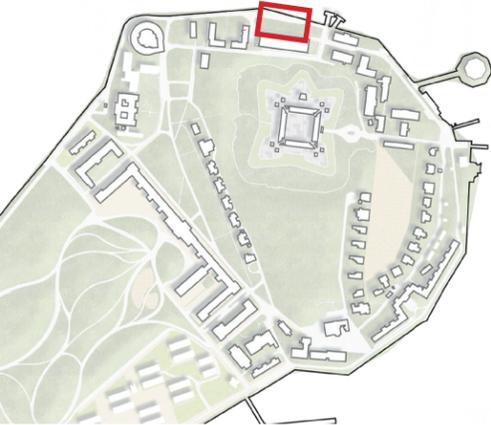
The rain garden located south of Castle Williams will provide beautiful public space and open up an area currently occupied by intrusive buildings. With an undulating landscape, the lower part serves as a water gathering pool during the rainy season, but can also be a nice place to sit when there is no heavy rain or snow melt.

Additionally, the walkways could be constructed using materials from buildings disassembled elsewhere on the island, maintaining a connection to the historic elements of the Northern District.



# Soissons Amphitheater

Soissons amphitheater could improve the quality of the public space along the waterfront, where there is currently limited seating. Additionally, the steps will provide additional flood protection for surrounding buildings. The middle of this amphitheater will provide multi-purpose space for the continued use of the oyster bar, or for concerts, movie screenings, and other public events.





