ENVIRONMENTAL AND SOCIAL JUSTICE IN HARLEM

INTERROGATING ENVIRONMENTAL HISTORIES THROUGH PRESERVATION

Historic Preservation Studio II Spring 2022
Columbia University Graduate School of Architecture, Planning, and Preservation

CONTENTS

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This report was produced by Columbia University's Graduate School of Architecture, Planning, and Preservation (GSAPP). The report compiles the findings of a semester-long Historic Preservation (HP) studio in the spring of 2022 at GSAPP. This is a studio premised on concepts of community-engaged research and learning as integral aspects of preservation practice. Students and faculty alike have benefited from the knowledge and perspective of a number of representatives of the Harlem community and beyond, whom the team would like to thank and acknowledge.

Ascendant Neighborhood Development Corporation
Chris Cirillo, Executive Director

Manhattan Community Board 10
Karen Horry, Chair, Parks and Recreation Committee

Friends of Morningside Park
Brad Taylor, President

Harlem Community Development Corporation
Curtis Archer, President

Harlem Park to Park
Nikoa Evans, Executive Director

Marcus Garvey Park Alliance
Suzan Marciona, Vice President

New Yorkers 4 Parks
Adam Ganser, Executive Director

Pleasant Village Community Garden
Lupe Sanchez, Interim Secretary
Nadege Alexis, Member

Save Harlem Now!
Angel Ayon, Vice President
Lynn Hendy, Treasurer

The Shabazz Center
Najha Zigbi-Johnson, Director of Institutional Advancement

Trust for Public Land
Joan Keener, Deputy Director, NYC Playgrounds Program

WE ACT (West Harlem Environmental Action)
Chris Dobens, Director of Communications

Groundwork Hudson Valley
Brigitte Griswold, Executive Director
Candida Rodriguez, Director of Community Relations

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Dr. Liv Yoon, Addressing the Urban Heat Island through an Equity Lens

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FACULTY PREFACE

The subject of environmental justice may seem removed from the scope of historic preservation. In conceiving this studio, faculty intentionally sought to explore what connections might exist and how the methods of preservation might inform understanding of how environmental injustices are historically created and persist within the built environment.

People of color, low-income people, and Indigenous peoples are disproportionately affected by harmful environmental conditions. These injustices are historically rooted in racist and exclusionary land use decisions. They are embedded in built environments and institutions, and are often repeated and reinforced in ongoing decision-making about land use, planning, preservation, climate adaptation, and more.

This studio was inspired by the Environmental Justice for All Scope of Work report prepared by the NYC Mayor's Office of Climate and Environmental Justice (2021), which called out the need to address land use issues that may contribute to new or existing environmental justice concerns. We challenged students to apply a preservation lens to examine how environmental injustice and climate vulnerability have been socially constructed in Harlem over time through policies, practices, and projects that shape landscapes and the built environment, and privilege or disprivilege the publics that inhabit them. Students leveraged preservation methodologies to investigate the social-spatial dynamics and place-based dimensions of communities and their longitudinal manifestations.

Student inquiries focused on the following:

- HISTORIES: What stories, places, events, works, policies, organizations and entities, and individuals characterize, represent, and/or demonstrate evidence of environmental justice or environmental racism/injustice?

- CONSEQUENCES: How have people and the places they inhabit been affected by these histories over time? How are these histories and their consequences encountered and/or experienced today, if at all?

- INTENTION: How can the preservation enterprise—through community-engaged research, policy, physical intervention, interpretation, creative expression, etc.—instrumentalize the social and spatial evidence of these environmental legacies to promote environmental and climate justice?

Through their research and conceptual proposals, students challenge these histories and their complicity in perpetuating environmental injustice, and also imagine and posit preservation's role in activating these histories toward more just futures.

Students
Kemuning Adiputri
Elaf Alsibyani
Adam Brodheim
Daoxin Chen
Emily Conklin
Schuyler Daniel
Jacqueline Danielyan
Kerrian France
Michelle Leach
Xiyu Li
Winnie Michi Trujillo
Nina Nahitchevansky
Shivani Rajwade
Jerry Schmit
Yinjie Tian
Shannon Trono
Mimi Vaughan
Hongye Wang
Wenjing Xue
Clara Yip
Damiana Yousef
Zihao Zhang
Shuya Zhao

Student Graphic Designer
Hongye Wang

Teaching Assistants
Anna Gasha
Ziming Wang

Faculty
Erica Avrami, PhD
James Marston Fitch Assistant Professor of Historic Preservation

Morgan O'Hara
Adjunct Assistant Professor of Historic Preservation

INTRODUCTION & METHODOLOGY

INTRODUCTION

This studio inquiry, titled *Environmental and Climate Justice in Harlem: Interrogating Environmental Histories through Preservation*, focuses on these contemporary health and equity issues through a preservationist's perspective—prioritizing change over time and spatial histories. As a studio, we spent a semester engaging local community groups while conducting on-the-ground field studies and rigorous research into the environmental story of Harlem.

This report presents key issues that we identified and interrogated through historic research, material engagement, and community outreach: many of the topics explored in the report investigate overlaps, intersections, and parallels we found between previously disparate ideas. In this way, we have brought into conversation bodies of work spanning environmental science, social justice, architectural preservation, and city politics, to name a few.

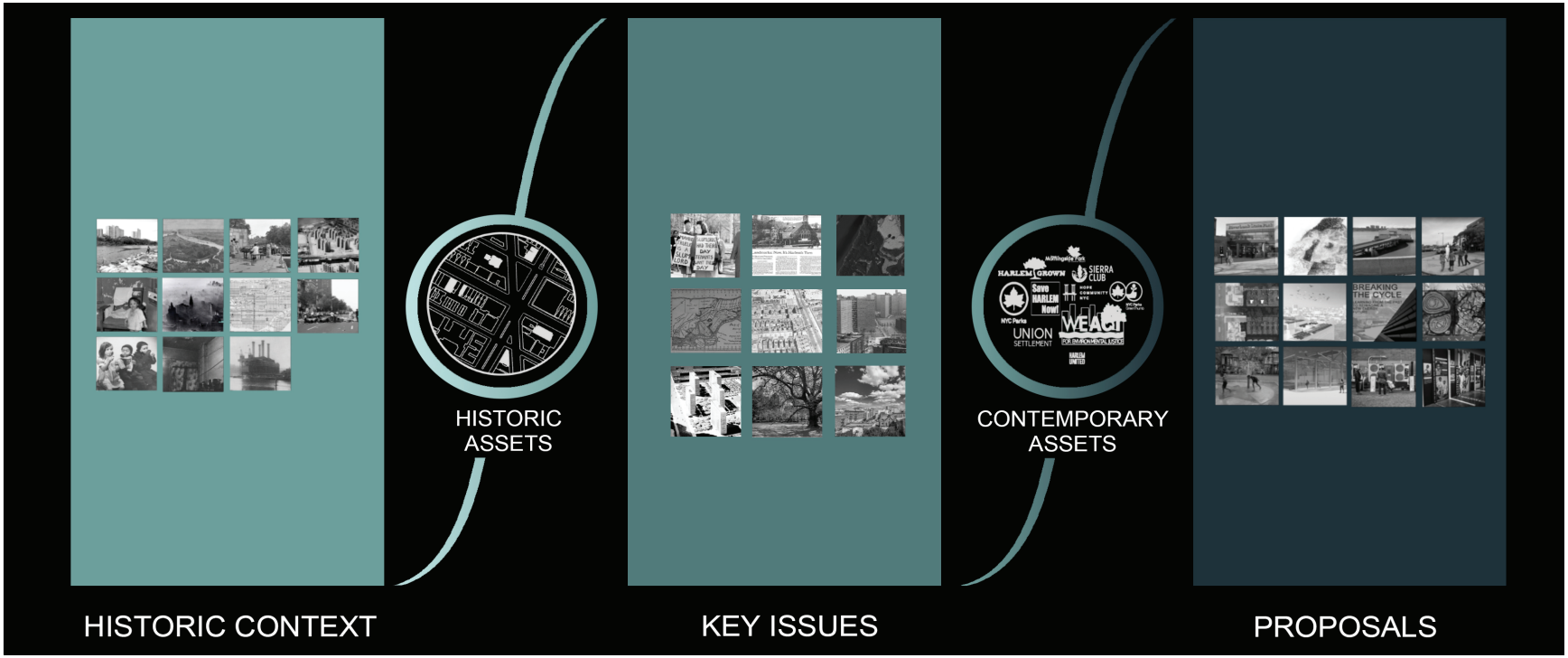
This breadth of inquiry may seem outside the realm of what is typically understood as "Historic Preservation," and that in many ways was our goal. We believe that our work as preservationists, and as part of Columbia's architecture school, is to find and illuminate concepts and practices that affect our built environment. The work of this studio goes beyond architectural aesthetics and into the realm of turbulent spatial histories that make up the historic fabrics in which we live.

First, it is important to ground our research in the definition of environmental justice, or EJ, with which we began the studio. The following is cited from the New York City Environmental Justice for All Report, which was used as a base:

> The fair treatment and meaningful involvement of all persons, regardless of race, color, national origin or income, with respect to the development, implementation and enforcement of environmental laws, regulations, policies and activities and with respect to the distribution of environmental benefits. Fair treatment means that no group of people, including a racial, ethnic or socioeconomic group, should (i) bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal and commercial operations or the execution of federal, state or local programs and policies or (ii) receive an inequitably low share of environmental benefits. (NYC Mayor's Office of Climate and Environmental Justice 2021, 6)

With this definition in mind, we then defined our geographic area of study for inquiries further into the spatialization of this environmental justice issue. Our area is defined roughly as "Harlem," bounded by the Hudson and Harlem Rivers stretching from 155th Street down to West 110th and East 96th Streets to the east of Central Park. We did not investigate this large area of Upper Manhattan homogeneously, however. We recognize that there are significant differences in land form, culture, and population histories in smaller neighborhood pockets like Hamilton Heights, Morningside Heights, and El Barrio, just to name a few.

Studio II study area.



The methodology of Studio II consists of five steps: historic context, historic assets, key issues, contemporary assets, and proposals.

METHODOLOGY

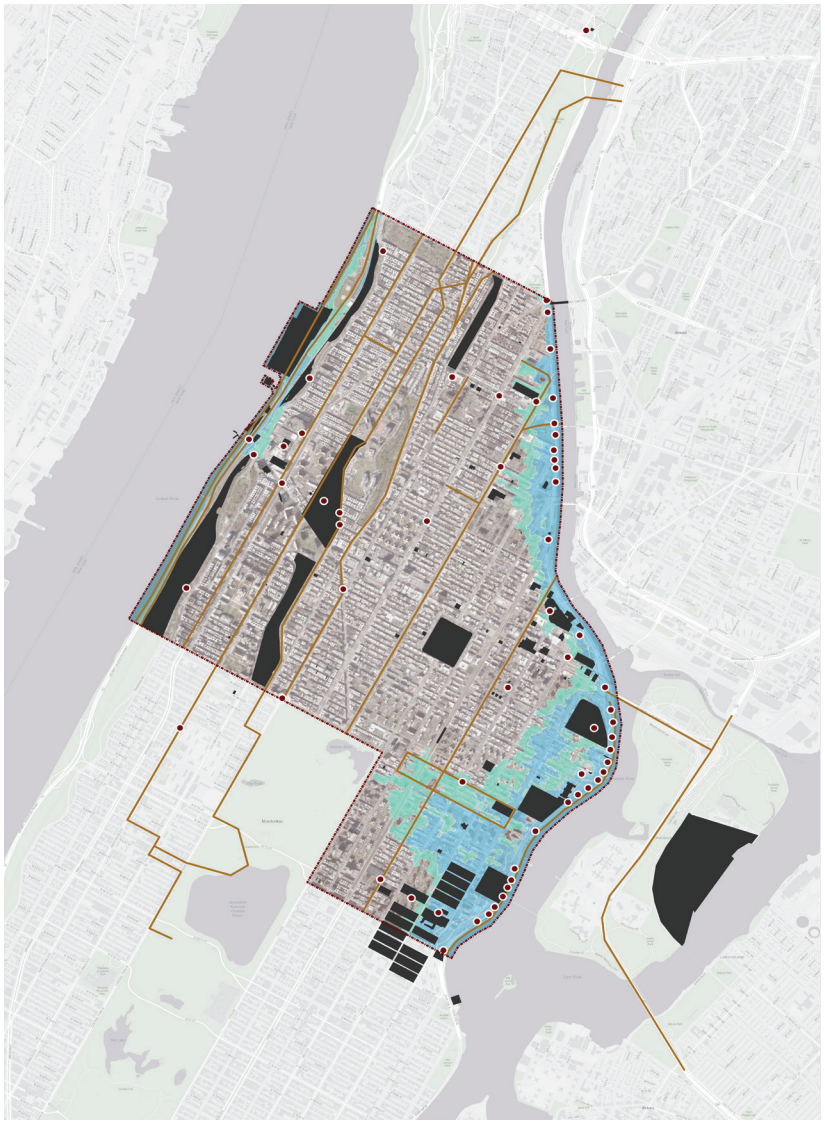
Our research process constructs the core of our studio methodology. Each step of the process will be explained in detail, but includes historic context research, key issues focusing on analysis of change over time, and proposals that respond to the wide base of work previously conducted. The studio identified historic assets to spatially orient our historic research and contemporary assets to connect with actors in the community.

We began this studio in January 2022 by exploring historic context. Eleven themes were identified by the faculty as pertaining to environmental justice. They deal with a wide range of social, spatial, and political realities that have been historically tied to fights for environmental justice, and remain at the forefront of activist efforts today. These research-based explorations, which revolved around a specific spatial identity and the populations that interacted within Harlem, helped us to better understand the issue of environmental justice in our study area. Working within these themes, we undertook Historic Context analyses, which summarized our research findings as well as a selection of Historic Assets.

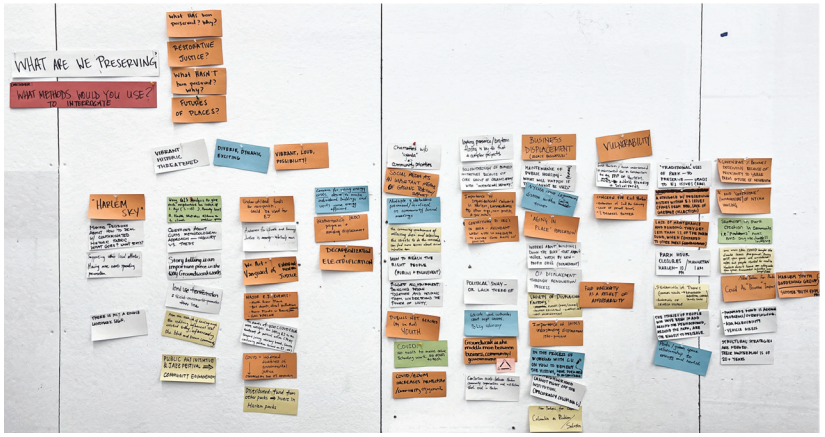
By embarking on a field survey in February, we identified historic assets within the study area—these "assets" ranged from individual objects or building footprints to entire urban corridors that contain significance and histories related to climate and environmental justice issues, whether surviving or not. These place-based heritages within the community gave us a better understanding of the multi-dimensional history of environmental justice in Harlem.

Through exploring historic context and assets, nine major key issues were identified that significantly affected the histories and consequences of environmental justice in Harlem. We delved deeply into examination of the data compiled to date, and generated additional information and insights through a field survey, mapping, narrative and demographic analysis, formal analysis, data visualization, and community-engaged research. With these key findings, we sought to establish a firm basis to inform future action.

In tandem with the spatial assets identified through our historic context research, we also identified community connectors as contemporary assets. By interviewing representatives of organizations that share common values with our studio inquiry, we learned about intersecting concerns, observations, and added insights for our study. These informed our analysis of key issues and guided proposal development.



The historic assets map includes 61 point assets, 18 polyline assets, and 122 polygon assets.



Students and faculty discussed key takeaways from interviews with representatives of organizations.

To implement our evidence-based findings in the final part of the methodology, our ultimate goal in this studio was to put forth proposals that promote environmental and climate justice in Harlem, and alert stakeholders, residents, and governmental bodies to past injustices. Each of the proposals that make up the final section of this report has a clear objective, and delves into complex and multi-faceted key issues. By raising our proposal ideas—such as architectural intervention, artistic installation, interpretation, and further research recommendations—we as future preservationists hope to use our own strengths to address the social, cultural, and environmental issues that affect our built world.

HISTORIC CONTEXTS & ASSETS

HISTORIC CONTEXTS AND ASSETS

The starting point of this studio was the examination of the historic contexts that contributed to the conditions experienced in Harlem today. Eleven overarching themes were identified by the faculty, each dealing with a wide range of social, spatial, and political realities that have been historically tied to fights for environmental justice, and remain at the forefront of activist efforts today. These research-based explorations revolved around specific spatial identities and the populations that interacted within Harlem, and were foundational in better understanding issues of environmental justice within the study area and as it relates to the city as a whole.

In relation to each of these themes, students also identified historic assets: places and spaces associated with the theme's stories and narratives. This process of identifying, mapping, and ground-truthing assets through a field survey allowed students to further understand how these narratives are spatialized and encountered in the Harlem landscape. Whether assets survive or not also speaks to how certain narratives and the publics vested in them are advantaged or disadvantaged through decision-making about the built environment.

The following themes are summarized in this section, and examples are provided of associated assets. Full analyses of these historic contexts are included in Appendix A, and the complete list of historic assets is included in Appendix B.

> Climate Risk and Response
> Energy
> Fresh Food and Nutrition Access
> Hazardous Material Exposure
> Indoor Air Light and Ventilation
> Open Spaces and Green Resources
> Outdoor Air
> Redevelopment and Displacement
> Solid Waste Management
> Transportation
> Water Quality & Management

CLIMATE RISK AND RESPONSE

CONTEXT

Endemic flooding, heat island effects and heat-related health issues, as well as extreme temperature fluctuation are areas of climate concern that have been and will continue to be exacerbated by the ongoing effects of climate change, and the costs will directly affect various vulnerable communities living and working in Harlem. Extant historic assets for this theme include public access-based solutions like shade and cooling facilities, acute vulnerability sites, and historical interventions to the existing landscape. Key historic assets analyzed also included historic waterways throughout the neighborhood, topographic outliers, glacial remains, and historic landscape typologies.

Harlem's topography and underlying natural formations are greatly influenced by geologic histories stemming from the island's formation by the Wisconsin Glacier during the last ice age. The extreme differences in elevation between east and west boundaries of Manhattan, as well as an extensive floodplain on the eastern shoreline, are the root causes of many of these instances of climate injustice and uneven mitigation efforts over time. Conditions are exacerbated by ongoing negligence toward resilience efforts to protect populations from the negative effects of the environment and the underlying, systemic forces that have resulted in community vulnerability then and now.

