

Financial District and Seaport Climate Resilience Master Plan



NYC/EDC

NYC Mayor's Office of
Climate Resiliency

ARCADIS

Executive Summary

Climate Change is not Coming, it is Here

The *Financial District and Seaport Climate Resilience Master Plan* is a shared **City-community vision for a resilient 21st-century waterfront**. This vision responds to the increasing hazards posed by climate change, while transforming the waterfront to better serve all New Yorkers for generations to come. Grounded in community and regulatory input, climate science, engineering, and feasibility analysis, the master plan reflects an ambitious vision that can be realized. The next step is to advance design and identify the funding to make this master plan a reality.



Photo Credit: Matteo Colombo

Why Lower Manhattan?

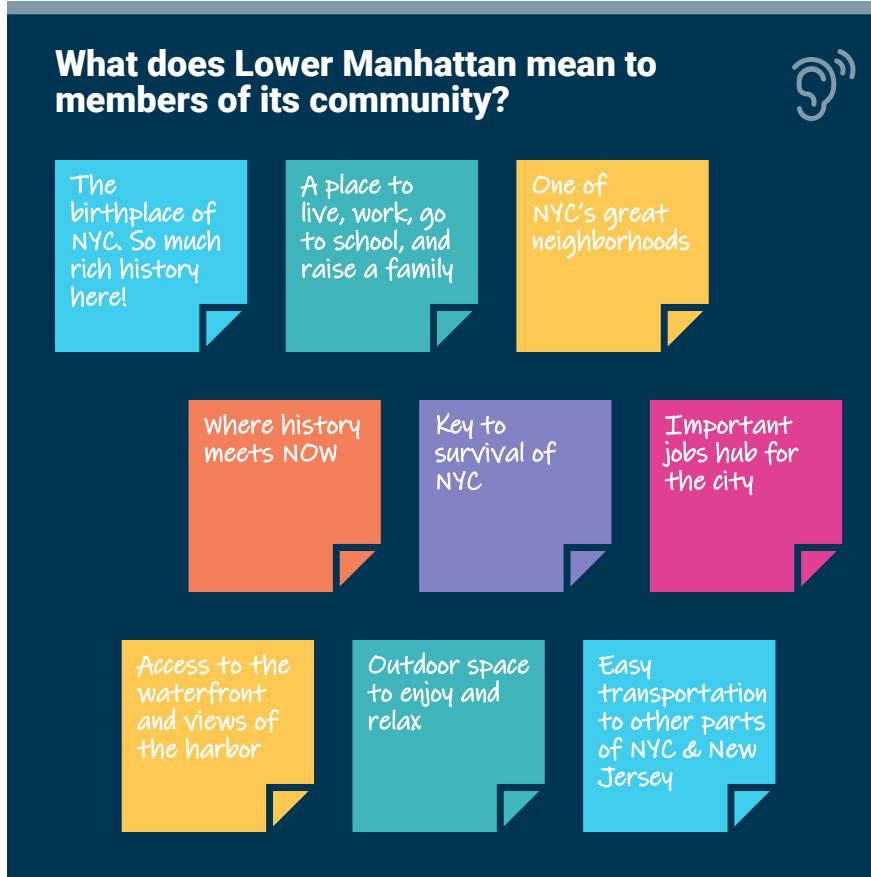
Lower Manhattan is at the core of New York City's transportation system, economy, and civic life. It also serves as both a destination and gateway for residents, workers, and visitors from across the city, region, and world. Millions of people travel through Lower Manhattan by rail, bus, car, and ferry every day, and people and goods flow through the area's highways, tunnels, and bridges. With over 415,000 daily subway and PATH (Port Authority Trans-Hudson) Train riders, and 93,000 daily ferry riders, Lower Manhattan provides connections across all five boroughs and to other regional centers like Midtown, Jersey City, and Downtown Brooklyn.

What happens in Lower Manhattan impacts New Yorkers in every corner of our city.

New Yorkers from every neighborhood work in Lower Manhattan, from small business owners to construction and building trade workers, to those in the healthcare, education, technology, civic, and financial sectors. As one of the largest business districts in the United States, Lower Manhattan is central to the economy of the city and region.