# MANAGED RETREAT

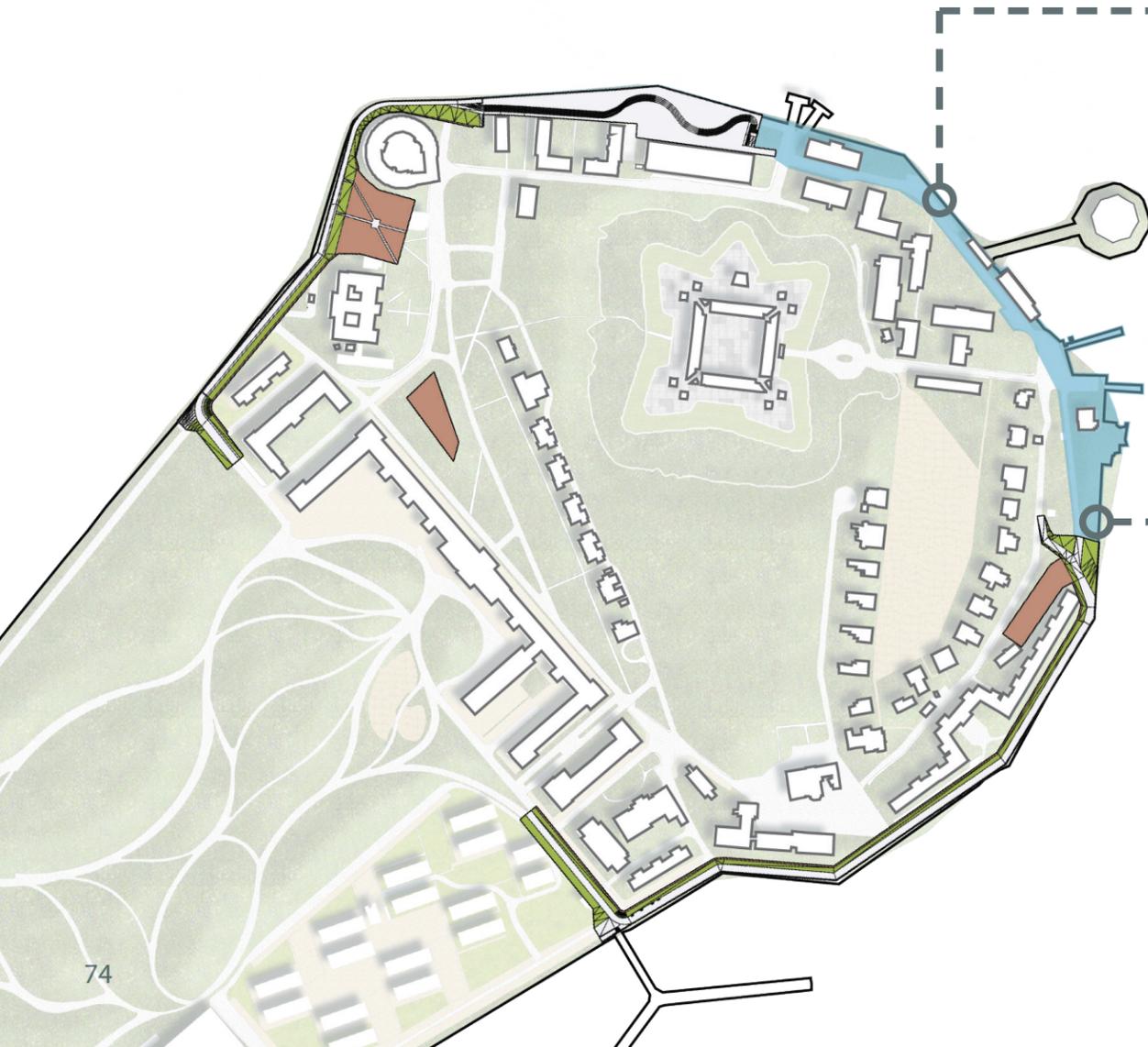
# CONSIDERATIONS

While the waterfront strategies protect a significant portion of the Northern District of Governors Island, there is a large gap of protection in the north east corner. There are several reasons for this. This is a long stretch of sea wall, covering almost 1/3 of the Northern District's waterfront, with only 4 buildings in the flood zone even with 10 feet of sea level rise. This is due largely to the topology of the island, with steeper elevation changes and an existing inland wall along the paved surfaces, shown on the next page. Of these

4 buildings, only 1 of them is a historic building. While it would be great to still protect these buildings where possible, because of their close proximity to the waterfront, two of the buildings residing on the sea wall itself, it makes it very difficult to offer any gray infrastructural protection. As a result, we recommend a strategy of managed retreat, where over the next 50 years there is a phased abandonment of this section of the Northern District's buildings.



The steep elevation changes provide a lot of natural protection for the buildings further inland from the waterfront. This gives further justification for not needing a more intrusive and costly intervention in this part of Governors Island. However, there are still several interventions we will recommend to take into account the phased retreat of this area, like disassembling non historic buildings as flooding starts to be a regular occurrence, and then tearing up the pavement and impervious surfaces and replacing with a constructed wetland with a raised pathway over it. For information on the cost of the project, see Appendix Figure 3.



**Historic Building 140**

This is the first building you see when you arrive at Governors Island. While ideally we would like to preserve this building for use, its proximity to the waters edge makes it extremely difficult to protect.

**Recommendation:**

**Abandon** as soon as sea level rise and coastal storms threaten to regularly flood this building. After abandoning, convert this building to a **climate change artifact**, preserving the historic value of this building while also providing an opportunity to educate about the impact of climate change.