ASSETS

Due to multiple factors, Harlem has been documented to have high vulnerability to extreme heat conditions and is one of the warmest neighborhoods in New York City (Vant-Hull et al. 2014; Rosenzweig et al. 2006). The area did not have a public pool until 1936, when Colonial Park (now Jackie Robinson Park) was developed. This facility was built thirty years after the West 60th Street pool, the oldest pool documented in Manhattan, illustrating how cooling facilities came to Harlem late compared to other areas of the island.

A few additional public pools were added to Harlem, including Jefferson Pool, built in 1936; Abe Lincoln Pool, built in 1951; Marcus Garvey Pool, built in 1967; Wagner Pool, built in 1969; and Sheltering Arms Pool, built in 1970. All of them provide a necessary cooling spot for public use, which Harlem lacked in the past.

Abe Lincoln Pool

Abe Lincoln Pool serves as a cooling facility to mitigate heat in the neighborhood. Photo c. 2005.

Jackie Robinson Pool

Jackie Robinson Pool is in the southernmost section of Jackie Robinson Park. It is one of the eleven pools that commissioner Robert Moses proposed in 1936. Photo c. 2007.

Thomas Jefferson Pool

The opening of East Harlem's Thomas Jefferson Pool, c. 1936.

Marcus Garvey Pool

Before the permanent pool in Marcus Garvey Park was built in 1971, a portable pool would be temporarily set up on what is now the chess table area near Madison Avenue and 122nd Street. Photo c. 1968.

Wagner Houses Pool

The New York City Housing Authority leased this property to the City in 1969 to develop a public pool for the community. The Wagner Houses Pool serves not only as a memorial to a dedicated political leader but also as a refreshing place for rest and recreation in the community. Photo c. 2019.

ENERGY

CONTEXT

The history of energy in Harlem can be categorized by fuel types, energy innovations, accessibility, and effects on the community. It is also defined by its differences from southern Manhattan; specifically, the lack of district steam heat uptown. Early fuel types, such as lighting gas and coal, would have to be stored in the community; as such, coal yards and gas holders are among the historic assets pertinent to this theme that no longer exist. As fuel types shifted from coal to oil, and then to natural gas, more hidden infrastructure brought energy to Harlem instead of the above-ground storage locations mentioned.

The majority of Harlem's heat is provided by steam systems in individual buildings. Over time, the expense of fuel, fuel changes, and maintenance would fall upon landlords and owners, which often left Harlem tenants with run-down and outdated heating systems that could cause adverse health effects and pollution. Accessibility to energy amenities and their regulation rarely appeared in New York City policy. Until the twenty-first century, there was little reference to heat or electricity in tenement laws, and fuel types were not regulated. While landlords were required to provide heat during the heating season starting in 1918, these policies were often ignored and uptown residents would have poor heating conditions. As a result, building projects in the area during the twentieth century advertised efficient heating systems and electricity to low-income renters. While these housing developments were able to increase access to energy, they sometimes came at the cost of displacement and destruction of houses, tenements, stores, and communities. Subsequent government-led efforts arose toward the end of the twentieth century, marking increased concern not only for the quality and consistency of heating sources, but also for those of the building envelope in its entirety.

ASSETS

Second Avenue Railroad Powerhouse

Powerhouse serving the Second Avenue Railroad connecting Harlem to lower Manhattan, c. 1940.

Consolidated Edison Company of New York, Inc. (CECONY)

The New York Consolidated Edison Company building, which provided electric and gas service in New York City and steam service in the borough of Manhattan, c. 1940. This building was demolished. However, this area has continued to be used by Consolidated Edison, and current Con Ed facilities still reside near here.

Consolidated Gas Company

Local Consolidated Gas Company building located in West Harlem, c. 1940.

FRESH FOOD AND NUTRITION ACCESS

CONTEXT

One of the major environmental justice concerns in Harlem has been the challenge of food equity: fresh food and nutrition access through natural and affordable healthy food options for vulnerable populations (Naidoo et al. 2018). The history of food production and distribution in Harlem sheds light on how these inequities were shaped. Heavily reliant on staple foods like milk and meats, the underserved populations of working-class and lower-income populations in Harlem often found their meal choices negatively impacted by racist and unjust policies. As the poor worked long hours and lacked access to kitchens, many became heavily dependent on outside sources for prepared foods in local markets. Corrupt marketing and racketeering practices by food retailers in Harlem made fresh food less than affordable. The lack of governmental regulation in Harlem's commercial spaces also neglected to remedy poor hygiene practices in the markets and restaurants that served Black and other marginalized populations.

ASSETS

Sheffield Farms Stable

The building at 3229 Broadway (which currently serves as Columbia University's Prentis Hall) was originally built as Sheffield Farms' milk plant and stable, housing horses used for the delivery of pasteurized milk until July 1938. It was constructed in 1903 as a two-story stable building for the Sheffield Farms dairy, then expanded to its present size in 1909.

Pathmark Supermarket

At the end of the twentieth century, because of the rezoning along 125th Street, a Pathmark market, which served as one of the few grocery stores in the area, was demolished and replaced with a residential project.

La Marqueta

"La Marqueta" was a traditional marketplace that specialized in Latin American and Caribbean goods located under the Metro-North railroad on Park Avenue between 111th and 116th Streets. Over 500 vendors operated out of La Marqueta in the 1950s and 1960s. Beginning in the 1970s, public buildings replaced the surrounding tenements, reducing foot traffic and contributing to the market's decline.

Mount Olivet Baptist Church Community Meals Program - Food Distribution Center

The Mount Olivet Baptist Church, located at 201 Lenox Avenue, also participated in the Emergency Food Commission Project. It still provides the community with a weekly food pantry.

Salem United Methodist Church

The Salem United Methodist Church, located at 2190 Seventh Avenue, is one of the five original churches that participated in the Emergency Food Commission Project to feed Harlemites under Governor Dewey in 1943.

HAZARDOUS MATERIAL EXPOSURE

CONTEXT

Hazardous material exposure has been a crucial issue in the housing and public spaces of Harlem. Data was collected on contaminated sites, known as brownfields, to see how the history of these areas has affected the community. Cleanup programs were developed to help minimize negative effects and rehabilitate these contaminated areas. More rehabilitated sites on the east side in comparison to the rest of Harlem suggests a relationship to higher concerns of contaminated waste, likely associated with the large industrial sites that developed in East Harlem during the nineteenth century. The impact of specific hazardous materials found in buildings and soil, such as lead and asbestos, has impacted Harlem over time. In the built environment specifically, the long-term use of lead pigments in paints has contributed to lead poisoning in children at problematic rates, and shaped significant activism within the Harlem community.

ASSETS

Global Community Charter School

This location was once a contaminated site and has now been remediated and is being used as a charter school, representing the positive evolution of a brownfield site.

Subway Station in West Harlem

The timber-framed subway station, under construction, with smokestacks looking northeast at Lenox Avenue and 110th Street in Harlem in 1901. Several historic factors shaped the current hazardous material landscape in Harlem. Proximity to transportation was critical for the efficient supply of raw materials and convenient access for workers.

INDOOR AIR, LIGHT, AND VENTILATION

CONTEXT

Activism and events throughout Harlem's history, such as rent strikes, rallies, and protests, helped lead to policy changes within the Tenement Acts of 1867, 1879, 1901, both benefiting and perpetuating poor living conditions in historical forms of housing in Harlem. The physical conditions of living, typologies of housing, and rehabilitation plans were contributing factors in inequitable living conditions, a form of environmental injustice, and the need for resident action. Historical records and studies performed by the studio team build a comprehensive history of the interior qualities of living in Harlem, enforced by the physical built form of Pre-Law Tenements (built before 1867), Old Law Tenements (built between 1880 and 1901), and New Law Tenements (built between 1901 and 1929). Examining original floor plans, city rehabilitation master plans, and reviews of each typology serve to characterize the benefits and flaws to the interior air, light, and ventilation qualities of dwellings in Harlem, affording insight into the progression of policy and built form.

Housing projects were designed to address many of these inequitable conditions, though not always effectively, and are examined in the Key Issues section of this report.

ASSETS

Mount Morris Ascension Presbyterian Church

In 1964, the rent strike leader Jesse Gray gave a speech at Mount Morris Ascension Presbyterian Church with more than 200 people gathered together to urge the state legislature to take over New York City's slums. The strikers demanded rent deductions and better living conditions. Photo c. 2019.

Subway Station in West Harlem

Samuel Hawkins, who managed rent-striking buildings at 16 and 18 East 117th Street and brought his landlord to court over living conditions, lived here in 1964. Photo c. 1940.

OPEN SPACES AND GREEN RESOURCES

CONTEXT

Histories of environmental injustice are evidenced through the study of green resources and open spaces in Harlem. The distribution of and access to trees, open spaces, playgrounds, and parks are historically related to race, socio-economic status, and public and private land use. Historic assets such as Marcus Garvey Park, the African American Burial Ground, and the Tree of Hope, as well as studies of open spaces and green resources in Harlem document histories of environmental injustice and activism.

ASSETS

Riverside Park

Manhattan's most spectacular waterfront park, seen here in 1908, is listed on the National Register of Historic Places and designated a New York City scenic landmark.

Marcus Garvey Park

Renamed in honor of Marcus Garvey in 1973, the park was built largely as a green space for Boss Tweed's Tammany Hall cronies, many of whom lived uptown by the 1860s. The land for the park was purchased by the City in 1839, but landscaping was long delayed. Its design was eventually supervised by Ignaz A. Pilat, who would later serve as an associate of Frederick Law Olmsted during the creation of Central Park. Image c. 1916.

Morningside Park

Morningside Park was completed in 1895. The Olmsted and Vaux design highlights the natural setting by creating two linear path systems, one broad and meandering and the other cutting through the Manhattan schist and hugging a massive buttressed retaining wall along the park's western edge. It separates the high terrain of Morningside Heights and the low terrain of Harlem. Photo c. 1911.

Spiritual memorial spaces like cemeteries illustrate long histories of racial and social inequality and injustice. Pre-1900, the property along the Harlem River between what is now 126th and 127th Streets was the site of a church and enslaved peoples' burial ground, and served the African American community at a time when limited gathering spaces were available to them. The burial grounds were later used as an animal farm, and then redeveloped as Sulzer's Harlem River Park, an amusement facility pictured here, c. 1890.

Sulzer's Harlem River Park

Thomas Jefferson Park

Thomas Jefferson Park provided organized play to the children of Little Italy, as the crowded tenement district in East Harlem was then known, c. 1910.

OUTDOOR AIR

CONTEXT

Outdoor air quality is a continuous issue in Harlem threatening the health of its populations, and constitutes a critical dimension of environmental and social injustice. Outdoor air issues are historically associated with technological changes that created new sources of pollution, government regulation to address pollution, and the community's fight for justice. Four representative periods illustrate the changing sources of pollution and demonstrate how outdoor air injustice has become an intensifying social issue.

Throughout the history of outdoor air pollution, the introduction of new technologies often alleviated pollution from obsolete sources, yet often created new concerns. From the prevalence of miasma theory in the nineteenth century to contemporary studies correlating higher rates of childhood asthma to communities of color, people in Harlem have historically fought for their right to clean air, especially in relation to transportation and land use. This research argues that the severity of air quality injustice has increased over time, suggesting Harlem has historically suffered a disproportionate burden of outdoor air pollution.

ASSETS

The Harlem Courthouse

The city government used the Harlem Courthouse as a laboratory to measure air pollution. At the time of the 1966 New York City smog crisis, it was the city's only station to measure the air. In November 1968, the city opened thirty-eight monitoring stations, replacing the old index system that only produced a single number for the entire city.

The 126th Street Bus Depot

The Amsterdam Depot

The location of the bus depots in Harlem illustrate an important environmental injustice history. Eight out of ten diesel bus depots in Manhattan were located north of 100th Street, concentrated mostly in neighborhoods that have higher percentages of non-White populations. There were five diesel bus depots actively in use by 1990 in Harlem. Among the five depots, the Amsterdam Depot and the 126th Street Depot were officially shuttered by the MTA and the other bus depots now accommodate natural gas and other green fueled buses. In May 1997, WE ACT launched a major public awareness campaign urging the MTA to invest in clean-fuel buses, as Harlem has had to bear a disproportionate amount of air pollution from diesel buses.

The Mother Clara Hale Depot

The Manhattanville Bus Depot

The Tuskegee Airmen Bus Depot

REDEVELOPMENT AND DISPLACEMENT

CONTEXT

Through this theme, the studio examined the government-led projects that historically contributed to housing displacement in Harlem, and its relationship to environmental justice in Harlem today. Since 1921, anti-immigration laws, redlining maps, slum clearance projects, and public housing programs, the federal and municipal government efforts to ostensibly improve urban housing conditions have resulted in recurring incidents of exclusion and government-sanctioned displacement in Harlem. Both residents and businesses were affected by redevelopment and the creation of super-blocks and new buildings.

ASSETS

East River Houses

The East River Housing Project, completed in 1940, was the first public housing program in East Harlem developed by NYCHA. It provided 5,000 rooms for 1,170 residents and only four families were displaced from their homes to make way for construction. It was also the first multiracial housing project in the city.

Harlem River Houses

The Harlem River Houses, completed in 1937 and seen here c. 1936, were one of the first two housing projects in the city funded by the federal government, with the goal of providing quality housing for working-class African Americans. After the Harlem Riot of 1935, there was pressure to improve housing for African Americans, but no genuine attempts were made to desegregate public housing until the Harlem River Houses Project was proposed.

President Abraham Lincoln Houses

Completed in 1948, the Lincoln Houses include fourteen buildings containing 1,282 apartment units. The development is a positive example of early public housing projects that added to East Harlem's population. Photo c. 1951.

James Weldon Johnson Houses

Completed in 1948, Johnson Houses includes ten buildings containing 1,308 apartment units. When the houses were built, nearly 100 families were relocated, and 175 community stores were lost. Photo c. 1947.

Robert F. Wagner Houses

The Robert F. Wagner Houses Project is also known as the Triborough Houses. It is a public housing development in East Harlem. While it provides 5,290 residents with 2,162 apartments, 225 local stores were lost and about 600 residents were relocated to construct the complex.

Franklin Plaza

Built in 1960, Franklin Plaza is a mixed-income residential development with a thirty-one store shopping center, designed in response to compounded loss of businesses following previous public projects.

SOLID WASTE MANAGEMENT

CONTEXT

Harlem has a contested political history with regard to solid waste management that spans both large-scale municipal infrastructure projects as well as the day-to-day performance of necessary municipal services. Across Harlem's history, the inequitable distribution of physical infrastructure has burdened Harlem and its population with higher degrees of environmental injustice, including substandard land reclamation, higher degrees of smoke from incinerators, as well as dust, fumes, and smells from municipal waste transportation. Harlem has also historically been serviced with poor garbage disposal practices, resulting in a degraded physical environment. Throughout Harlem's history, these challenges have been met with political responses and social resistance, in the forms of increased government enforcement, lawsuits, and physical protests.

Harlem's coastline was a site of aquaculture, indicated by oyster shell middens and other settlement remains found in East Harlem along the East River that date to before or concurrent with initial colonization (Sanderson 2009). The dumping of waste along the East River continued through the nineteenth century with land reclamation efforts filling in large portions of the East River's western shore, including what is now East Harlem. In the twentieth century, incinerators and marine transfer stations (MTS) were located along both the Hudson (at 135th Street) and East Rivers (at 139th Street and 91st Street) and handled waste from the entire island of Manhattan, beyond Harlem, whose community faced the impacts of these externalities. While the twentieth century mostly saw the Harlem community unsuccessful in attempts to achieve environmental justice, the twenty-first century has seen the Harlem community more successful in negotiating the locations of physical infrastructure in relation to the Harlem community's concerns through strong organization (Sze 2006).

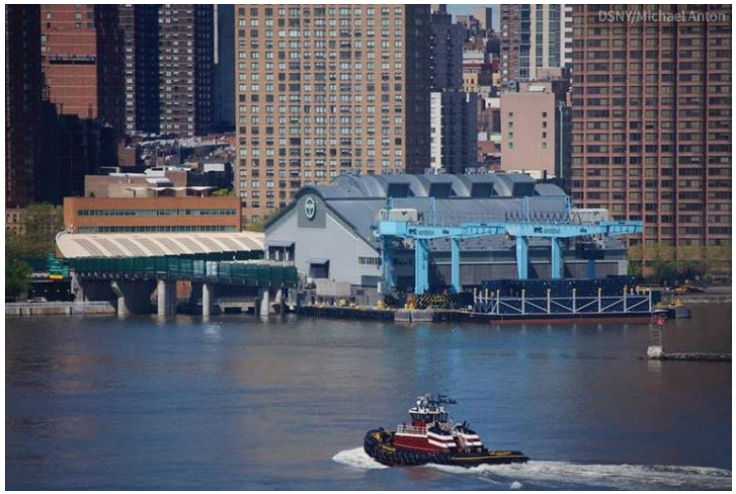
Throughout its history, Harlem has frequently been the location of communities that have lacked full political representation due to economic or racial makeup. These communities have been disadvantaged with inadequate trash practices from both the government and real estate owners. However, these communities' protests have succeeded when a geographic density of a particular community gave sufficient energy to protest activities, as seen in the activities of the Young Lords in East Harlem (Older 2019).

ASSETS

139th Street Incinerator

The 139th Street incinerator site was responsible for loading on trash barges all garbage north of 100th Street and the majority of the street sweepings and ash collected between 90th and 145th Streets on the east side of Manhattan, totalling some 400,000 cubic feet a year. Despite the first recorded complaint in 1920 about the heavy use of the site, the facility was expanded to include an incinerator in 1925. Photo c. 1940.

91st Street Marine Transfer Station



As the geographic extent of Harlem stabilized in the twentieth century, Harlem's coastlines would be seen as prime locations for the offloading of solid waste from the island of Manhattan. One of the marine transfer stations was opened in the 1930s at East 91st Street to handle waste from the entire island of Manhattan, just outside of Harlem, which was the main community impacted by the dumping practices.

135th Street Marine Transfer Station

The 135th Street MTS was opened in 1955 and served as the main facility receiving waste generated by the borough of Manhattan for more than forty years.

Museum of Trash

The New York City Department of Sanitation "trash museum" in East Harlem holds the collection of relics saved from the landfill by retired sanitation worker Nelson Molina. The "museum" is still an active Department of Sanitation garage in East Harlem.