In recent decades, Lower Manhattan has transformed into a growing mixed-use neighborhood with 24/7 services and amenities for residents, students, workers, and visitors. Over the past two decades, the residential population has grown by 170 percent. The Lower Manhattan of today is a residential community, as well as a business district, transportation hub, and cultural destination.

Lower Manhattan is also the birthplace of New York City dating back to the 17th century. However, this area's human history began much earlier when the Lenape people settled here over 3,000 years ago. Over the centuries, Lower Manhattan has continued to reinvent itself as part of a transforming and growing city. Today, it remains an iconic global symbol and an exemplar of dynamism and resilience in the face of change.



Statements collected throughout the public engagement process about the importance of Lower Manhattan

Why Now?

By the 2040s, Lower Manhattan's shoreline will begin to experience frequent tidal flooding from sea level rise, impacting streets, sidewalks, buildings, and critical infrastructure. By the 2050s, this flooding will occur monthly, and, by the 2080s, it will happen every day. The Whitehall Terminal for the Staten Island Ferry—the busiest passenger ferry route in the country—will begin to see operational impacts by the 2050s. By 2100, daily high tides will reach up to three blocks inland at Pearl Street. Failure to act will render much of this area unusable, leading to the loss of Lower Manhattan—along with its critical citywide functions—as we know it today. **Such a devastating impact on our economy, transportation system, and identity, affecting the lives and livelihoods of millions of New Yorkers, is not an option.**

We are not planning for the Lower Manhattan that exists today. We are planning for the Lower Manhattan of the future that will be underwater every day if we do not act now.

In addition to tidal flooding, Lower Manhattan is at risk from more frequent and severe storms, like hurricanes and nor'easters. Hurricane Sandy devastated the area in 2012, taking two lives and damaging buildings, streets, and infrastructure. In 2021, Tropical Storm Henri and Hurricane Ida brought record rainfall to the city. These threats will only increase over time. By the 2050s, annual losses from coastal storms, including building damage, healthcare costs, and lost services are expected to be over a billion dollars a year if no action is taken. By 2100, severe storms will bring up to 15 feet of flooding and reach up to William Street, five blocks from the East River shoreline. The drainage system will also be increasingly stressed due to the combined effects of increased rainfall and coastal storms, leading to flooding of streets and basements, if no action is taken.



Lower Manhattan by the Numbers

Lower Manhattan is both a destination and a gateway, serving as a transit hub, a thriving residential community, a central business district, and home to dozens of cultural and civic institutions. This graphic and accompanying data represents a snapshot of the importance of Lower Manhattan and the critical functions it serves – for the New York City region and beyond.

- 14 subway lines**
- 17 ferry routes**
- 510,000 commuters**
- 290,000 workers**
- 62,000 residents**
- 55,000 students**

<ul style="list-style-type: none"> Lower Manhattan NYC Ferry Landing Other Ferry Landing Subway Station Ferry Route Subway Route 	Building Area <ul style="list-style-type: none"> 20,000 - 250,000 SF 250,000 - 750,000 SF 750,000 - 1,500,000 SF 1,500,000 - 3,000,000 SF 3,000,000+ SF 	Land Use <ul style="list-style-type: none"> Mixed-Use Commercial Residential Public Facilities
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Sources
 LEHD Origin-Destination Employment Statistics (LODES).
 NYC Permitted Event Information - Historical: NYC Open Data.
 Primary Land Use Tax Lot Output (PLUTO). NYC DCP.
 Subway and Bus Ridership for 2019. MTA.
 Surging Ahead: Lower Manhattan's Economic Revival and What It Means for New York. Alliance for Downtown New York, 2015.
 Unique Visitor to Lower Manhattan 2019/2020. Audience Research & Analysis (ARA).