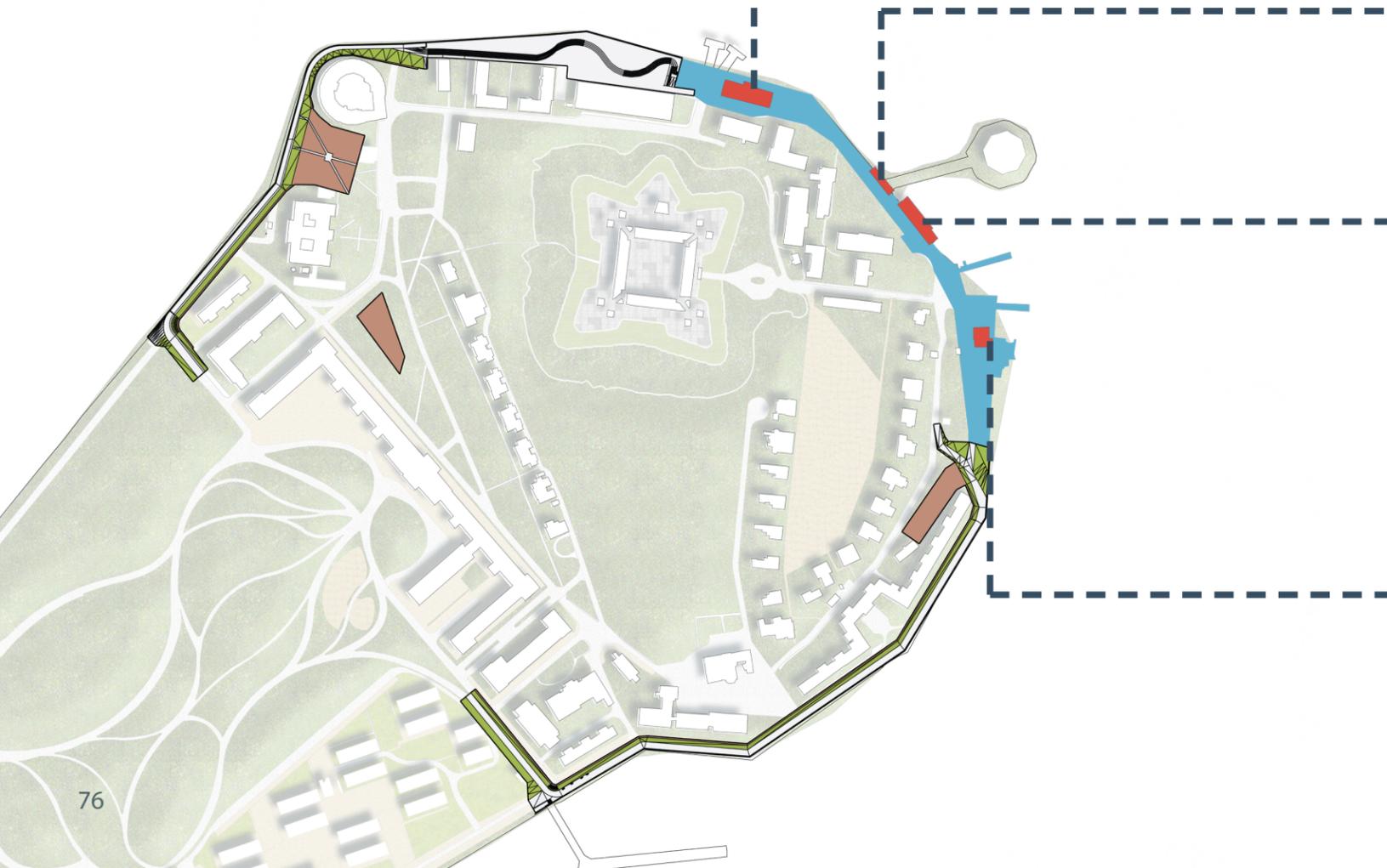
# BUILDINGS STILL AT RISK

**Non Historic Buildings**

The other three buildings that remain at risk after the waterfront intervention are all classified as non-contributing buildings to the historic district. While they do provide use in their current state, it is not feasible to protect these buildings given their proximity to the waterfront.

**Recommendation:**

**Abandon** as soon as sea level rise and coastal storms threaten to regularly flood these buildings. Then **disassemble** and reuse materials elsewhere on the island like walking paths and seating.



# OTHER CONSIDERATIONS

A large portion of this stretch along the waterfront is made up of paved and other impervious surfaces, including a road and several parking lots. These surfaces are ineffective against flooding and provide an unsuitable surface for wildlife should sea levels rise above this level.