TRANSPORTATION

CONTEXT

The environmental implications of various modes of transportation in Harlem are influenced by transit development, changes in routes, evolving technology, and traffic patterns. Historic assets associated with transportation histories were analyzed both individually and collectively to understand their role within the community and the evolution of the built environment. Environmental justice serves as a framework to analyze the significance and impact of railroads, ferry ports, elevated rails, bridges, and different public transit methods on the community of the study area, and to explore how different Harlem publics have historically been and currently are adversely affected by transportation and related issues.

ASSETS

Robert F. Kennedy Bridge

Robert F. Kennedy Bridge, formerly the Triborough Bridge, is a complex of bridges and elevated expressway viaducts in New York City. The bridges link the boroughs of Manhattan, Queens, and the Bronx. A debate over the location of the bridge followed the proposal of a bill in the New York State Legislature to construct the bridge in 1920. The plan to locate the Manhattan exit by the Upper East Side was ultimately abandoned, leading to its placement farther north by 125th Street, which would experience the heavy traffic, noise levels, and pollution associated with the bridge. Photo c. 1936.

130th Street Pier

In 1850, the Manhattanville Depot was designated as the first northbound stop of the new Hudson River Railroad, advancing the neighborhood's growth as a railroad suburb and effectively turning the Manhattanville waterfront into a very busy transfer station between land and sea. While this contributed to further development of West Harlem, it also brought a sharp increase in industrial facilities due to improved waterfront access for shipping and commuting. Photo c. 1957.

1 Train (125th)

125th Street Station of Line 1 is the only station on the Manhattan Valley Viaduct, which carries the Broadway-Seventh Avenue Line across a natural valley surrounding this area. Due to the open-air environment of the railway tracks and close distance to the surrounding residential buildings, the level of noise and air pollutants is very high. The viaduct today is often used as shelter from the elements by unhoused people in the area.

99th Street Car House

Storage facility for street cars listed on an 1899 railroad map. Image from 1940 demonstrating the way that many transit facilities were updated over time with new modes of transportation. The building is demolished.

New York Railways Company

Facilities serving the New York railway company. This is another example of the many transit hubs and facilities that were located in Harlem. The building, seen here in 1940, is demolished.

WATER QUALITY AND MANAGEMENT

CONTEXT

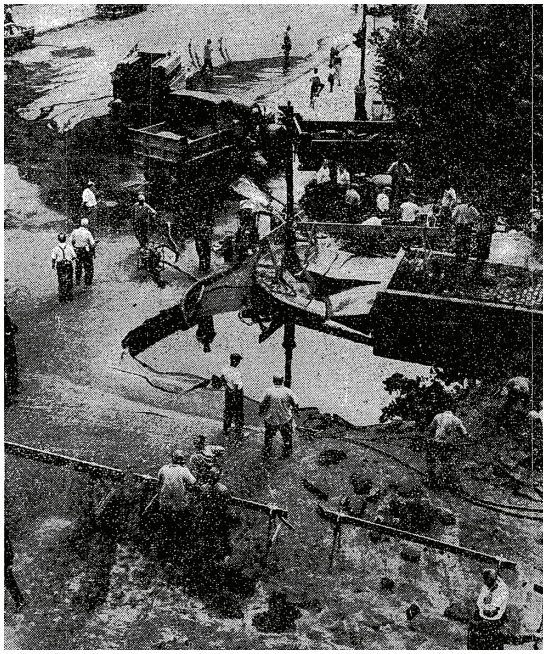
Water quality and management in New York City is fraught with complex histories, infrastructural systems, and community relationships. Looking through the lens of environmental justice, the development, implementation, and management of water and wastewater systems in the Harlem neighborhood between 110th Street and 155th Street illustrate a history of city bias and environmental inequity. The water system of present-day New York City and Harlem specifically is the result of natural geologic processes that formed the Mannahatta watercourses used for trade, transportation, and sustenance by the Indigenous peoples of the region. Since settler colonial development in Manhattan in the seventeenth century, these natural watercourses, once prized for their drinkability (as opposed to the saline water of the Hudson River) and as a source of power, have been subject to pollution, burial, infill, and conversion from a source of freshwater to sewers. While all of Manhattan developed dependencies on aqueduct systems, effective stormwater drainage systems, sewers, and marshland infill, environmental injustices in the implementation and management of these systems was especially apparent in the Harlem neighborhood. This research exposes these injustices through an assessment of the development and management of water bodies and systems in Harlem, including a number of specific projects and case studies that illustrate the community's relationship to waterways and water infrastructure. Finally, an assessment of the community's vulnerability to rising sea levels and increased inland flooding relative to the infrastructures currently reveals, at greater depth, the injustice historically rooted in the management of water resources.

ASSETS

Sewer outfalls in Harlem

The storm water and sewer infrastructure of Harlem is less well-equipped to handle flooding events without depending on sewer outfalls into, primarily, the Harlem and East Rivers. Thus, raw sewage and storm water are dumped directly into the rivers rather than diverted to treatment facilities.

Water Main Burst at 145th Street and Seventh



Water main burst in 1956 at Seventh Avenue and 145th Street under the toad causing a hole that was estimated 14' deep and 40' x 22' wide. Fear of fire due to lowered water pressure resulted in deployment of fire boats. The water burst also caused a critical water shortage throughout the area. The surrounding area is repeatedly affected with water supply shortage and public transportation suspended by water burst.

North River Wastewater Treatment

Sewage treatment plant serving the west side along the Hudson River that the community opposed and sparked WE ACT objection. Over the years, the community has complained about the fumes and odor. Riverbank State Park was built on top of the facility.

Old/New Croton Aqueduct Gatehouses

The Old and New Croton Aqueduct systems offer a holistic view to understand how the water supply in Harlem evolved over time. The Old Croton Aqueduct was regarded as a solution to the long-lasting water sanitation problem. After the Old Croton Aqueduct reached its carrying capacity forty years after it was built, the New Croton Aqueduct was completed in 1890. Historically, the water supply area of both Croton Aqueducts included the study area of Harlem, and although the Old Croton Aqueduct stopped sending water to the city in 1955, some of the study area is still using water from the New Croton Aqueduct.

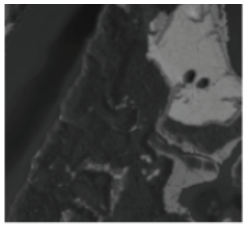
KEY ISSUES

KEY ISSUES

Students identified nine topics as key issues that have significantly informed how environmental injustice and climate vulnerability have been socially constructed in Harlem, through policies, practices, and projects that shape the built environment. Student inquiries leveraged narrative and demographic analysis, formal analysis, data visualization, and community-engaged research to investigate the social-spatial dynamics and place-based dimensions of how these land use decisions have privileged or disprivileged Harlem communities over time.

Through the following nine key issues, students have established the foundation that informs the forthcoming proposals, which imagine and posit preservation's role in activating these histories.

> Narratives of Environmental Justice Activism
> Lack of Spatial Encounters with Environmental Justice Histories
> Landscape Vulnerability
> Vulnerable Populations
> Housing Inequities
> Displacement Risks
> Redevelopment Conflicts
> Open Space Disparities
> Harlem Sky Tensions







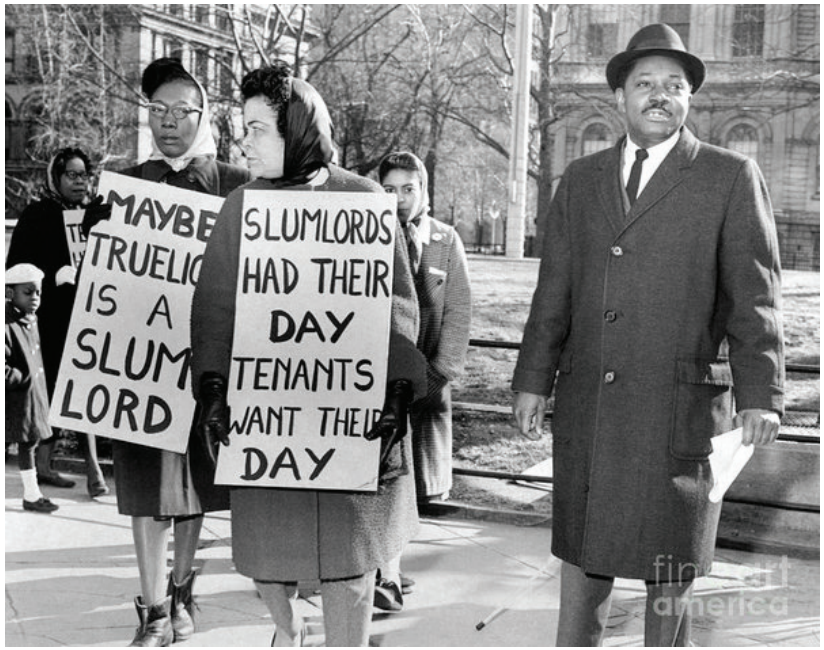
Young Lords protest at Third Avenue, c. 1969.

NARRATIVES OF ENVIRONMENTAL JUSTICE ACTIVISM

Environmental and climate justice activism represent narratives with which the historic preservation field has had limited engagement. These histories influenced and continue to impact Harlem's built environment through the actions of community members. Harlem has often been characterized as a "historic stronghold for environmental justice" (Sze 2006). The histories of these events, which give Harlem this distinction, reflect the toils and triumphs of environmental justice activists on a multitude of fronts: from housing to waste handling, from the reclamation of urban landscapes, to ongoing fights for better air quality. Understanding these pivotal events and their impact on Harlem underpins the work of this studio. Environmental justice does not just happen—it is instead the tireless work of advocates, organizations, and fighters who have shaped and continue to help shape Harlem's future.

OCCUPYING SPACE FOR GRAY

Harlem residents have never sat silently in the face of injustice. Jesse Gray, founder of the Harlem Tenants Council, rallied Harlemites to unite together to advocate for improved living conditions in Harlem. He worked with other local activist groups to facilitate rent strikes that protested the subhuman living conditions in many Harlem apartments. When brought to court over unpaid rent, Jesse instructed the tenants to bring rats, dead or alive, from their apartments to the courthouse (Jackson 2006). As the news media looked on, tenants explained the horrific conditions they inhabited, resulting in the dismissal of the case against Gray. The rent strikes and activism in Harlem pressured the local government to address urgent housing concerns, including egregious landlords and the lack of affordable renovated public housing. This would later lead to interest in the redevelopment and rehabilitation of tenements (Jackson 2006).



Jesse Gray, leader of the Harlem rent strike, with picketers by City Hall, c. 1964.

THE YOUNG LORDS: ORGANIZED OFFENSIVES FOR JUSTICE

Tenants in Harlem also faced exposure to contaminants that were ingrained in the very fabric of their homes. Lead poisoning has proven to be one of the most pervasive issues with regard to dangerous materials in Harlem. In 1968, the New York City Health Department reported 600 lead poisoning cases among children over just a ten-month period. Cases of lead poisoning were so frequent in East Harlem that it was deemed the "anchor" of the "lead belt" that ran through New York's poorest neighborhoods (Fernández 2020b).

The next year, the death of two-year-old Gregory Franklin due to severe lead poisoning would spur the creation of the Young Lords Lead Offensive, an effort in which the Puerto Rican activist group, the Young Lords, conducted door-to-door screenings of children for lead poisoning (Fernández 2020b). The shocking results, including a day during which twelve out of forty children tested positive, would finally prompt action, and within the year, the City had updated its housing code and created a new agency tasked with fighting lead poisoning.

Beyond concerns for the immediate environments created by the built fabric of Harlem's housing, issues also arose surrounding the environment in which these homes were situated. During the 1960s, trash management practices deteriorated substantially with trash piling up along streets, in alleys and in city parks. The *Daily News* ran a series of articles about poor trash collection practices. As part of this coverage, they conducted a survey that found just six trash cans within a forty block section of East Harlem (Fernández 2020b).

The Young Lords recognized these trash practices as a central challenge in Harlem. As part of their movement focused on neighborhood empowerment and community improvement, they took matters into their own hands. Over multiple days during the summer of 1969, residents of East Harlem blocked the neighborhood's main avenues with uncollected garbage and abandoned cars, which they subsequently set on fire. This was the so-called "Garbage Offensive." Hundreds of young people in Harlem used brooms to push garbage onto the streets of Harlem. Together with community members, they halted traffic with their trash barricades to bring attention to the poor waste management practices in East Harlem (Fernández 2020b).

The Young Lords block East 111th Street and Third Avenue with garbage, c. 1969.

GREEN GUERILLAS

In the 1970s, the Green Guerillas sparked a movement, tossing seed bombs into trash-filled lots (NYC Dept. of Parks and Recreation, "History of the Community Garden Movement," n.d.). Residents in areas affected by the blight of empty lots, like East Harlem, organized restorative justice efforts to revitalize their neighborhoods (Sokolovsky 2006). Over time, many of these lots were converted to gardens and formally preserved through a transfer or sale to nonprofits like the Trust for Public Land (Zamgba 1999). Hundreds of others, however, have been destroyed over the years, reinforcing the reality of fewer green resources in Harlem for residents who have often invested their time, money, and energy in guerilla gardening projects (English 1999).

WE ACT: TARGETING SITES OF POLLUTION

In 1988, Peggy Shepard, Chuck Sutton, and Vernice Miller-Travis created WE ACT, the West Harlem Environmental Action group, to address issues at the North River Wastewater Treatment Plant. The issues surrounding this new sewage plant on the Hudson River included its relocation from the Upper West Side to West Harlem, the failure to hire and retain employees from the local community, and the effects of the noxious odors and diminished air quality (Miller 1994). WE ACT's work helped to educate the community on issues affecting environmental health and hold those in authority accountable. WE ACT demonstrated at the plant to raise awareness of its poor management and they settled a lawsuit against the city regarding the plant in 1993 (WE ACT 2015).

WE ACT extended its action beyond the North River plant to a series of campaigns to fight for the local community's right to clean air, with a particular focus on the diesel bus depots in Harlem. The Clean Fuel/Clean Air MTA Accountability Campaign created the political will for Governor George Pataki and key state legislators to mandate that the Metropolitan Transportation Authority (MTA) make hundreds of alternative fuel bus purchases and retrofit diesel depots to compressed natural gas. Joined by residents and religious leaders, the Dump Dirty Diesel campaign brought the community together to advocate about the severity of outdoor air issues in Harlem, and catalyzed the MTA's investment in hybrid energy (WE ACT 2005). WE ACT called on the government to actively work to reduce racial and ethnic asthma disparities (WE ACT 2005).

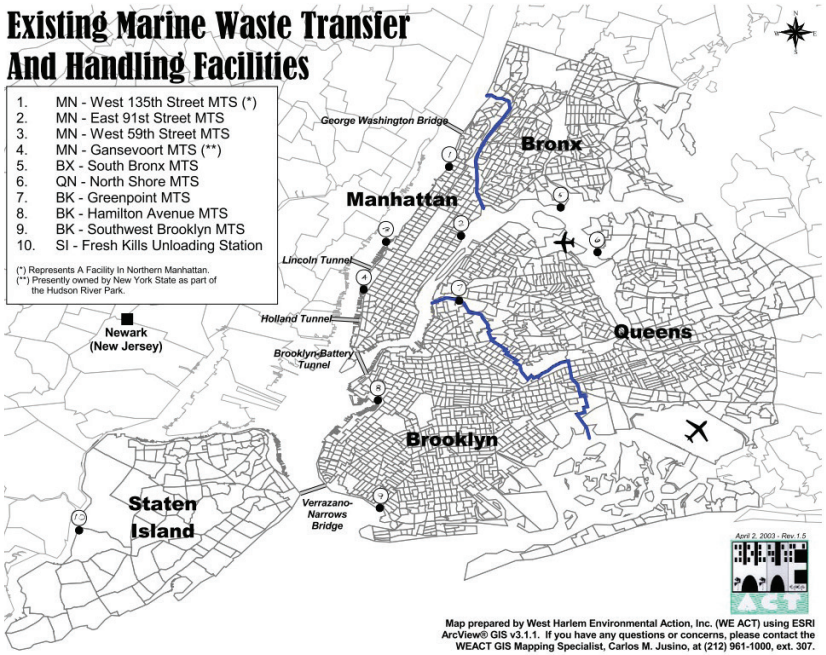
WE ACT would also involve itself in issues concerning another polluting facility located just south of the North River Sewage Treatment Plant: the 135th Street Marine Transfer Station (MTS), located in the Hudson River at 135th Street. During the second half of the twentieth century, the 135th Street MTS was responsible for receiving between 1,100 and 2,500 tons of waste per day as it operated non-stop with as many as over ninety sanitation trucks idling along surface streets waiting for their turn to dump waste into the facility (WE ACT 2017). In the late 1990s, New York City decided to close its last remaining landfill, Fresh Kills, and sought a new means of transporting waste out of the city. The 135th Street MTS closed. Initial plans for a privatized carting system for residential trash quickly proved expensive and infeasible, and in 2003, a return to a municipally-run system utilizing trash barges was put forward under a new mayor, Michael Bloomberg. This decision was spurred in part by a citywide coalition of environmental groups under the umbrella Organization of Waterfront Neighborhoods (OWN), which sought a more equitable distribution of solid waste management facilities.

WE ACT started to address the environmental injustices of North River Wastewater Treatment Plant. Date unknown.

Peggy Shepard urged the MTA to commit to modifying bus depots to accommodate natural gas buses, c. 1997.

Father Robert Castle speaks at a press conference announcing the launch of WE ACT's MTA Campaign, c. 1997.

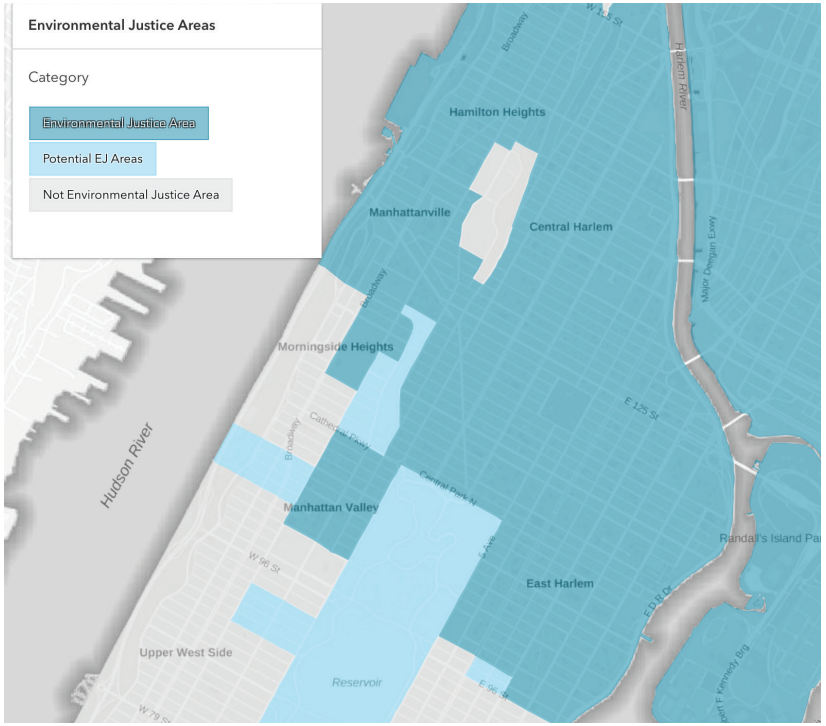
OWN sought to reuse and rehabilitate the existing network of marine transfer stations so that each community would be responsible for its own solid waste (Sze 2006). Initially, the City of New York proposed only reopening the 135th Street MTS in Manhattan, but OWN advocated for re-opening other sites at 59th Street and 91st Street as well (U.S. Dept. of Transportation 2000). However, WE ACT, which had initially been a member of OWN, determined that Harlem already had enough of an environmental burden with major sites serving the whole city (such as the North River plant) located in the neighborhood. WE ACT ultimately left the OWN coalition and sought to prevent the re-opening of the 135th Street MTS (Sze 2006). WE ACT, along with other community groups and politicians, would be successful in blocking the re-opening of the 135th Street MTS, which is still vacant. WE ACT currently has plans to rehabilitate the 135th Street MTS into an education center.