Notes
 Data based on 2019 transit ridership figures



A Center of Culture, Community, and Civic Life

- 170%** increase in residents since 2000
- 21** higher learning institutions
- 17.7** million annual visitors to major attractions in the area
- 550** major civic events in the last decade, such as parades, protests, and marches

A Critical Hub of Transportation for the City and Region

- 50%** of Lower Manhattan workers come from the other four boroughs
- 33%** of Lower Manhattan workers come from outside NYC
- 17%** of Lower Manhattan workers come from Manhattan
- 370,000** daily riders use the subway, ferry, and PATH, respectively, in Lower Manhattan

A Driver of the City's Economy and Workforce

- \$6.5** billion in estimated tax contributions in 2019
- 1 in 10** jobs in New York City
- 10%** of the City's assessed property value

Why a Climate Resilience Plan?

Lower Manhattan is particularly vulnerable to the impacts of climate change due to its low-lying shoreline, which is why the City is advancing over \$900 million in capital projects to protect this area. In 2019, the City released the *Lower Manhattan Climate Resilience Study*, a comprehensive multi-hazard climate risk assessment, highlighting the vulnerabilities of the area. The report identified capital projects to adapt and protect 70 percent of Lower Manhattan's shoreline but found the areas between The Battery and the Brooklyn Bridge particularly challenging and in need of further study. This included examining the need to extend the shoreline of Lower Manhattan into the East River to construct flood defense infrastructure. **This master plan sets out to fill this critical gap in realizing a resilient Lower Manhattan.** Combined, these capital projects along with the master plan comprise the Lower Manhattan Coastal Resiliency (LMCR) strategy.

Brooklyn Bridge to The Battery is a missing link in realizing a resilient Lower Manhattan.

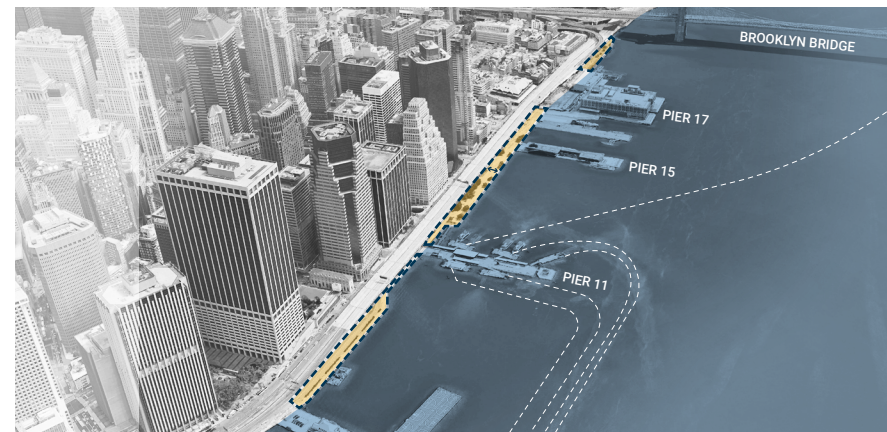
The Financial District and South Street Seaport (Seaport) neighborhoods are unique within the geography of Lower Manhattan, facing unprecedented challenges to implementing a flood defense system. Along this one-mile stretch, a complex mix of infrastructure—subway tunnels and stations, vehicular tunnels, subsurface utilities, and an elevated highway—limit what can be built on existing land. Combined with limited space along the waterfront, in addition to the presence of active ferries, vessel traffic, and other maritime operations, constructing a flood defense system here is a monumental challenge. This area is also low-lying and experiences larger waves during coastal storms compared to neighboring areas, further limiting the types of flood defense infrastructure that can provide protection.

Solving this challenge is a once-in-a-generation opportunity to create a better waterfront for all, while preserving the essential functions and historic character of the area. This master plan knits flood defense into the fabric of these neighborhoods, overcomes highly complex technical constraints, and envisions a transformed public waterfront for all to enjoy.