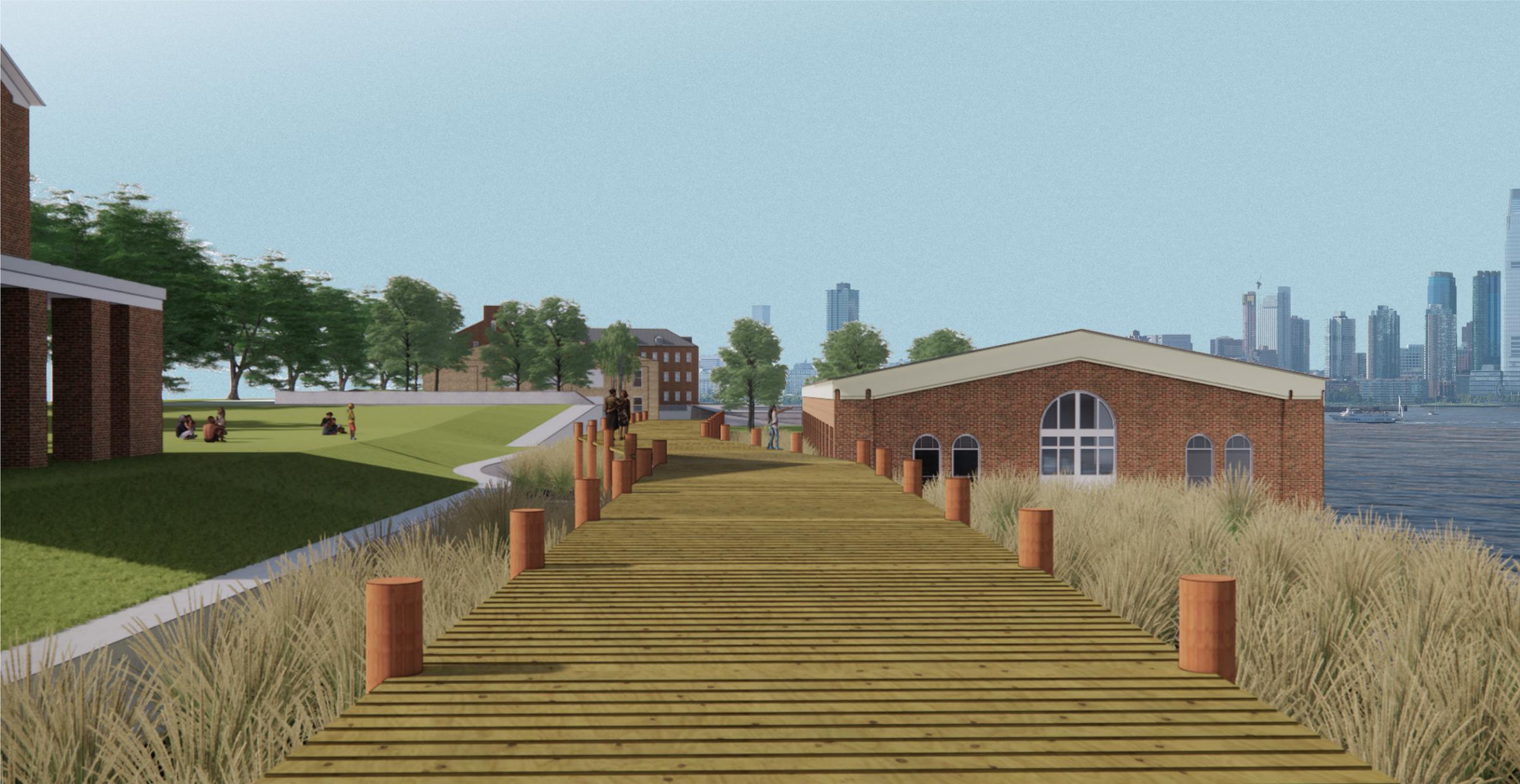
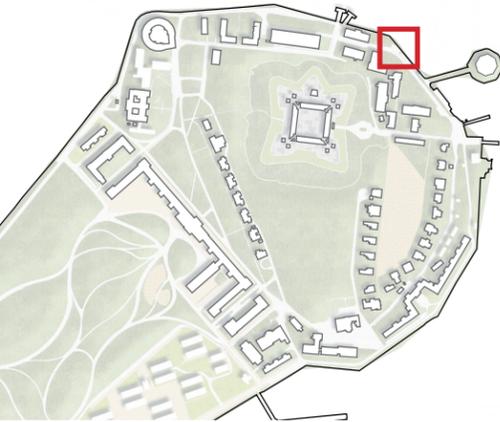