Marine transfer station locations throughout New York City, c. 2003.

CONTEMPORARY EJ ACTIVISM

Today, issues of environmental injustice have been amplified as a result of contemporary health, climate, and social events and movements, such as the COVID-19 pandemic and the Black Lives Matter protests. One example is the recent implementation of the New York City Mayor's Office of Climate and Environmental Justice. It acknowledges that "communities with a majority of low-income residents and people of color—often those with the least amount of power and contribution to environmental degradation—have experienced a disproportionate share of poor environmental outcomes" and codifies environmental justice into the City's decision-making processes. Some of the Office's work has included the mapping of defined "environmental justice" areas, which shows that most of Harlem is a primary area of concern, and outreach to solicit public comment. In addition, the Office's advisory board is led by Peggy Shepard of WE ACT as Chair, showing that the history of Harlem environmental justice activism is being brought to the forefront of government action today (NYC Mayor's Office of Climate and Environmental Justice, "Addressing Climate and Environmental Justice Concerns," n.d.).



As part of New York City's Environmental Justice for All Report, "environmental justice areas" were defined, including almost all of Harlem as an area of concern.

A key aspect in developing the New York City Environmental Justice for All Report was an increase in public engagement to influence public policy.

Organizations interviewed as contemporary assets for the studio.

The missions of key connector organizations help to create common ground between activism and restorative justice. The studio takes the position that preservationists can offer distinctive perspectives and construct historical narratives to bolster these efforts. Although not all of the organizations the studio interviewed were specifically preservation-oriented, this approach posits the importance of highlighting a wide range of intersections with preservation interests.

Many organizations are thinking of ways to promote and support environmental and climate justice. Multiple organizations have turned to social events and media in the hopes of bringing these matters to the forefront of community concerns. Organizations have also started acting as mediators between businesses, the community, and government, creating a positive impact on the discussion revolving around environmental and climate justice. However, despite increased awareness and efforts to engage the community, much of Harlem is vulnerable to redevelopment. Communities are unable to fight off large institutions, such as Columbia University or historically in the case of Morningside Heights Inc., in advancing an already long history of displacement. Studio-interviewed organizations strongly stressed the importance of collaborative efforts between large scale-developers and the community in order to further Harlem's development in an equitable way.

Towards the end of each interview, the organization representatives were asked to describe Harlem and its community in a few words. Harlem was described as vibrant, dynamic, diverse, loud, and filled with many possibilities. The President of the Friends of Morningside Park said: "The stories of the people who have been in and around Harlem, around the park, are the biggest to preserve" (Brad Taylor, unpublished interview, March 31, 2022).

LACK OF SPATIAL ENCOUNTERS WITH ENVIRONMENTAL JUSTICE HISTORIES

In the context of New York City historic preservation, the recognition of histories is largely implemented through the listing of sites of significance on the National Register of Historic Places and/or local designation by the NYC Landmarks Preservation Commission (LPC). The studio sought to understand how narratives of environmental justice and related activism have been represented spatially in Harlem. To explore the relationship between preservation and the socio-spatial dynamics of Harlem over time, preservation designation reports, monuments, and memorials were analyzed to gain insight about community values, patterns of decision-making, and narratives of public memory. This analysis led to insights as to how histories of environmental justice have been addressed or ignored in formal preservation listing and designation, and the finding that histories of environmental justice and environmental justice activism are spatially under-represented in Harlem.

LISTING AND DESIGNATION

The studio team examined designation reports from the National Register of Historic Places and LPC. One initial key finding is that Harlem was largely ignored in terms of LPC designations, when compared to other parts of the city, until an initiative in the 1990s. In 1991, new LPC chairwoman Laurie Beckleman set out to make previously overlooked neighborhoods like Harlem more of a priority (Kennedy 1991, R1). According to articles by the *New York Times*, both Harlem community members and local preservation groups believed that the efforts to preserve in Harlem had taken too long, as many sites in the underrecognized community were already lost (*New York Herald Tribune* 1931; Siegal 1999, CY1). Key sites related to Harlem's environmental history were among those lost over time, including the Tree of Hope and the decommissioned Consolidated Gas Company building (Lee 1934, 4; *New York Herald Tribune* 1931, 23).

ENVIRONMENTAL JUSTICE IN LISTING AND DESIGNATION

The studio identified 196 historic assets in the study area that were related to Harlem's environmental justice history. These assets provided a starting point to evaluate whether narratives of environmental justice were reflected in the historical values discussed in listing and designation documents. Of these 196 assets, only sixteen are recognized as significant by the National Register, LPC, or both.

In the analysis, these sixteen assets were classified into categories of green and open space, institutional, infrastructural, religious, residential, and archeological. In the green and open space category, the Thomas Jefferson Pool designation report discusses issues of environmental racism, such as Robert Moses' implementation of methods that he believed would deter non-White vistors, such as changing the pool water temperature and only hiring White lifeguards (Noonan 2007). Also in this category, the Morningside Park designation report describes a history of segregated open space and issues of land sovereignty, citing the 1960s protests of Columbia University's athletic complex (Shockley and Sutphin 2008). Only one institutional site designation report, the Public School 109 El Barrio Artspace, referred to environmental justice issues. This report describes its importance as

one of the first schools built in the H-shaped layout to prioritize students' access to indoor light and air, as designed by Charles B. J. Snyder in 1899 (Herman 2018; Howe and Lyons 2000). However, the report does not mention the site's history as a Harlem Flats landfill location or a Young Lords protest site. The remaining reports describe architectural significance or relevance to the development of Harlem, but they do not explicitly mention narratives regarding environmental justice in Harlem (reports were obtained through the LPC, n.d.; New York State Office of Parks, Recreation and Historic Preservation, n.d.).

Of the sixteen designated assets, only the three illustrated here explicitly mention environmental justice within their LPC designation reports, and there are no National Register of Historic Places reports that explicitly mention environmental justice. While many issues of environmental justice were extensively described in those three reports as part of the site's history, it is clear that their relationship to environmental justice is not the reason for its designation or significance according to the report.

Of the 196 historic assets identified by the studio as important to environmental justice histories, 16 are already LPC-designated, but only 3 of them include references to environmental justice in their designation reports. Not a single National Register listing that coincides with the environmental justice-related historic assets identified by the studio mentions environmental justice.

View of the entrance to Thomas Jefferson Pool, whose designation report explicitly mentions environmental justice, c. 2007.

View of Morningside Park, whose designation report explicitly mentions environmental justice, c. 2012.

View of Public School 109, whose designation report explicitly mentions environmental justice, c. 2018.

MONUMENTS, MEMORIALIZATION, AND PUBLIC ART

Aside from listing and designation reports, other forms of narrative spatialization—including monuments, plaques, and public art—were also analyzed. This study considered seventy-seven of these types of narrative memorializations in the study area, which gave an insight on the identity and guiding values of a community, its key figures, and the events in its history. Our analysis showed that the central narrative was not environmental justice, but primarily featured the military history of New York City and Harlem's African-American cultural history (NYC Dept. of Parks and Recreation, "NYC Public Art Map," n.d.; Prats and Pfingsten, n.d.). Of the total seventy-seven, only twenty related to Harlem's environmental history or had some adjacency to environmental justice history by referring to topics such as open space or clean water, and only two explicitly focused on environmental justice.

Many spatial encounters with Harlem's environmental history are public art, with some focusing on open space or a specific aspect of Harlem's historical development. EJ-relevant sites include the Hooper Fountain, a now-obsolete drinking source for carriage horses; the sculpture dedicated to the non-extant Tree of Hope; and a memorial to Harlem politician Frederick E. Samuel who, as the plaque reads, "helped to make the park an oasis in the community" (NYC Dept. of Parks and Recreation, "NYC Public Art Map," n.d.). Only two examples of memorials, monuments, plaques, or public art explicitly relate to environmental justice or activism by addressing a particular issue or raising public health awareness. Both of these projects are contemporary, temporary art installations—the *Plastic Fantastic* art installation about the use of plastic on the environment by Capucine Bourcart, and the *At the Hydrant* photo installation by Hilary Duffy, which discusses COVID in relation to the Harlem community (NYC Dept. of Parks and Recreation, "NYC Public Art Map," n.d.). No examples were both permanent and specific to Harlem's environmental justice issues and history.

The Plastic Fantastic *art installation discusses the effects of plastic use on the environment, c. 2021.*

The At the Hydrant *photo exhibit represents the Harlem community during the COVID-19 pandemic, c. 2022.*

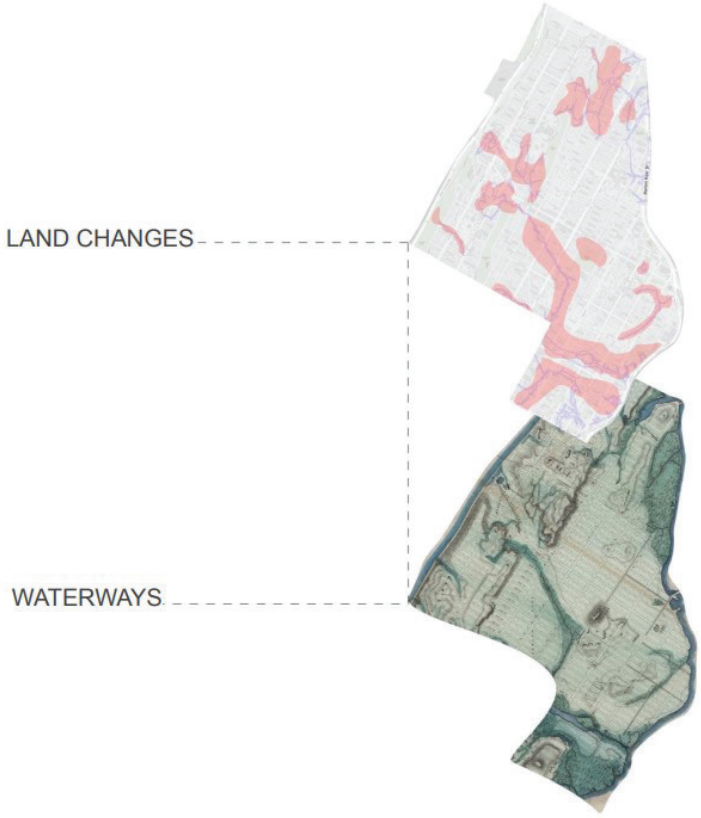
No formally or permanently recognized sites that specifically focus on environmental justice activism in Harlem, historical or contemporary. One project, *Mapping Resistance* by artist Miguel Luciano, highlighted the activism of the Young Lords in East Harlem through a temporary photo installation in 2019 (Mapping Resistance, n.d.). This further highlights the gap that exists in spatial representation of environmental justice in Harlem. Environmental justice activism are not a centered narrative for what has been memorialized in Harlem.

The Mapping Resistance *project is an example of spatializing environmental justice activism, c. 2019.*

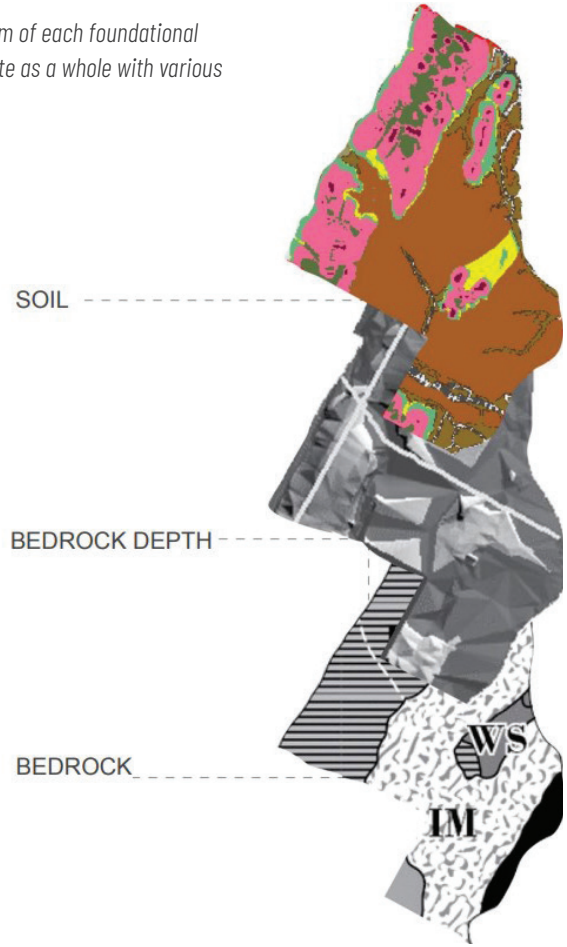
LANDSCAPE VULNERABILITY

While memorialization represents a more tangible reminder of environmental justice histories in Harlem today, land-based vulnerability poses a less visible way in which environmental justice concerns persist in Harlem. Inquiries of land conditions were developed to understand the underlying forms and systems inherent to upper Manhattan that have contributed to landscape vulnerability and greatly impacted how people have lived and constructed in Harlem over time. It is important to note that many characteristics of Harlem's landmass have been modified by human intervention through development and other land use decisions. To set up subsequent inquiries, bedrock and its depth, soil, natural waterways, and manmade land were examined to better understand the foundational layers beneath Harlem as it is known today.

The research focused on the primary formational layers, composed of soil and bedrock, which serve as the foundation for all land and development. This analysis revealed that these layers compiled atop each other constitute a relatively weak foundational base for East Harlem—disproportionately more than West Harlem and the rest of Manhattan Island.



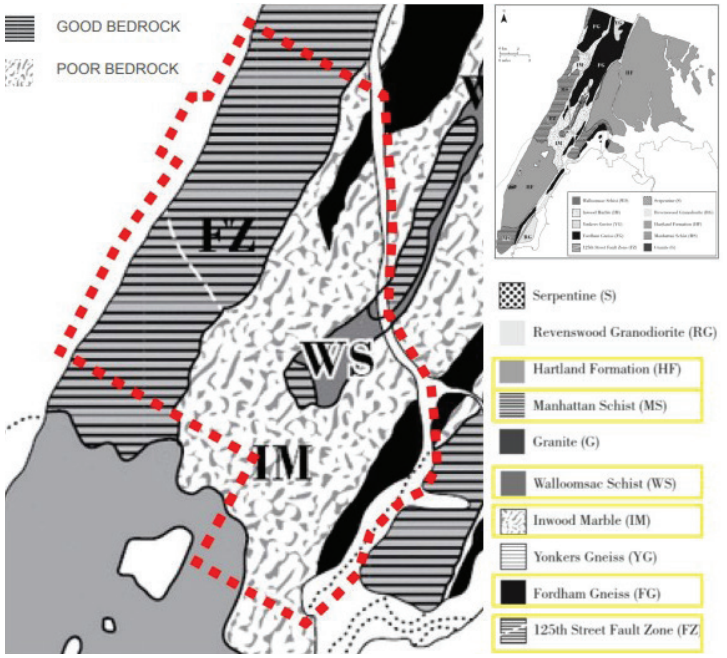
A layered axonometric diagram of each foundational layer of Harlem depicts the site as a whole with various vulnerabilities mapped.



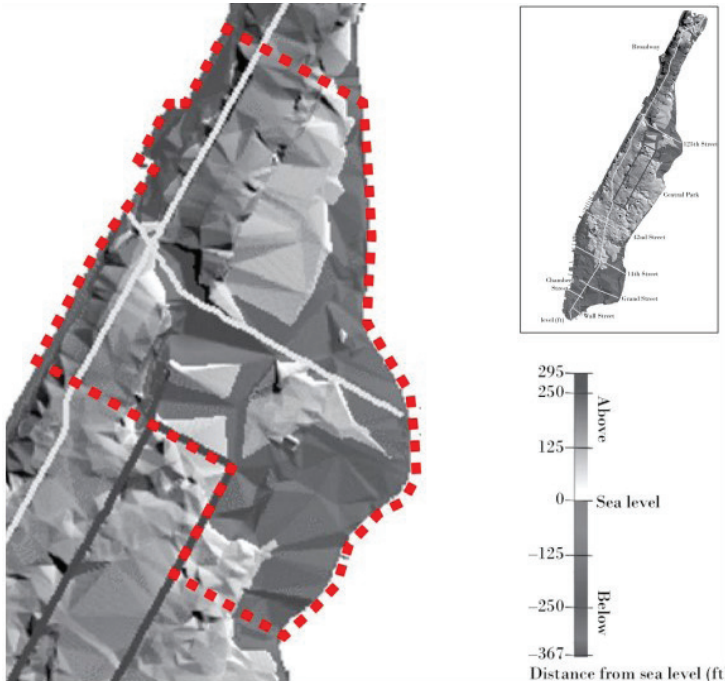
BEDROCK DIFFERENCES AND COMPLICATIONS

Harlem as a whole is composed of Inwood marble and two types of schist (Manhattan and Walloomsac), with small pockets of Fordham Gneiss found in the north-east (Sanderson 2009). On Manhattan Island at large, the weathering character of each of the metamorphic rock units listed above influences the local topography (Stoffer [1998] 2019). Beneath the densely urbanized Harlem lowlands lies Inwood marble. Inwood marble is both softer and more soluble than the other rock units, and therefore wears down more readily, so that over geological time scales, it has fallen further below top soils and closer to sea level over time (Stoffer [1998] 2019). The majority of the rest of Manhattan is built on Manhattan schist or Manhattan Formation, both of which are exceptionally hard, and are able to support weight more consistently and over longer periods of time (Merguerian and Moss 2006).