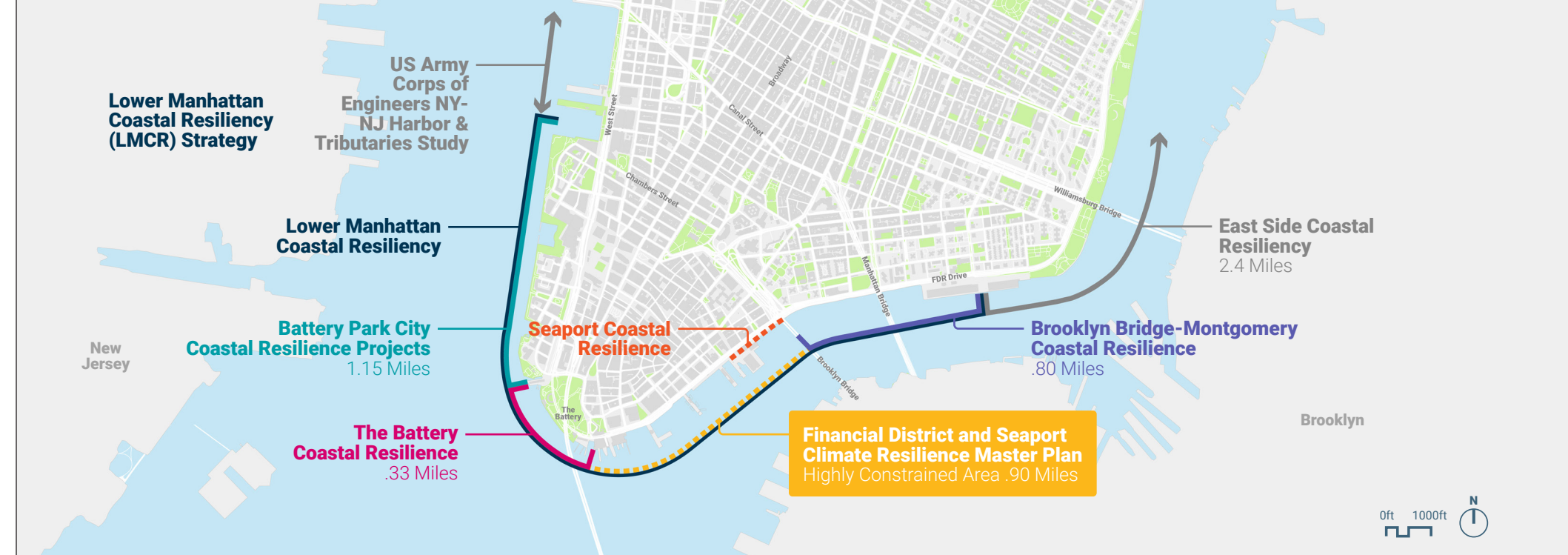
What makes constructing this infrastructure on land so challenging?



Other neighborhoods – like the Lower East Side – have wide-open spaces that can accommodate coastal flood protection infrastructure.



By contrast, space is limited along the shoreline in the Financial District and Seaport.



Battery Park City Coastal Resilience Projects

Lead: Battery Park City Authority (BPCA)

This includes a series of resilience projects and drainage improvements to provide flood risk reduction for Battery Park City and parts of adjacent neighborhoods in response to the threats of coastal storm surge and sea level rise.

The Battery Coastal Resilience

Lead: NYC Economic Development Corporation (NYCEDC), NYC Parks

This project will raise and harden the esplanade that runs along The Battery, protecting this important open space while preserving its historic character and active waterfront uses. The flood defense will be designed to protect against sea level rise through 2100.

Brooklyn Bridge-Montgomery Coastal Resilience (BMCR)

Lead: NYCEDC, NYC Department of Design and Construction

This project combines permanent floodwalls with floodgates that are hidden during normal weather conditions and flip-up during a coastal storm to create a complete line of flood protection. This project also includes drainage improvements and community amenities, such as playgrounds, benches, and seating.

Seaport Coastal Resilience (SPCR)

Lead: NYCEDC, Mayor's Office of Climate Resiliency (MOCR)

The City is acting now to protect the Seaport, which is the lowest-lying and most vulnerable portion of the master plan's study area. The project will raise the esplanade approximately three to five feet to defend against tidal flooding and coastal storms and includes drainage improvements. The project will also improve waterfront access for pedestrians and cyclists. The City is seeking federal funding to complement the City's commitment.