## **Recommendations**

These paved surfaces should be replaced by a constructed wetland. Constructing a wetland along the waterfront provides an excellent opportunity to reincorporate wildlife into Governors Island's coastline and provides green infrastructure as a way of dampening the impacts of storm surge. Additionally, a raised pathway could be constructed over the wetland, providing a unique public space attraction with a continuous view of Brooklyn and Manhattan's skylines.

# CLIMATE LANDMARK

By retreating back to the inland high ground along this stretch of Governors Island, this strategy would provide a unique opportunity to serve as a reminder of our past, and a striking example of the needed work ahead in our future.



# CONCLUSION



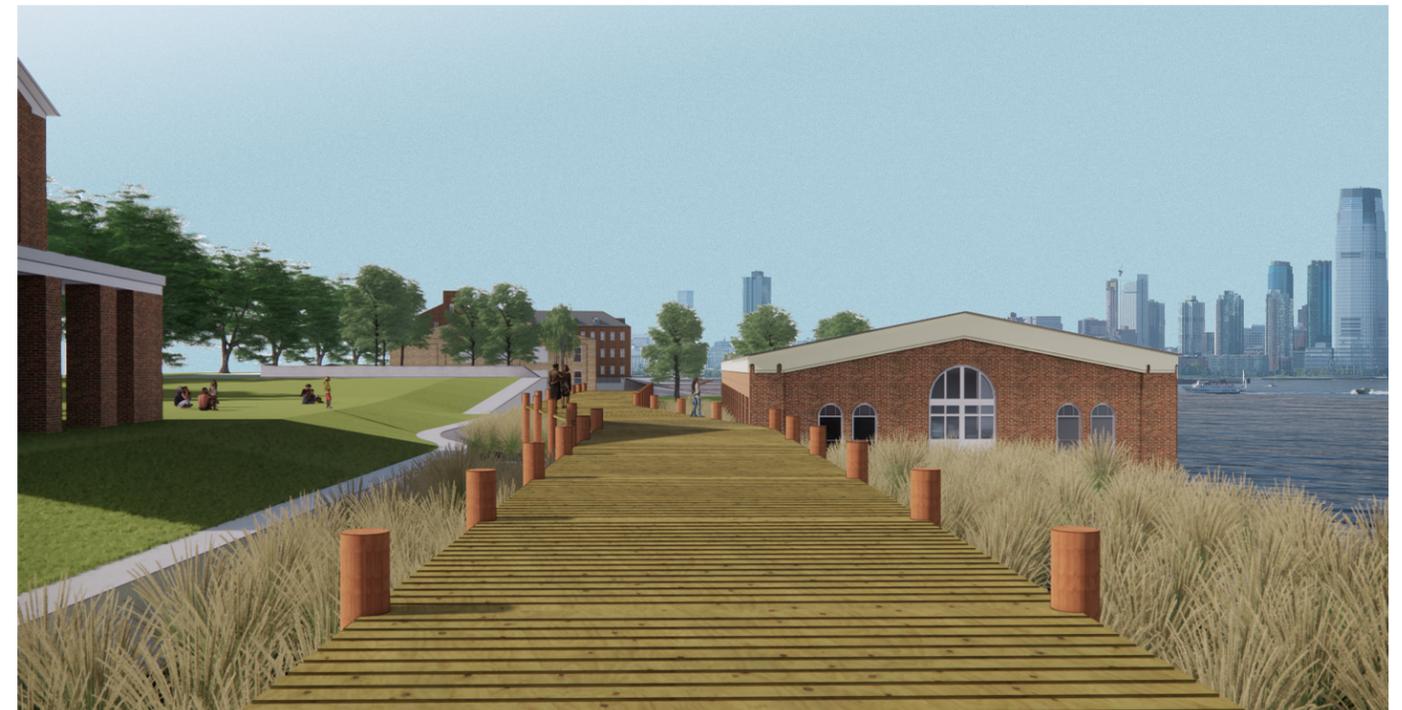
Climate Change is happening now. Hurricane Sandy was a wake up call to the vulnerabilities that coastal cities like New York City face. Rising sea levels and stronger coastal storms put low lying areas and islands like Governors Island at im-

mediate and increasing risk. We need to address these risks immediately, and decide whether the costs of action are worth it in the face of far greater costs of inaction.