Continuing westward from East Harlem is the escarpment rising towards Morningside and Washington Heights. Composed of massive exposures of schist, these locations reveal the complex, faulted, and contorted structures of the bedrock below (Brock and Brock 2001). Not only is the rock *type* of bedrock poorer quality in Harlem compared to Manhattan at large, but the depth of bedrock dictates vulnerability as well.



Map illustrating the rock type of bedrock in Harlem and Manhattan at large.

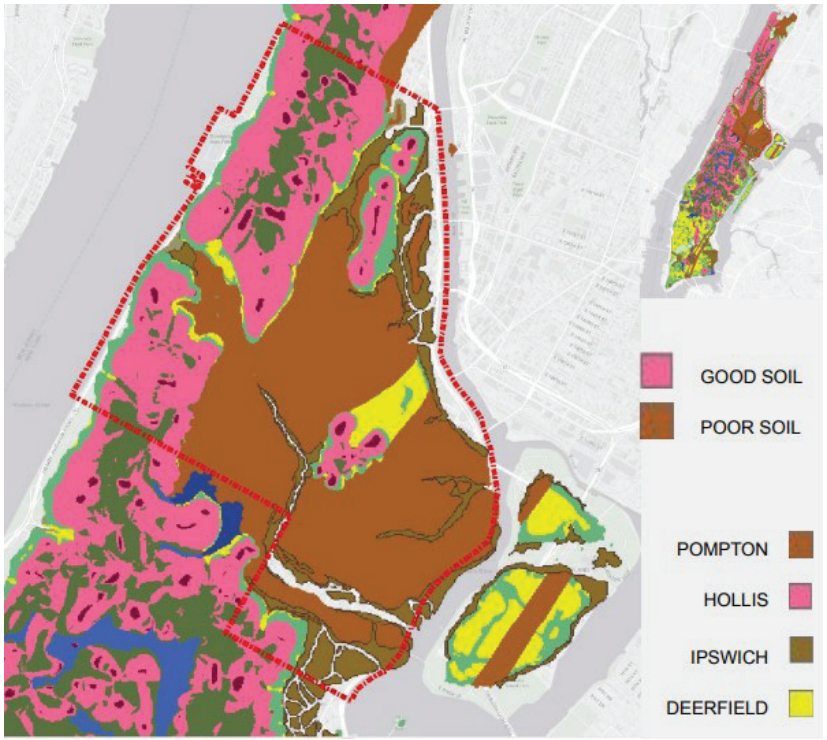


Mapped bedrock depth of study area in cmparison to Manhattan at large.

SOIL COMPOUNDS LAND-BASED VULNERABILITIES

Due to the topography of the island, as subsoil formed, it slid down from the higher hills of West Harlem into the lowlands of East Harlem, burying the bedrock below the soil. Where bedrock is far below the surface and difficult to reach, such as the Inwood marble below Harlem, the need for deeper, more costly foundation types creates inherent problems with possible development and construction in Harlem. To give an example of this, at 90th Street and Central Park West—just below our study area but of the same geological makeup as East Harlem—a developer in the 1940s attempted to reach bedrock to construct a large apartment building. When laying the foundations, the crew was surprised to discover that the bedrock was 60 feet below grade, requiring them to change their foundation plans to reach to the depths of bedrock below (Barr 2016).

Atop the foundation stones of Harlem lies soil. The soil type that lies under East Harlem compounds the issue of vulnerability by being inherently prone to erosion and slow to absorb. But what *is* bad soil? To the engineer, the subsoil indicates the type of structures that can be supported and what foundations are necessary for stability. Are shallow foundations enough for a building, or does it need to be attached to the bedrock? How does this subsoil affect the construction of infrastructure, such as subways, streets, and other projects?



Map illustrating the variety of soil type in Harlem and Manhattan at large.

Pompton soils—indicated in brown on the soil map above, and the majority type—are characterized by their moderately coarse texture and poor drainage (Borough of Hawthorne Environmental Commission 2022). They are derived from glacial outwash and exhibit moderate permeability, but due to high water tables and low slopes, they are usually wet (National Cooperative Soil Survey 2013).

The Hollis series, by comparison, which are indicated in pink and predominantly found along the westernmost portion of the site, are shallow to bedrock and are found on ridge crests and areas adjacent to rock outcrops. Far from the average sea level, well above water, these soils are well drained, and when they do come in contact with large amounts of water, shed the water down hills and into surrounding areas (National Cooperative Soil Survey 2016).

The Ipswich and Deerfield series are less common, but present in East Harlem. The Ipswich series consists of very deep, very poorly draining soils, formed in thick organic deposits. They are found near tidal marshes, which in Manhattan are subject to inundation by salt water (National Cooperative Soil Survey 2018b). The Deerfield series consists of very deep, moderately well drained soils formed in glaciofluvial deposits, which are sediments consisting of boulders, gravel, sand, silt, and clay from ice sheets or glaciers (National Cooperative Soil Survey 2018b).

When these largely wetter, less permeable soil conditions are considered alongside Harlem's low-lying geography and deep bedrock, these conditions compound to create problematic conditions during storm surges and large rainfalls. When the area is overwhelmed with water, the soil that Harlem is built atop cannot efficiently drain itself, resulting in land-based vulnerabilities like flooding, poor grounding for infrastructure, and other developmental factors that East Harlem experiences today.

HISTORIC WATERWAYS AND MARSHLANDS

Given the elementally erosive character of Harlem soil, the natural waterways and aquatic systems that impact these soil conditions were investigated next. Looking back at pre-development, pre-grid maps and topographic studies of Manhattan, it is clear that Harlem formerly contained a complex and interconnected system of waterways.

Streams carried water from the heights in the west, creating pockets of rivers and streams. These eventually conjoined at lowland points in East Harlem to create marshland. These marshy areas served as water filtration points, and also absorbed overflow from heavy rain and storm activity naturally. Today, these lowland areas persist, despite being drained, paved over, and geologically forgotten.

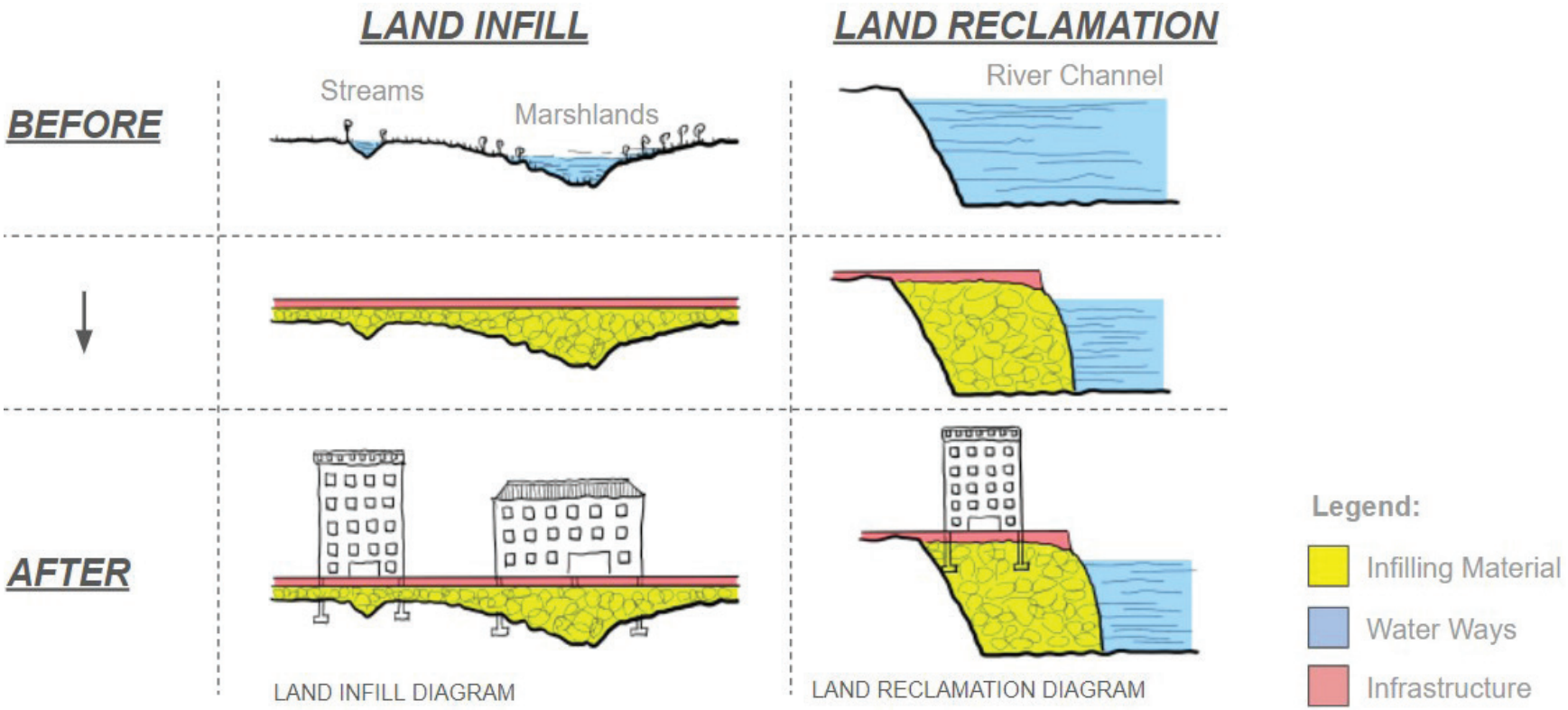
The low, marshy areas remain vulnerable as areas where water naturally collects. Today, they are recognized by the socio-political phenomenon of the "floodplain," or areas that incur high risk of flood action for inhabitants. East Harlem was

Manhattan's largest active marshland before development spread northwards, taming the ebb and flow of the East River through a system of filtering streams. Now, with East Harlem being one of Upper Manhattan's most densely packed neighborhoods, the unpredictable nature of the lowland topography poses a threat to residents and the built environment. FEMA's updated floodplain map shows the potential impacts of 100- and 500-year flood events pumping water as far inland as Madison Avenue, where the Harlem marsh originated.

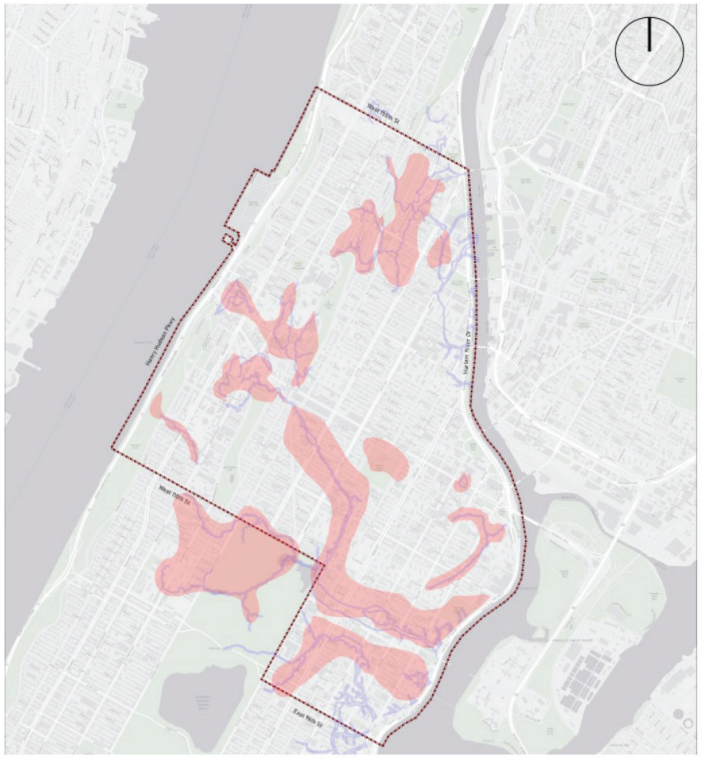
LAND RECLAMATION AND INFILL ON HARLEM MARSH

Even though the marshland areas of East Harlem were unstable, unpredictable, and unsuitable for construction and development in their natural forms, nineteenth-century developers and policy-makers in New York City sought to overcome this natural barrier. They wanted to make East Harlem just as prosperous as the stronger landmass to the west and south. They chose to embark upon a campaign that drastically changed the natural qualities of the Harlem Flats, infilling the streams and marshes as well as extending land development further into the East River.

They tackled this feat through two methods: land infill and reclamation. Land infill was implemented along the smaller water bodies and streams that ran through East Harlem to make unusable land usable by filling it with foundation material to level the ground. Land reclamation was also employed to extend the landmass of Harlem by filling shorelines with ground material.

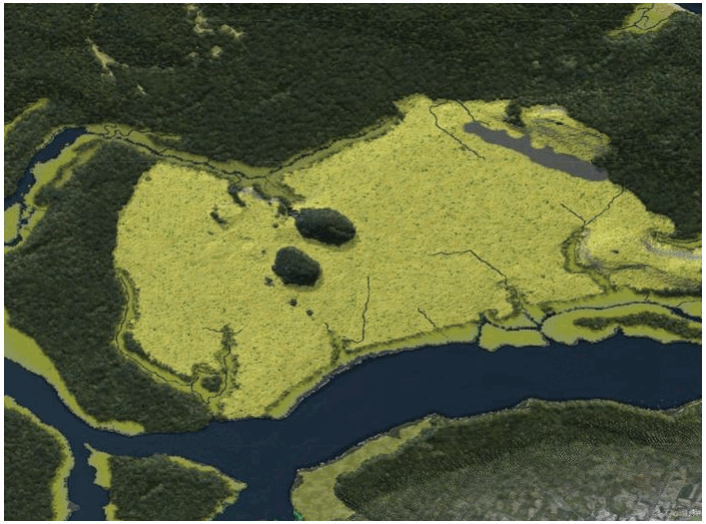


Difference between land infill and land reclamation.



Map of land infill and land.

The red area on the left map shows infill along water systems and marshlands, while the yellow areas on the map on the right indicate newly reclaimed land along the Hudson and Harlem Rivers that did not exist before.



Visualization of land reclamation, c. 1609.

This visualization shows the shoreline near the Harlem River before and after land reclamation. The comparison shows how government projects attempted to stabilize the land of East Harlem. Yet their efforts only exacerbated vulnerability in the landscape, leading to land-based inequities that persist in these lowland areas today.

Animal Carcasses

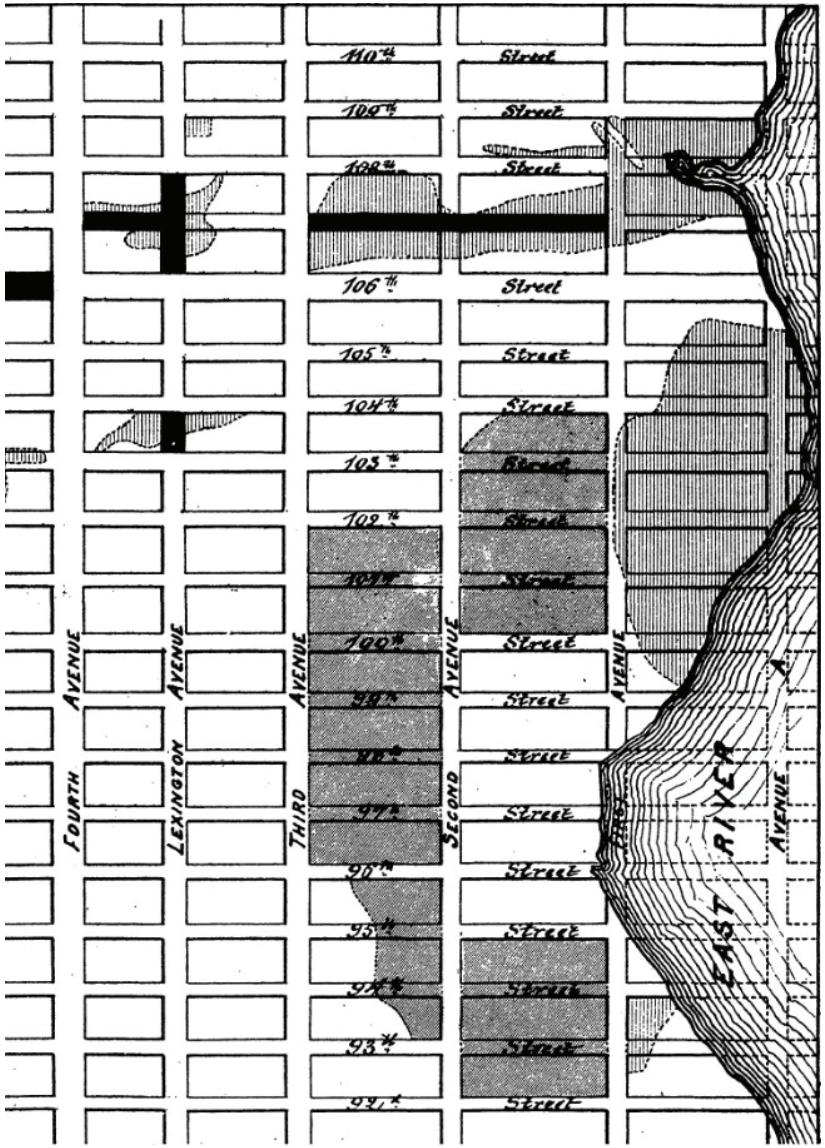
Street Dirt

Cellar Excavations, Building Refuse

Coal Ashes

Substandard infill materials.

The efforts of land "stabilization" were carried out through the use of unsuitable materials that did not comply with the New York City code. Repeatedly, surveyors, reformers, journalists, and citizens called for the use of "clean fill," as in this newspaper article from 1875. In the same year, however, papers followed up with another story, observing that the contractors, as well as private parties, were careless in selecting proper material.