What is a climate resilience master plan?

This master plan is not set in stone, but rather is intentionally flexible so it can adapt to future needs and priorities.

The master plan:

- Is a guiding document for long-term decision-making
- Is grounded in extensive community engagement
- Demonstrates what this area could look like in the future

What did this Master Plan set out to Achieve?

This master plan set out to define a viable resilience solution to adapt the Financial District and Seaport neighborhoods to the impacts of climate change. In Fall 2019, the New York City Economic Development Corporation (NYCEDC) and Mayor’s Office of Climate Resiliency (MOCR) launched a two-year public planning process, bringing together City agencies, local experts, and an interdisciplinary team led by the Dutch engineering firm Arcadis, to shape the master plan. The master plan’s ultimate success depends on fostering widespread community support, ensuring technical feasibility, and charting a clear pathway to implementation.

Grounded in a Shared Vision

In developing this master plan, the City worked closely with representatives of the Lower Manhattan community, citywide organizations and individuals, and the broader public to reflect a shared vision for the waterfront. The Climate Coalition for Lower Manhattan (CCLM), a stakeholder group formed to guide this master plan, brought together residents, business representatives, community organizations, and environmental and resilience groups to actively shape the master plan.

Technically Feasible

Key to the master plan’s success is proposing a reliable and technically feasible flood defense system. To do this, the project team conducted extensive technical analyses, including studying how water in the East River moves during both coastal storms and normal weather conditions; the viability of different flood defense tools in this location; and, the potential impacts to waterborne transportation and aquatic ecosystems. The project team also studied how the current drainage system works and developed a strategy to manage stormwater behind the proposed flood defense system.

Implementable

In addition to technical feasibility and community engagement, the master plan charts out a path through design, permits and approvals, and construction. While this includes many considerations, from funding to governance to constructability, state and federal permitting requirements

will have the greatest impact on the final design. As implementation will require state and federal permits, it is critical that the City carefully balance these requirements with the master plan goals and City policy priorities.

Sustainable

In line with *OneNYC 2050* and the City’s goal of carbon neutrality by 2050, the master plan aims to guide the Financial District and Seaport’s adaptation to the impacts of climate change without compromising the needs of future generations.