This is also a moment to recognize the public benefit that climate change adaptation strategies can have. We can provide new public spaces around green infrastructure which help with rain water and storm water management. We can create

unique spaces for events and views of the city. And we can create opportunities to bring nature back to our cities and remind us of our past while looking toward our collective future.



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Figure 1 - Ferry Schedule Example

FROM PIER 11, MANHATTAN (WEEKDAYS)	FROM GOVERNORS ISLAND	FROM PIER 11, MANHATTAN (SAT-SUN)	FROM GOVERNORS ISLAND (SAT-SUN)
9:05 am	9:35 am	9:05 am	9:35 am
9:35 am	10:05 am	9:35 am	10:05am
10:05 am	10:35 am	10:05 am	10:35 am
10:35 am	11:05 am	10:35 am	11:05 am
11:05 am	11:35 am	11:05 am	11:35 am
11:35 am	12:05 pm	11:35 am	12:05 pm
12:05 pm	12:35pm	12:05 pm	12:35pm
12:35pm	1:05 pm	12:35pm	1:05 pm
1:05 pm	1:35 pm	1:05 pm	1:35 pm
1:35 pm	2:05 pm	1:35 pm	2:05 pm
2:05 pm	2:35 pm	2:05 pm	2:35 pm
2:35 pm	3:05 pm	2:35 pm	3:05 pm
3:05 pm	3:35 pm	3:05 pm	3:35 pm
3:35 pm	4:05 pm	3:35 pm	4:05 pm
4:05 pm	4:35 pm	4:05 pm	4:35 pm
4:35 pm	5:05 pm	4:35 pm	5:05 pm
5:05 pm	5:35 pm	5:05 pm	5:35 pm
5:35 pm	6:05 pm	5:35 pm	6:05 pm
6:05 pm	6:35 pm	6:05 pm	6:35 pm
6:35 pm	8:35 pm	6:35 pm	8:35 pm

Figure 2 - Waterfront Cost Estimate

**Fill for Slopes and Esplanade**

	The Hills on Governors Island	Waterfront Proposal
Total Cubic ft. of Fill	8,019,000	690,000
Estimated Cost	\$70m	\$6m

**Sea Wall Construction**

	Southern District Sea Wall Replacement	Waterfront Proposal
Feet of Sea Wall	4,000	2,800
Estimated Cost	\$35m	\$36m (twice as tall ~ 50% higher cost per foot)

	Surface	Railing	Miscellaneous (Benches, lights, etc.)
Length	4,400 ft x 20 ft	4,000 ft	
Estimated Cost	\$528,000 (at \$6 per square foot concrete)	\$200,000 (at \$50 per linear foot)	\$100,000

Total Cost = \$6m + \$36m + \$830,000 = \$42.8m

Figure 3 - Managed Retreat Cost Estimate

	Sq. ft.	Estimated Cost per sq. ft.	Estimated Total Cost
Building Disassembly	17,280 sq. ft	\$8	\$138,240
Pavement removal	40,000 sq. ft.	\$4	\$160,000
Wetland Construction	110,000 sq. ft	\$3	\$330,000
Raised Pathway	25,000 sq. ft	\$60	\$1,500,000

Total Cost = \$140,000 + \$160,000 + \$330,000 + \$1.5m = \$2.13m

# **A RESILIENT GOVERNORS ISLAND**

Urban Planning Studio Report

Columbia GSAPP

Spring 2021