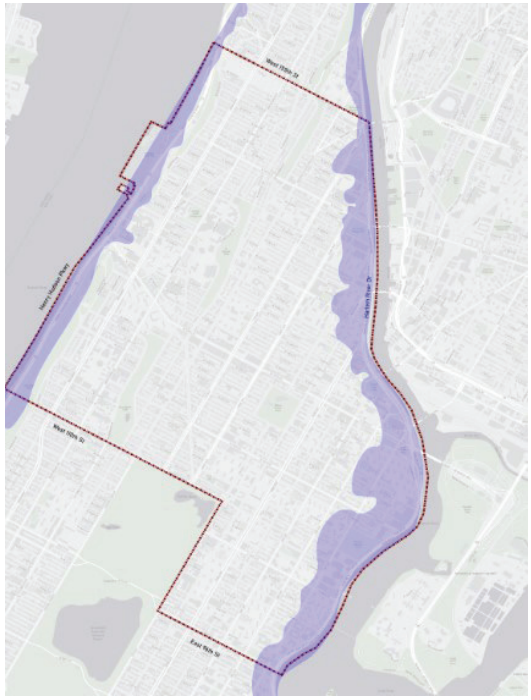
Artificial Lands Made of Waste

RECLAIMED LAND IN HARLEM

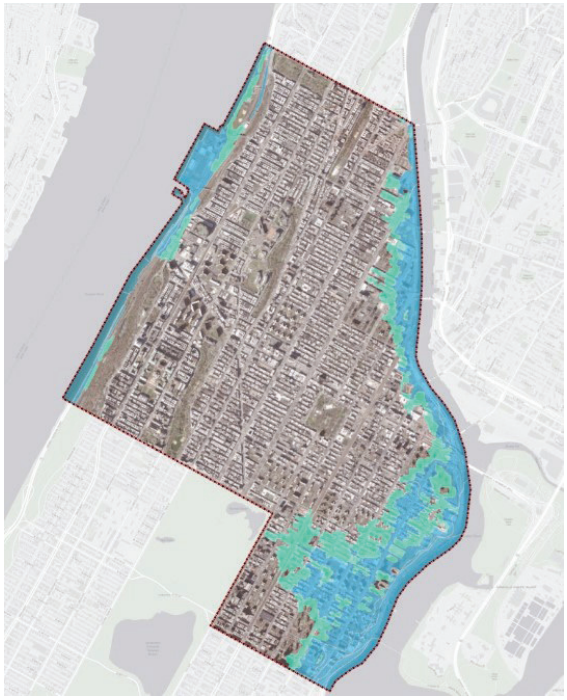
"The Harlem Flats," *Daily Graphic*, July 15, 1875

Map of reclaimed land in Harlem.

Hurricane Donna (1960) storm surge.



Hurricane Sandy (2012) storm surge.

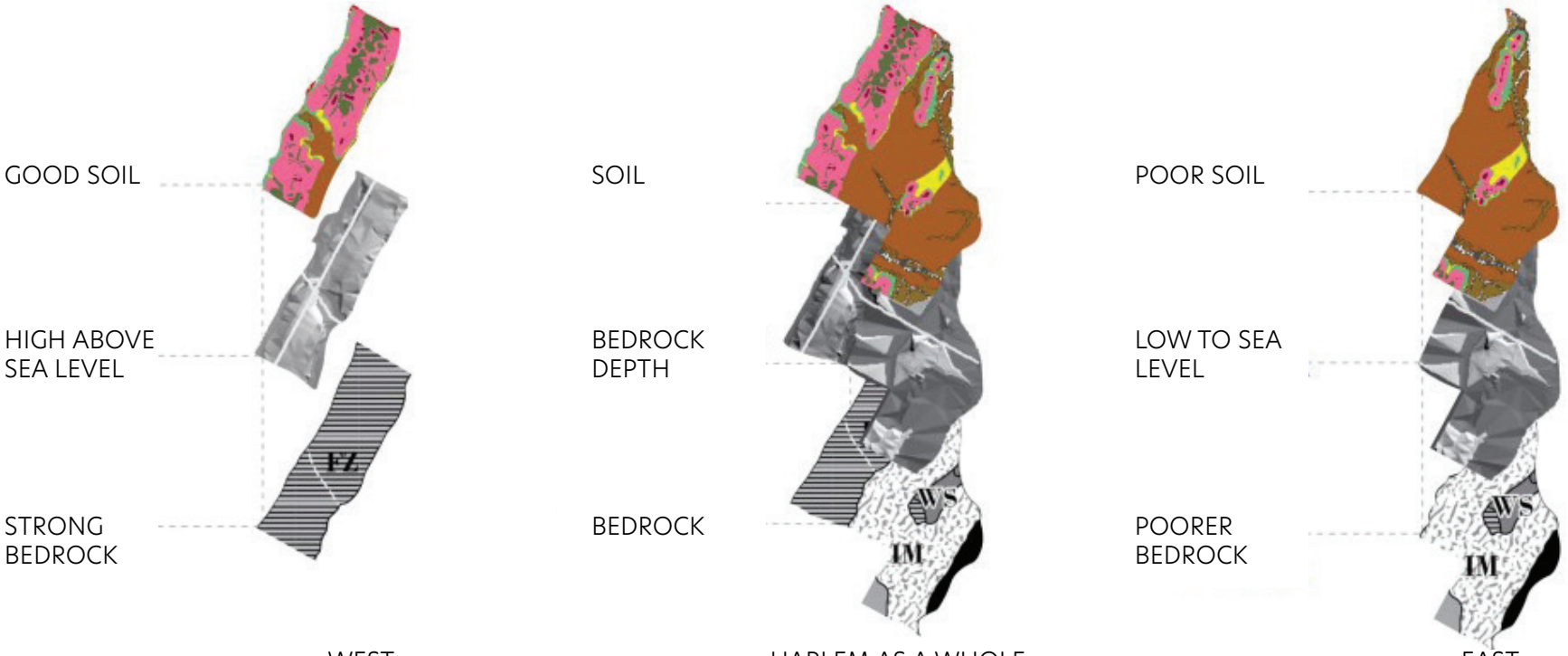


Floodplain map from FEMA.

FLOODPLAINS AND CONTEMPORARY RISK

These first two maps show two historic storms that devastated Harlem with storm surge and flooding: Hurricane Donna in 1960 to the left, and Hurricane Sandy in 2012 to the right. These storms had surges of 11 and 14 feet, respectively, and surge waters covered many vulnerable coastal lands that are home to public housing, aging infrastructure, parks, and social amenities.

The predictions into the twenty-first century, likewise, are not rosy: looking at the FEMA map, East Harlem's vulnerable marshland floodplain is poised to continue to flood, the impacts worsening, into this projection for 2050 without coastal resilience intervention or building adaptation. Climate change has and will continue to exacerbate existing vulnerabilities that have been presented thus far; the compounded issues of poor infill on vulnerable lowland, inadequate adaptation, and unstable foundational ground coalesce to form this FEMA floodplain. The increased risk of surges as far inland as Madison Avenue is a significant environmental justice threat.



An exploded axonometric view of a comparison of Foundational Layers of East and West Harlem.

EAST AND WEST HARLEM DISPARITIES

Land-based vulnerabilities raise a few provocations—the layered maps visually compile all facets discussed that compound East Harlem's land-based vulnerability.

Shown on the left of the image are the rock formation layers beneath the neighborhood of West Harlem. Supported by Manhattan schist, the soil is composed in a thinner layer, resting atop the bedrock, while the soil itself, being mainly of the Hollis series, performs better with respect to water permeability, erosion, and strength. Illustrated to the right are the layered inequities of East Harlem. Geologically poorer and harder to reach, lies Inwood marble, with inherently poorer abilities to deal with water—both from the sea level and storm surges.

MODELING WHAT LIES BENEATH HARLEM

In addition to the aforementioned layers, modeled here are extrapolated earth cores based on our findings. Illustrated through the image of a soil core are the vast differences between the formation of foundations of different neighborhoods. Illuminated is the difference in land quality throughout the study area. Imagining we could physically drill and take core samples from the top soil to the bedrock at various points in West, Central, and East Harlem—the findings are not equal.

To focus on the inequities present in East Harlem's vulnerable landmass, three key findings are illustrated in the upper drawing on the figure to the right, taken on Second Avenue at 140th Street: the median sea level, depicted in blue, hits the fine-grained sand of the lowland marsh's historical typology. This means that building foundations laid into this land hit deep, spongy, erosion-prone materials, and will continue to do so as sea levels rise. By comparison, the lower core drawing—taken on Broadway at 128th Street—shows the median sea level farther down the core, hitting the solid schist bedrock. The soils atop this bedrock drain better and flooding does not immediately affect these constructions, creating stabler and surer ground for building construction, with less expensive building foundations required.

While these disparities suggest inequities, it is important to keep in mind the difference between causation and correlation. The compounded vulnerabilities shown through landmass are not the only factors inr Harlem's rate of development, investment, and infrastructure—just because there are no skyscrapers where the bedrock is deepest does not mean that deep bedrock was the reason. Just because there were dense immigrant enclaves where the ground is damp and poorly drained, does not mean that wet ground made them slums. Government intervention, knowledge and ignorance of material and land, along with a plethora of other decisions made Harlem as it is today. In order to separate cause and effect, we must also view how socio-economic development occurred in relationship to the environment (Barr 2016).

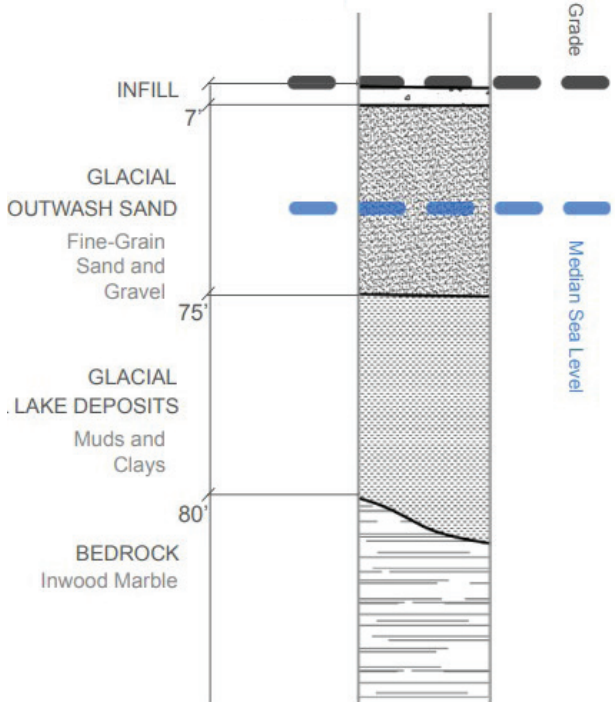


Image of a soil core illustrating the compounded land-based vulnerabilities found in East Harlem, through median sea level, bedrock depth and rock type, soil, and material.

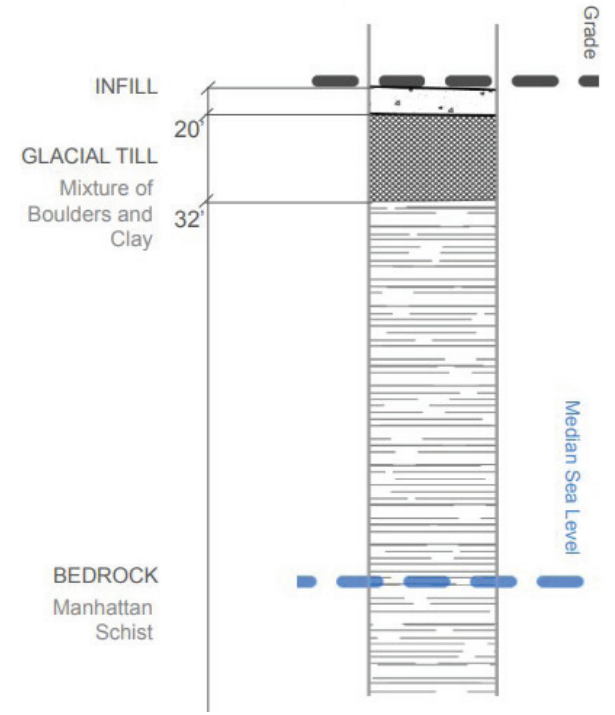


Image of a soil core illustrating the compounded land-based advantages found in West Harlem, through median sea level, bedrock depth and rock type, soil and material.

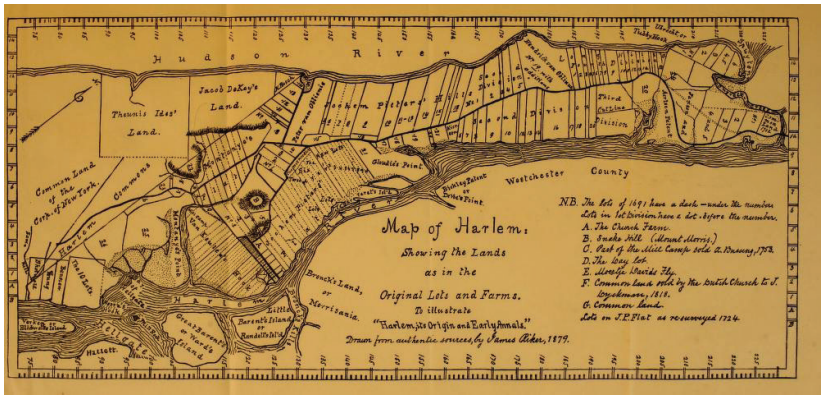
Landscape of the island of Manhattan, before colonization.

VULNERABLE POPULATIONS

In examining who has occupied the lands now known as Harlem over time, the studio sought to understand how disadvantaged populations have experienced disparities due to their race, ethnicity, and socio-economic conditions (NYC Mayor's Office of Climate and Environmental Justice 2021). These histories of environmental injustice and environmental racism inadvertently shape the landscape and the conditions in which these groups continue to be vulnerable.

DISPOSSESSION OF LENAPE PEOPLES

The studio team first looked to settler colonial history, when Dutch settlers took immense efforts to dispossess the Munsee-speaking Wickquaseeks in order to create the plantations, farms, and lots of Nieuw Haarlem. One site that illustrates this history of dispossession (and in a way that is not isolated) is Rechgawanes. Located near present-day 102nd Street and Third Avenue, it was occupied by the Dutch and the French for more than three decades before a formal recognition of land ownership was issued to Rechkewackan and his chiefs (Riker 1881).



Map of Harlem showing the Lands as in the Original Lots and Farms. c. 1879.

CHANGING DEMOGRAPHICS

The colonial settlement of Harlem marked the start of centuries of changing demographics. "In the nineteenth century, various areas of Harlem had become home to different communities of immigrants, people of color and low-wage laborers" (Tremante 2000). Irish and German, Russian, and Eastern European Jewish communities settled in the overcrowded tenements along Third Avenue, and later Italians (Baics et al. 2021).

The Union Settlement House was opened in 1895 on East 104th Street between Second and Third Avenues as a mission by the Union Theological Seminary. It was founded to help provide for the growing number of struggling immigrants, providing "assimilation" support for those who lived in poverty in the surrounding neighborhood (Caro 1974).

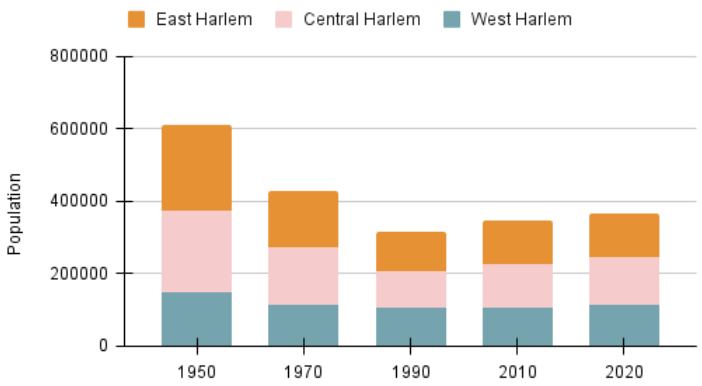
By the year 1910, large populations of Black tenants began to settle around 135th Street. Many migrants from the southern United States came seeking work and freedom and settled in Central Harlem's growing community of African Americans. Soon, Central Harlem would become known as the Black Mecca and the birthplace of the Harlem Renaissance.

Harlem experienced a great population decrease from 1950 to 2020, reaching its lowest point in 1990. From 1950 to 2020, the population in West Harlem decreased by 23.83 percent, Central Harlem's population decreased by 41.82 percent, and East Harlem's population decreased by 48.14 percent.

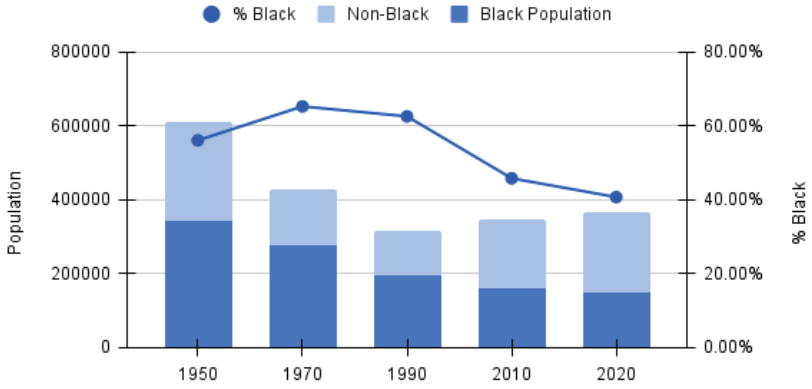
Since 1950, the Black population in Harlem has steadily decreased, despite up-ticks in the overall population in the past two decades. The proportion of the Black population within the total population has been declining since at least 1970.

The same pattern can be observed for each section in the study area. Black populations have consistently decreased in West, Central, and East Harlem since at least 1970, with Central Harlem suffering the most dramatic change. Meanwhile, the overall population is increasing.

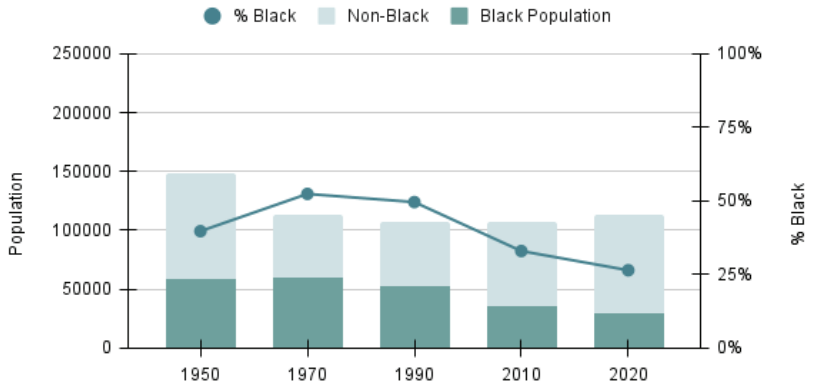
Map of immigrant settlement in East Harlem in the year 1880.



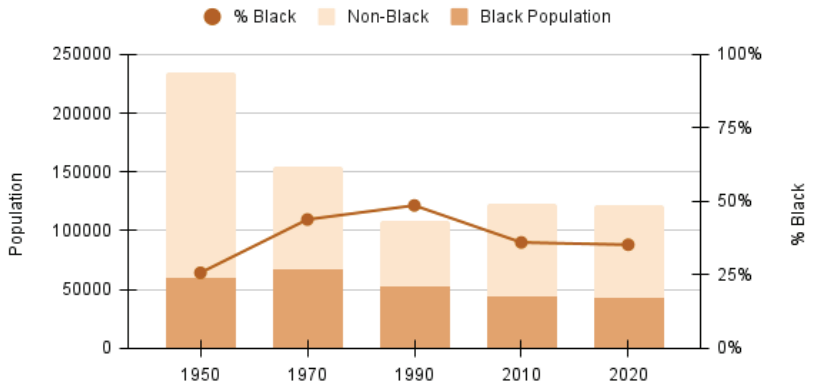
Population in Harlem, 1950-2020.
Data Source: US Census and ACS Data with Social Explorer.