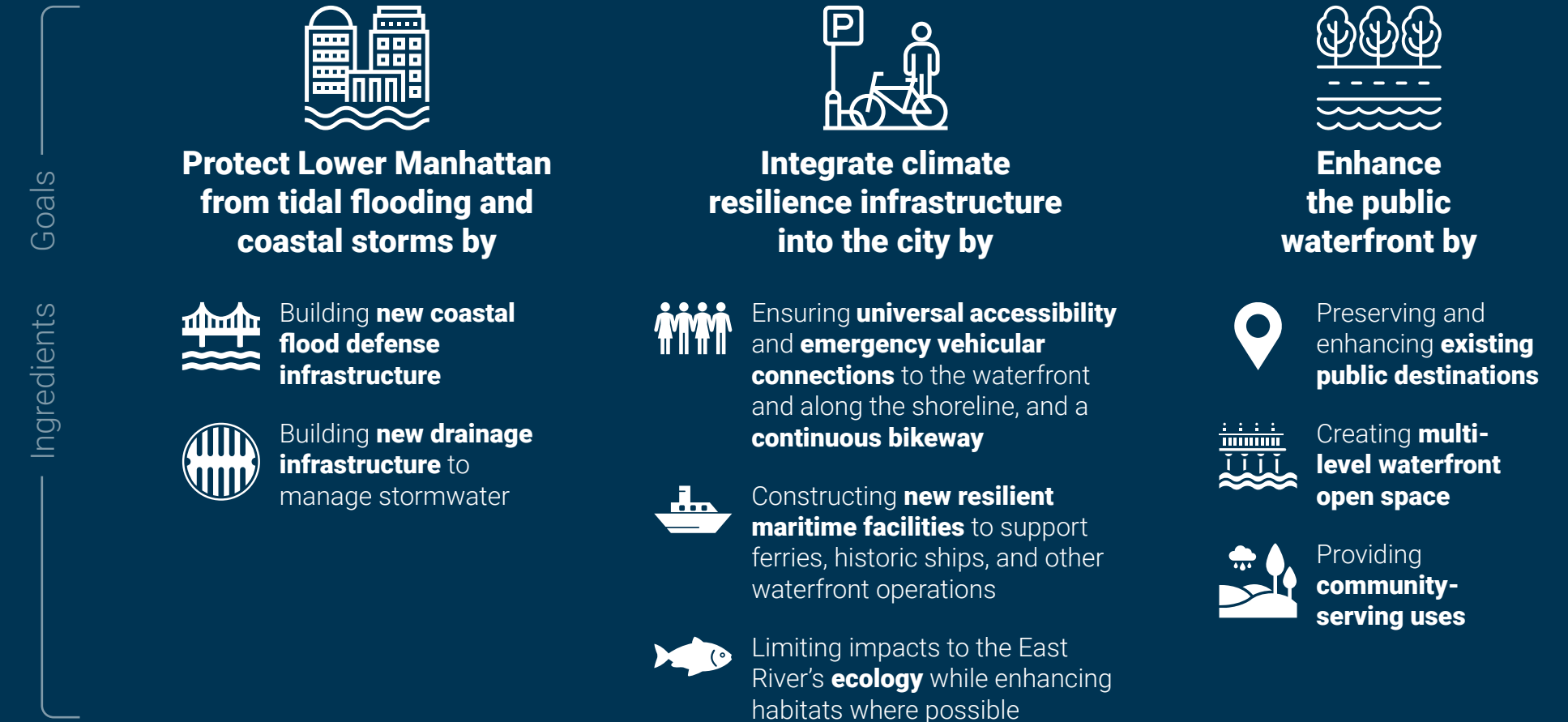
What is the Climate Coalition for Lower Manhattan?

Members of the CCLM, the master plan’s primary stakeholder group, include representatives from:

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|---|---------------------------------------|
| Alfred E. Smith Houses Resident Association, Inc. | Resilient Cities Catalyst |
| Alliance for Downtown New York | The Rockefeller Foundation |
| The Battery Conservancy | South Street Seaport Coalition, Inc. |
| C40 Cities Climate Leadership Group | South Street Seaport Museum |
| Financial District Neighborhood Association | Trinity Church Wall Street |
| Manhattan Community Board 1 | Tri-State Transportation Campaign |
| Manhattan Community Board 3 | Trust for Governors Island |
| Natural Resources Defense Council | Trust for Public Land |
| New York League of Conservation Voters | Urban Assembly New York Harbor School |
| Pace University | Waterfront Alliance |
| Partnership for New York City | Assembly Member Niou |
| Pasanella and Son Vintners | Borough President Brewer |
| Real Estate Board of New York | Council Member Chin |
| Rebuild by Design | Congressman Nadler |
| | Senator Gillibrand |
| | Senator Schumer |
| | State Senator Kavanagh |

Master Plan Goals

To protect Lower Manhattan, we must transform this waterfront to be resilient while maintaining its vibrancy and critical functions.



What is a Resilient 21st-Century Waterfront?

The *Financial District and Seaport Climate Resilience Master Plan* will **ensure that Lower Manhattan withstands rising sea levels and increasingly intense coastal storms**, while knitting a new flood defense system into the fabric of the city and creating a waterfront that serves all New Yorkers for generations to come.

Central to this master plan's success is the need to identify reliable and technically viable infrastructure to defend the one-mile stretch from the Brooklyn Bridge to The Battery from future tidal flooding and coastal storms. The primary design challenge is to achieve these resilience goals while continuing to provide universal accessibility to, from and along this waterfront, reconstructing ferries and maritime uses to make them resilient, and respecting the ecology of the East River. The master plan also presents an opportunity to improve how people experience the waterfront with welcoming entrances, multi-level open spaces, and strong connections to the existing historic destinations along the waterfront.