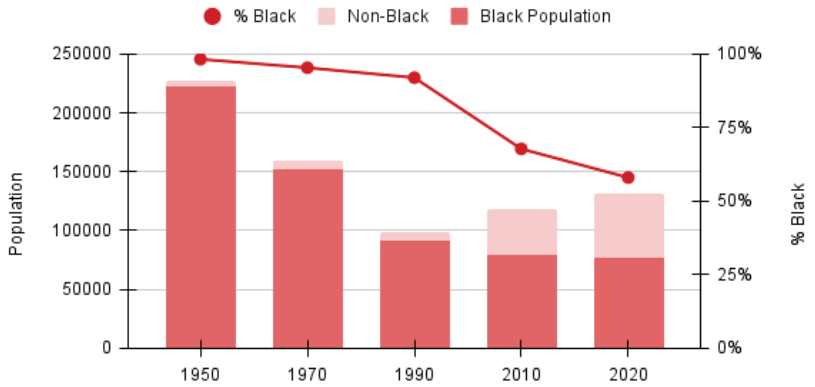
Black and non-Black populations in Harlem, 1950-2020.
Data Source: US Census and ACS Data with Social Explorer.



Black and non-Black populations in West Harlem, 1950-2020.
Data Source: US Census and ACS Data with Social Explorer.



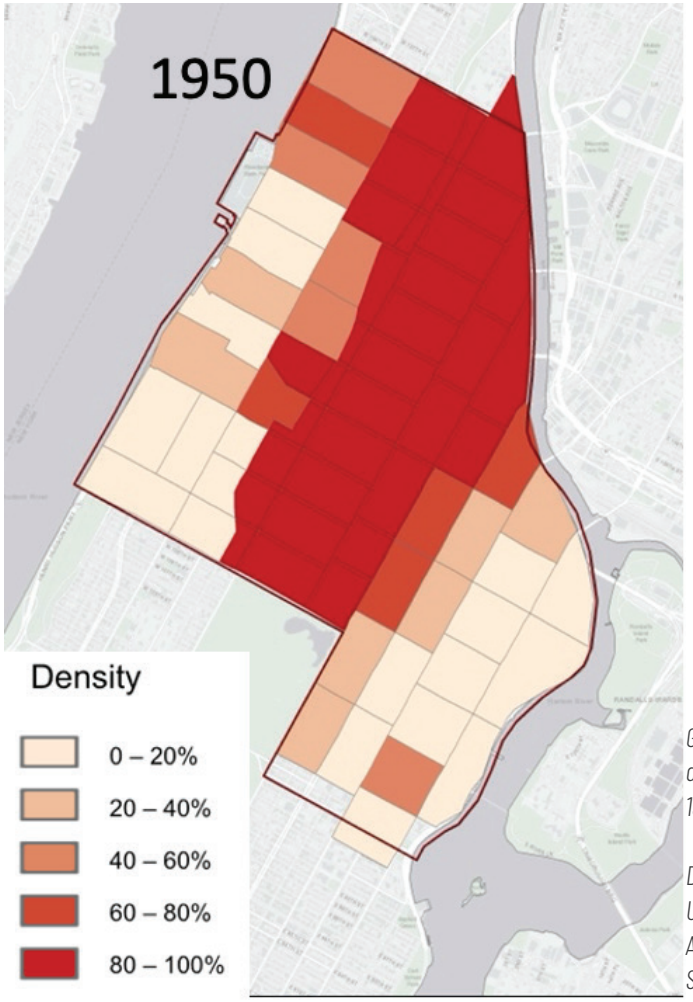
Black and non-Black populations in East Harlem, 1950-2020.
Data Source: US Census and ACS Data with Social Explorer.



Black and non-Black populations in Central Harlem, 1950-2020.
Data Source: US Census and ACS Data with Social Explorer.

SHIFTS IN GEOGRAPHIC DISTRIBUTION

The following maps of the study area spatialize the relative percentages of the non-White population in 1950 and 2020. The darker shaded areas indicate higher non-White population percentages. As mentioned previously, in 1950 Central Harlem had a more non-White population in comparison to other regions. Over time, this population has become more evenly spread across the entirety of Harlem. Due to the changes in census reporting criteria, data about non-White Hispanic populations is included in the map for 2020, which partly accounts for this shift in distribution.



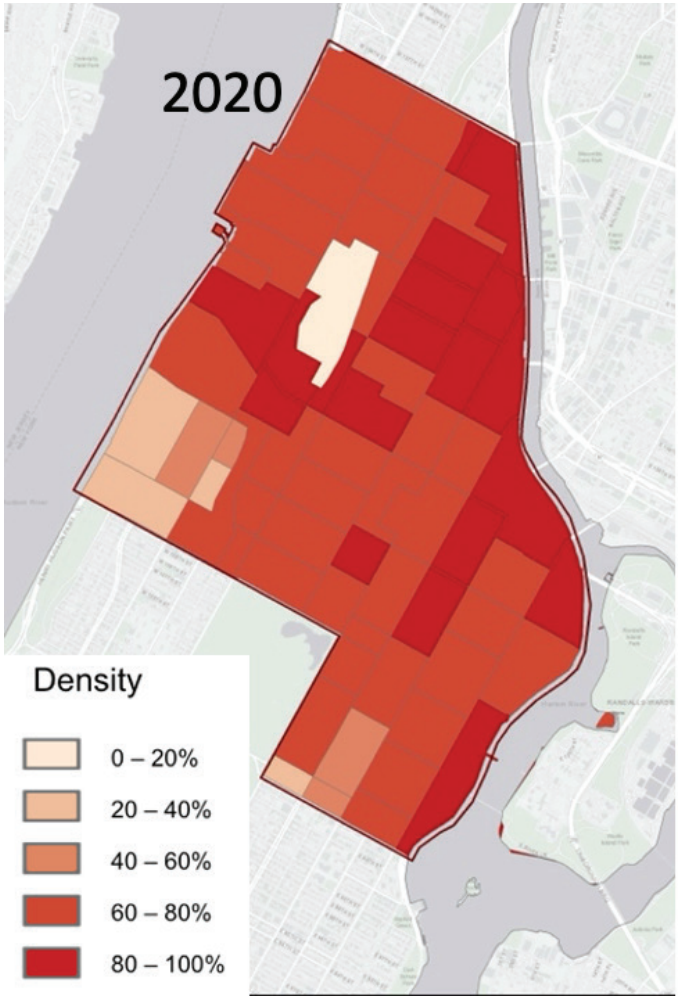
Geographic distribution, 1950.

Data Source: US Census and ACS Data with Social Explorer.

HARLEM'S INCOME GAP WIDENS

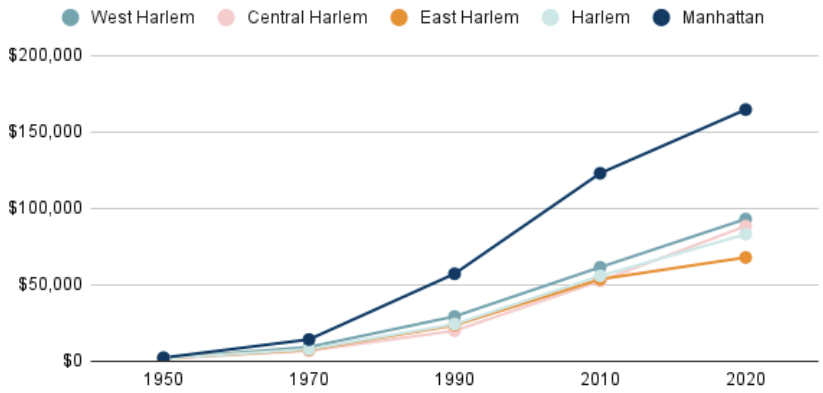
While changes in racial demographics have been significant, income levels in Harlem have failed to keep apace with those of Manhattan as a whole. Harlem is nowhere near the average growth income rate with an average difference of almost $100,000.

Compounding this income gap between Harlem and the rest of Manhattan is the significant income disparity between Black and White populations in Harlem, with Black Harlemites earning on average less than 60 percent that of White Harlemites in 2010, and less than 34 percent that of White Harlemites in 2020.

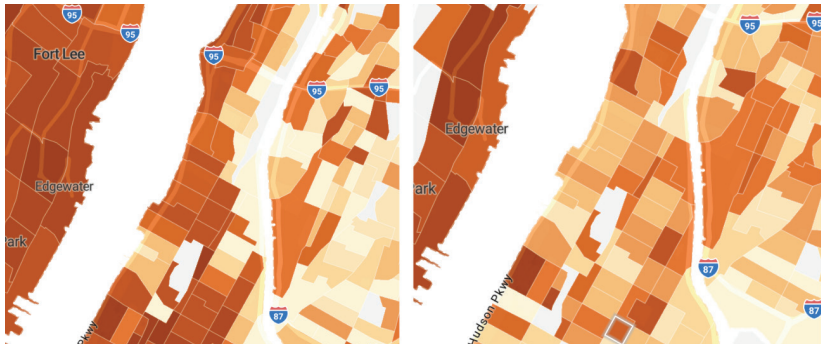


Geographic distribution of population density, 2020.

Data Source: US Census and ACS Data with Social Explorer.



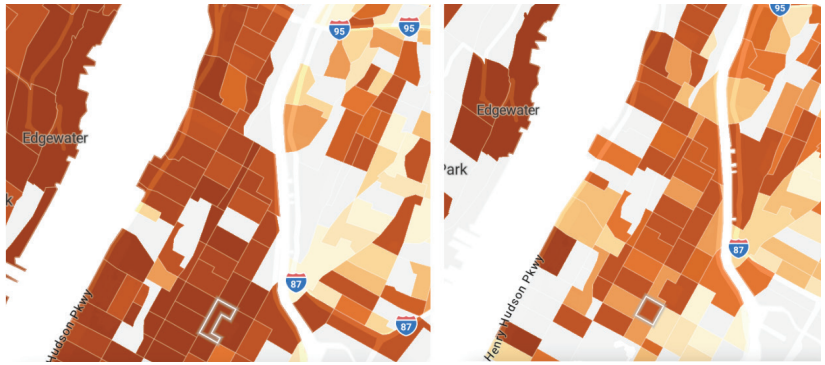
Average population income. Data Source: US Census and ACS Data with Social Explorer.



White Alone
$ 81,964

Black or African American Alone
$ 48,447

Racial disparities in income: 2010. Data Source: US Census and ACS Data with Social Explorer.



White Alone
$ 156,563

Black or African American Alone
$ 53,828

Racial disparities in income: 2020. Data Source: US Census and ACS Data with Social Explorer.

HOUSING INEQUITIES

Residents of Harlem have historically faced environmental conditions that have had tremendous implications on their health, safety, and welfare, including housing conditions. Government-led efforts to address unhealthy and unsafe living conditions would prove controversial in their premise and scope.

HOUSING'S RELATIONSHIP TO ENVIRONMENTAL JUSTICE

Examining the history of housing in Harlem reveals the glaring prevalence of tenement housing within many parts of the community, along with the prevailing perception that this type of housing catered to Harlem's lower-income population.

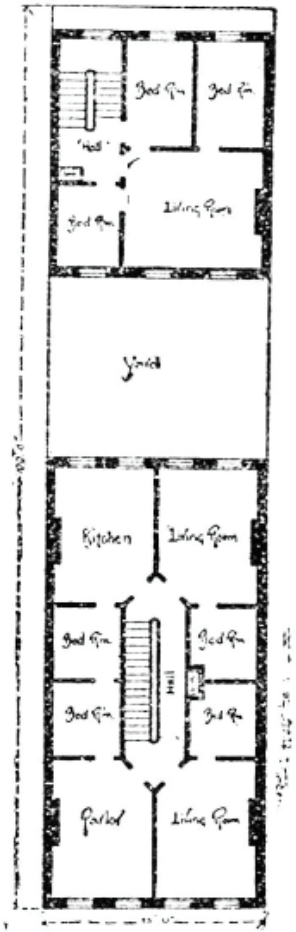
Early buildings were characterized by their poor handling of interior light and ventilation. This early housing stock saw little to no regulation, witnessing only slow and incremental improvements through the Tenement House Acts (Fryer 1901). When employed, these policies attempted to address the inadequate interior conditions that these buildings created.

Urban renewal efforts in the mid-twentieth century also sought to address the issues presented by these early tenement buildings. Today, New-Law tenements are the most common form of this typology remaining, both throughout Harlem and Manhattan (Dolkart 2006).

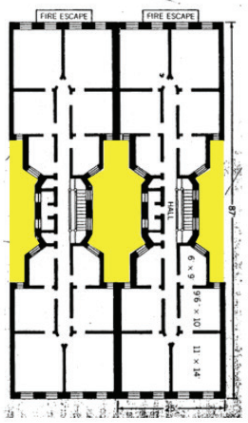
ACCESS TO LIGHT AND FRESH AIR LIMITED BY DESIGN

Looking at building floor plans and footprints more closely, it is clear that access to natural light and fresh air was restricted by the design of these buildings, which initially sought to prioritize maximal lot coverage over internal exposure to natural light and fresh air.

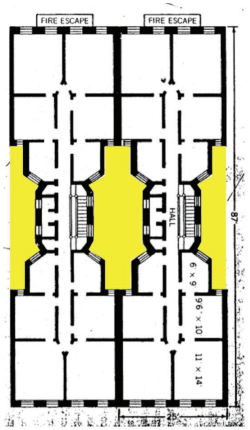
Pre-Law tenements had only two rooms in each apartment receiving direct sunlight and air from the street and backyard, with all of the remaining rooms receiving little to no natural light (Dolkart 2006).

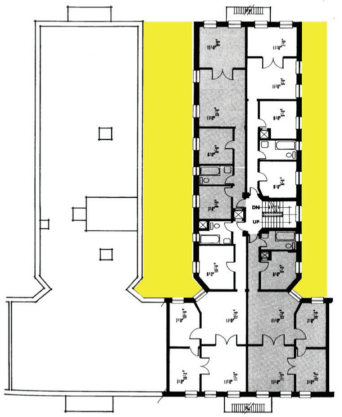


Pre-Law tenement showing unvoided footprint.

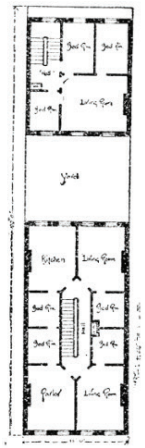


Old-Law plan showing initial iteration of light wells, c. 1969.



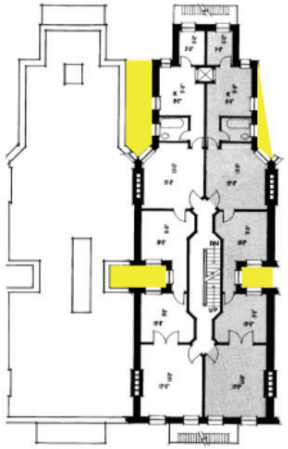


New-Law plan showing "T" and "O" shapes, c. 1969.



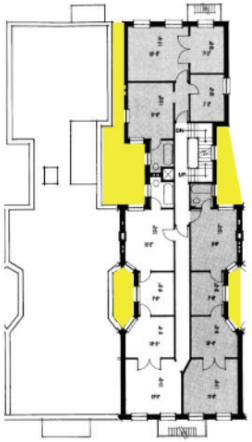
PRE-LAW

Prior to the tenement house legislation of 1879.



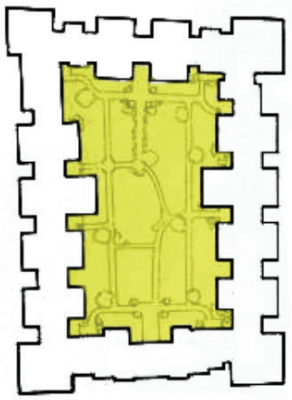
OLD-LAW

Architects Renewal Committee in Harlem. *Housing in Harlem*. 1969.



OLD-LAW

Architects Renewal Committee in Harlem. *Housing in Harlem*. 1969.



NEW-LAW 'O' SHAPE

Floor Plan of Knickerbocker Village Showing Large 'O'-Shaped Light Well, 1924.

From left to right: Pre-Law, Old-Law 1, Old-Law 2, and New-Law "O"-shaped floor plans.

Old-Law tenements introduced light and air into the interior rooms through so-called "airshafts," which were provided between two adjoining buildings (highlighted in yellow above). However, the airshafts proved more of an issue than a remedy, later being called "foul air shafts... receptacles for garbage and filth... and a conveyor of smells and noise" by Robert DeForest in the Tenement Housing Committee Report of 1900.

New-Law tenements sought to rethink the organization of their massing with the "O" shape to revolve about a much larger open court. This evolution shows the air and ventilation capabilities through the introduction and expansion of light and air wells, in yellow.

POOR PLUMBING, VENTILATION, AND LIGHTING

Ventilation inadequacies were compounded by factors such as malfunctioning plumbing. An intimate characterization of Harlem's early housing conditions are gleaned from a 1915 report from the National Urban League on housing in the community.

The League reported that of the residences surveyed in their 1915 study, 54 percent had "fair" plumbing and nearly a quarter were classified as "bad." The report went on to discuss accounts of sickness related to leaking pipes and saturated walls and floors. The report even discussed how some units did not have operating running water systems, which required tenants to manually haul fresh water to their shared bathrooms (National Urban League 1915).

Inadequacies in natural light were compounded by those in artificial lighting as well. Advances in electric lighting witnessed by Lower Manhattan were slow to reach uptown residents, who were more accustomed to gas lighting well into the 1930s (White 2017). The aforementioned 1915 National Urban League report additionally details the often dark and dangerous common areas of these tenement buildings due to insufficient gas lighting or even lack thereof.