After detailed study as a part of the master plan, the City has concluded that achieving these goals requires extending the shoreline of Lower Manhattan into the East River to create the space necessary to build flood defense infrastructure. With such limited space along this waterfront and most of the esplanade built on pile-supported structures, a shoreline extension into the East River is needed just to construct the floodwall itself. Beyond space for the floodwall, the City is proposing a shoreline extension that ensures the community is not walled off from the waterfront.

The proposed design will seamlessly integrate flood defense infrastructure into a new multi-level public waterfront open space for all to enjoy. The upper level will protect against coastal storms, with buried floodwalls that double as elevated open spaces with expansive views of the harbor and the city. A lower-level esplanade will be close to the water itself and connect to piers and ferries. This esplanade will be high enough to remain dry as sea levels rise and designed to flood safely during coastal storms.



Bird's-Eye View Facing South
Illustration of what a resilient waterfront could look like in the future

The City is prioritizing *passive flood defense*, which means permanently raising the height of the shoreline to protect the area. Passive measures are needed because this area will eventually face flooding every day due to sea level rise; deploying floodgates every day is not feasible. Further, the Financial District and Seaport's low-lying topography combined with strong wave action during coastal storms makes relying solely on floodgates less suitable. In select locations, floodgates will accompany the passive flood defense, limiting additional weight over subway tunnels and providing entrances for emergency and maintenance vehicles to reach the shoreline. Absent a coastal storm, these floodgates will be hidden, opening views to the river and providing direct access to the shoreline edge.

The City is also proposing new stormwater infrastructure to keep stormwater from backing up and flooding the area behind the new coastal flood defense infrastructure. A combination of both traditional, or "grey" infrastructure, as well as green infrastructure, will help manage stormwater runoff, limiting the additional stress placed on the sewer system during heavy rain and coastal storm events.

This flood defense system poses a once-in-a-generation opportunity to transform the waterfront, creating a place that serves New Yorkers better than before.

This waterfront is not a blank slate. The flood defense needs to be integrated into the existing city fabric and continue to support the diverse uses that serve the city and region. Ferry terminals along the waterfront will be redeveloped into new modern facilities with room for future expansion. People will be able to access the waterfront with frequent and inviting entrances designed for universal accessibility. The bike path and waterfront esplanade will be replaced and improved to provide safe and uninterrupted connections between the Brooklyn Bridge and The Battery.

This waterfront will also be designed to help advance the City's sustainability goals. The new shoreline edge will incorporate opportunities for ecological enhancements, providing new habitats for fish and other aquatic organisms. Nature-based solutions will be woven throughout to help manage stormwater, provide shade, and reduce local summer temperatures. Further, the master plan identifies opportunities to integrate renewable energy as part of any new buildings or structures along the waterfront.

Pine Street Cove Facing North
Illustration of what a resilient waterfront could look like in the future



What's Next?

This master plan is comparable in scale to other major infrastructure projects essential to New York City's future. These include the Gateway Program to expand and renovate the Northeast Corridor between Manhattan and New Jersey, or Water Tunnel No. 3, which will secure the city's fresh water supply. The master plan will likely take 15 to 20 years to fully implement and cost over five to seven billion dollars. No one funding source will cover the entire cost; therefore, a variety of local, state, and federal sources—both existing and new—will need to be considered. Critically, the City will need to secure permits from state and federal entities to move forward. As a next step, the City will advance the design process and work closely with the community and regulators throughout future phases of work.

Take Action

This moment belongs to all New Yorkers who work in, live in, travel through, and enjoy Lower Manhattan and want to help build a more resilient, livable city. This master plan is the first step toward closing a major gap in the Lower Manhattan Coastal Resiliency strategy, but the work does not end here. New York City needs you—your vision, your advocacy, your participation—to make this master plan a reality.

Learn more about the next phase of work and how you can get involved at fidiseaportclimate.nyc.gov.



Illustrations of #MyResilientLowerManhattan drawn by children at a community open house (Photo courtesy of project team)



NYC / EDC **NYC** Mayor's Office of
Climate Resiliency