HEAT INADEQUACIES

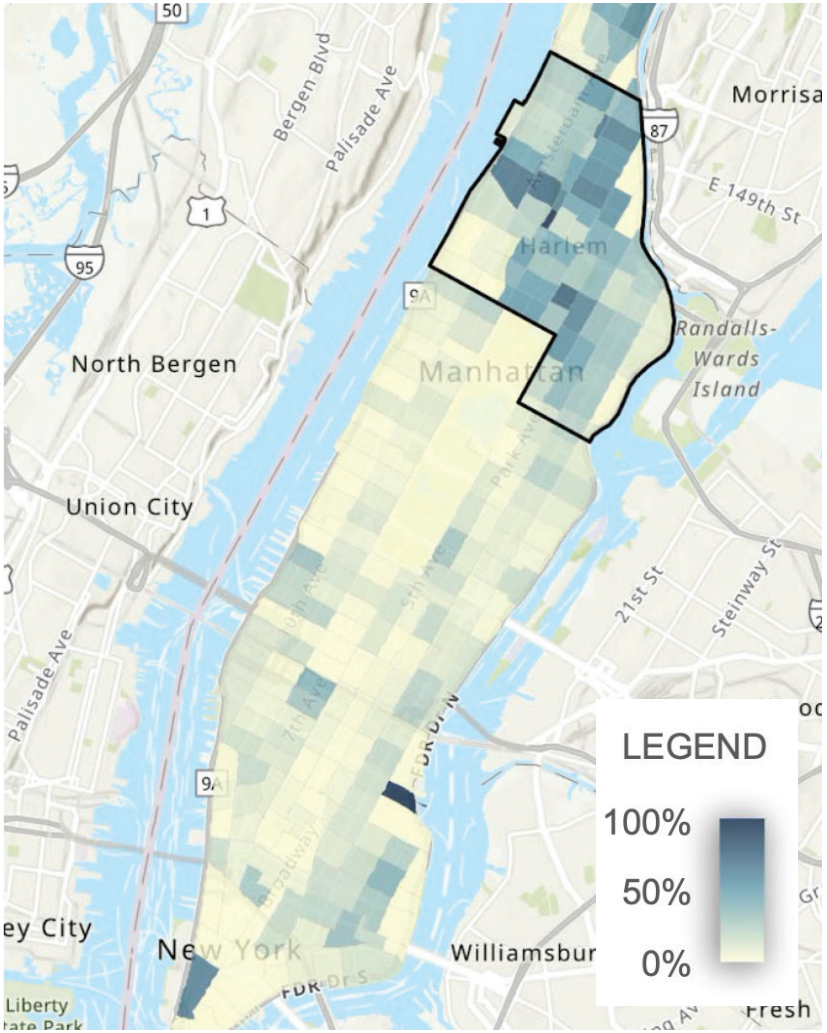
The 1915 National Urban League report also discusses heating infrastructure in these homes. Overall, it projected that 53.6 percent of all tenements in the district of study had operating central steam heating systems and noted the tendency of Harlem landlords to allow these steam systems to fall into disuse due to the then-mounting price of coal (National Urban League 1915).

In response to widespread complaints regarding insufficient heat, landlords were required beginning in 1918 to keep their buildings above 68 degrees Fahrenheit during the heating months under a new addition of Section 225 of the Sanitary Code of the City (NYC Dept. of Housing Preservation and Development, n.d.).

Despite this effort, the accounts of landlords neglecting to adequately heat their apartments are innumerable. A 1922 *New York Tribune* article, for example, details a violation of Section 225 by Jacob Solotoroff, noting that he had purchased roughly one-sixth of the amount of coal necessary to adequately heat the seventy-two units across his four buildings (*New York Tribune* 1922).

This issue of control over heat is further characterized by Harlem's continued dependence on boilers servicing individual tenement buildings. To place this in a greater context, a look at a 1960 energy use map of Manhattan reveals the continued dependence of Harlem's buildings on individual coal-fired systems, whereas the lower part of the island had access to a municipal steam system that lessened demand.

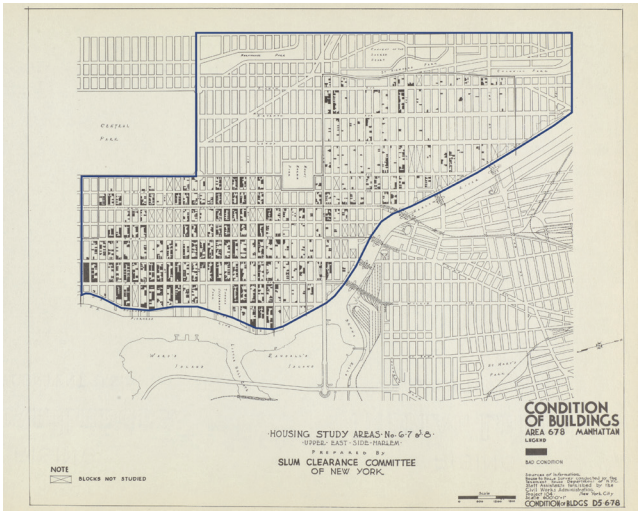
Later on, subsidized housing would provide an avenue through which residents could have access to more dependable amenities.



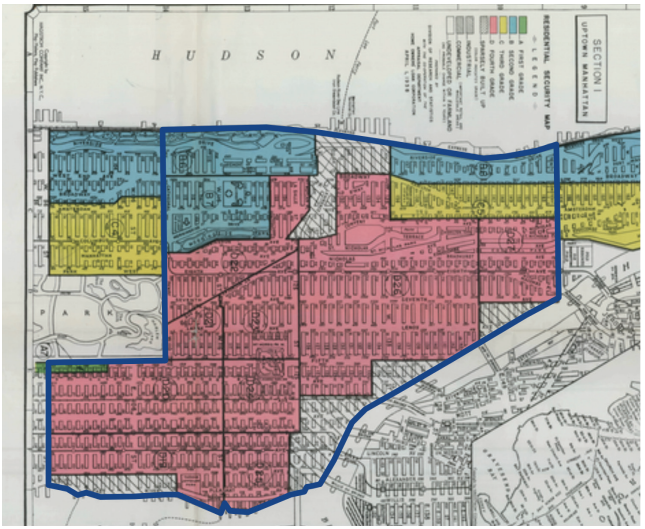
Harlem's continued dependence on coal, despite many neighborhoods converting to petroleum, c. 1960.

CONDITIONS EXACERBATED BY SLUM CLEARANCE & REDLINING

Poor housing conditions fueled a perceived need for redevelopment and informed the designation of areas within Harlem as slums. Thus, the slum clearance project was introduced as an urban renewal strategy to regenerate run-down districts and construct housing projects and other public programs. In the 1933-1944 maps prepared by the Slum Clearance Committee of New York, many buildings in Harlem, especially in East Harlem, were identified as in "bad condition." These same buildings were made more vulnerable through redlining.



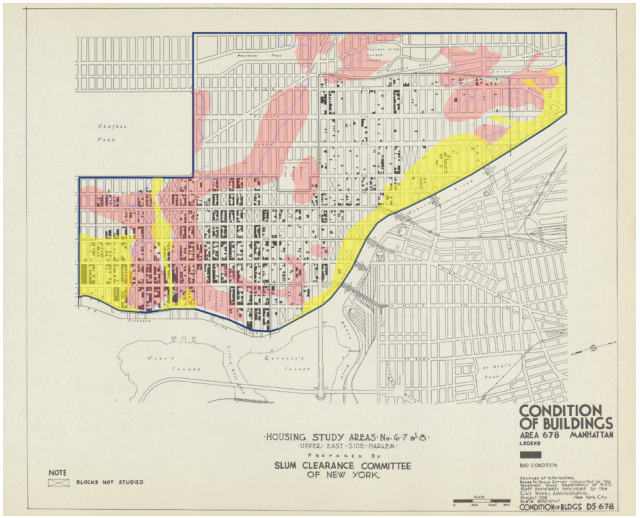
Slum Clearance Condition Map, c. 1933-1934.



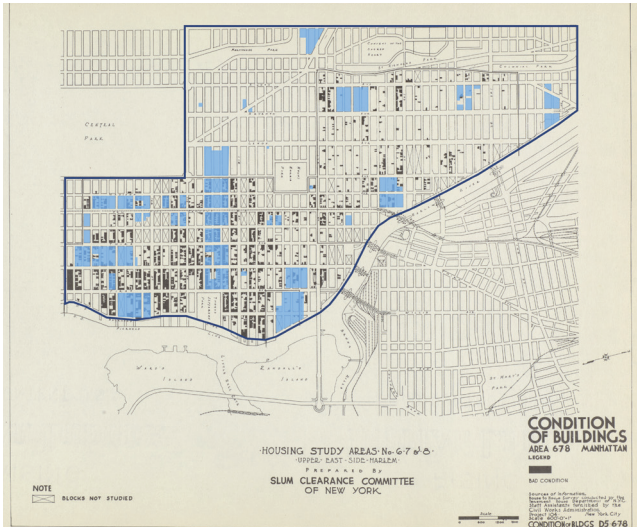
Redlining Map in Harlem, c. 1938. (Studio study area outlined in blue)

When the slum clearance condition map is overlaid with reclaimed land and infill sites from the 1850s to 1930s, some correlation can be seen between poor housing and infilled areas, mainly in East Harlem.

With the intention to better the neighborhood, public housing projects initially brought great changes to the city. Several New York City Housing Authority public housing projects rose out of areas that were deemed "slums" or "blighted."



Reclaimed land overlaid with the Slum Clearance Condition Map, c. 1933-1934.

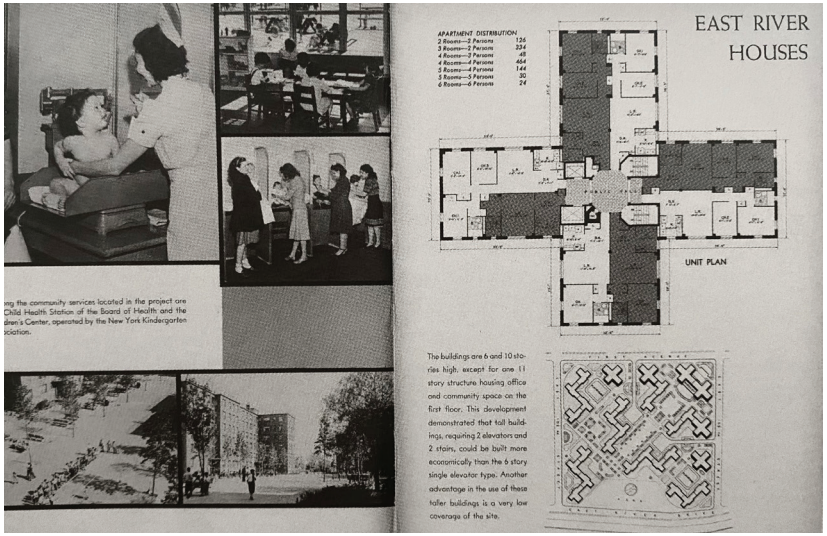


NYCHA public housing areas overlaid with the Slum Clearance Condition Map, c. 1933-1934.

REDEVELOPMENT VERSUS REHABILITATION

In the mid-twentieth century, a series of redevelopment projects took place across Manhattan. As the city defined new and ideal standards of living through metrics such as blight reports, certain areas were deemed to be slums and redeveloped into New York City Housing Authority (NYCHA) public housing, with the goal to provide healthy living conditions with affordable rent.

The first public housing program in East Harlem was the East River Houses, developed by NYCHA in 1941. When it was completed, it housed 1,170 residents in 5,000 rooms. The development required the relocation of only four families.



East River Houses, c. 1944.

Children playing outside of a public housing development in Harlem, c. 1965.

Blighted Area? These Business Owners Beg to Differ

By CHARLES V. BAGLI

Damon Bae's commercial laundry on Third Avenue in East Harlem may never be mistaken for the kind of glamorous businesses found near Wall Street, Times Square or Madison Avenue, but it is a thriving concern in this neighborhood of three- and four-story buildings and vacant lots.

The laundry, Fancy Cleaners, serves the five dry cleaning stores Mr. Bae owns in Manhattan, and the small retail dry-cleaning operation he opened inside the laundry has attracted customers from Harlem and beyond in the five years since he moved here from Murray Hill.

"I didn't expect such a huge volume," Mr. Bae said. "There aren't many residential buildings nearby. But you offer a good price, and people will find you. You should see the line on Saturdays. I've even got people coming from the Bronx."

Fighting the city's efforts to condemn property on behalf of a big developer.

But Mr. Bae, and more than a half-dozen other small-business owners in this neighborhood bound by Second and Third Avenues, from 125th to 127th Streets, are waging an uphill fight to hold onto their property. The Bloomberg administration has so far moved successfully in the courts to condemn six acres on behalf of a big developer for a $700 million East Harlem Media, Entertainment and Cultural Center.

"I think that the city is going to take away our properties and businesses so they can make another developer with deeper pockets a lot of money," Mr. Bae said.

The city approved the project in 2008. It will include office and retail space, a small hotel, cultural space and 800 apartments, 600 of which will be set aside for low-, moderate- and middle-income families.

The first phase of the construction — a 40-unit residential building at the southeast corner of 125th Street and Third Avenue — is nearing completion.

Many of the business owners knew that a large stretch of the area was included in a 150-block urban renewal effort that was approved in 1968 but never quite materialized. But property owned by at least three of the businessmen was not included in the renewal zone, at least not until 2008, when the Bloomberg administration added those parcels to the mix.

At the time, Mayor Michael R. Bloomberg hailed the creation of jobs and housing, and the city justified taking the private property by declaring the area "blighted" — a description that Mr. Bae and the other business owners found galling.

The city owned most of the land, allowing it to sit fallow for decades while turning down Mr. Bae and other business owners who wanted to buy parcels to expand their operations.

"It's artificially manufactured blight," Mr. Bae said.

In a recent decision by a panel of judges at the Appellate Division of State Supreme Court, Justice James M. Catterson agreed. He said the city's claim of blight and underutilization were "nothing but a canard to aid in the transfer of private property to a developer."

The Bloomberg administration has so far been successful in the courts in its push to condemn land for a $700 million project.

But he said he was forced to concur with the court's decision to dismiss the lawsuit brought by Mr. Bae and other property owners because recent rulings by the Court of Appeals had "made plain that there is no longer any judicial oversight of eminent domain proceedings."

The battle against eminent domain in East Harlem has received less attention than similar disputes at Atlantic Yards in Brooklyn, Willets Point in Queens and the Columbia University expansion in West Harlem. But in each case, longtime businesses were pushed out to make way for large developments.

Jacob Toledo, the owner of Cycle Therapy, runs the city's largest motorcycle dealership in a refurbished five-story building on East 127th Street. Rows of new and used Triumph, BMW, Honda and Yamaha motorcycles and scooters line the neat shop, while the smell of oil hangs in the air. Mr. Toledo says he may be forced to close his business permanently if the city takes his land.

Five years ago, he said, he crisscrossed the city looking for a new location after he was pushed out of a site on the West Side of Manhattan by new zoning and rising real estate values.

Only days after buying the orange-colored building in East Harlem, Mr. Toledo said he learned that the property might be condemned.

"I don't think we can find any place in the city that can fit my business," he said.

Evan Blum, another local businessman, is not part of the lawsuit to stop eminent domain on 125th Street, but he is very much opposed to it. This is his third encounter with eminent domain, he said.

"The city makes it so hard for the small businessman to exist," Mr. Blum said. "I'm not politically connected. Small businesses can't make contributions to politicians. So the big guys always win."

Mr. Blum owns the building housing Demolition Depot on the south side of 125th Street, between Second and Third Avenues. Celebrities, billionaires, restaurant owners and brownstone dwellers make their way to Demolition Depot for that must-have claw-footed bathtub, or for gargoyles, stone lions and chestnut doors.

However, a building he leases across 125th Street, stocked with four floors of marble, wood and stone fireplace mantles, is threatened by the condemnation effort.

Nearby, Gary Spindler, the owner of Uptown Auto Repair, also says he worries about the future of his business if the property is condemned. He bought the business in 1999, attracted to its location near the Robert F. Kennedy Memorial Bridge, formerly known as the Triborough.

"I thought I was buying an opportunity to run our business and have the property appreciate in value," he said.

Proponents of the project argue that the property owners should have known that someday their property could be subject to eminent domain because it sat within the old urban development zone. But both Mr. Spindler and Mr. Bae said title records indicated that their properties were not part of that plan when they bought them.

"Our properties were carved out of the urban renewal plan," Mr. Bae said.

The business owners say they remain in limbo while the court case plays out.

"Now I don't know if I'll be here next year," Mr. Bae said. "I'm afraid to make an investment in my business."

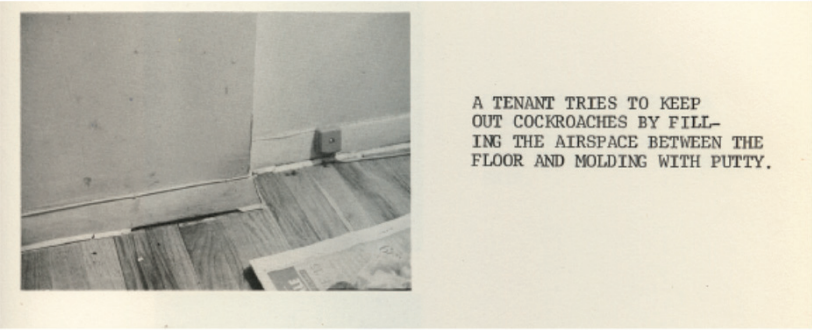
Headlines and article about blight, development, and threatened businesses in Harlem, c. 2011.

Over time, however, the scale of these redevelopments proved difficult for NYCHA to maintain, and conditions gradually deteriorated as needs for repairs and updates outpaced NYCHA's capacity.

By the late 1960s, revitalization was promoted as a more cost-efficient solution to address poor living conditions in dilapidated public housing. However, rehabilitation efforts historically had mixed results. The Mangum family and their home at 263 West 114th Street serves as a case in point. The Mangums' building was just one unit out of a larger complex of NYCHA-managed tenements on 114th Street, which was later collectively renamed the Randolph Houses.

The House on W. 114th Street, a booklet distributed in 1968 by the U.S. Department of Housing and Urban Renewal, created a precedent for successful rehabilitation with compelling before-and-after photos of the interior rehabilitation along with pictures of the happy Mangum family in their newly renovated apartment.

In reality, despite progressive updates to energy systems, an assessment of the rehabilitation conducted by the Harvard-MIT Joint Center for Urban Studies found many insufficient fixes that would need to be remediated again due to the decision to use cheap and incompatible materials (Goldstein 2019).



Evidence of poor rehabilitation with cheap and incompatible materials, c. 1968.

Before and after the rehabilitation of the Mangums' home on 114th Street, c. 1964.

As a result of the inadequate approach of the 1960s, more extensive rehabilitation at the Randolph Houses was necessary by the early 2000s, which by then were listed on the National Register of Historic Places. In 2007, the NYCHA vacated twenty-two of these same units in response to the unlivable conditions into which the century-old buildings had fallen. The significant delay in addressing this building's depleting conditions forced residents to live "with vermin, flooding, and crumbling walls for decades" until NYCHA gut renovated the buildings (Baird-Remba 2017). This case is demonstrative of the consequences to both environments and the health of residents brought on by chronic neglect.

Ultimately, *redevelopments* sought to improve standards of living through demolition and new construction and led to a high concentration of NYCHA complexes in Harlem, while *rehabilitation* responded to severe decay or health risks in developments that had once been the standard for affordable living and health.

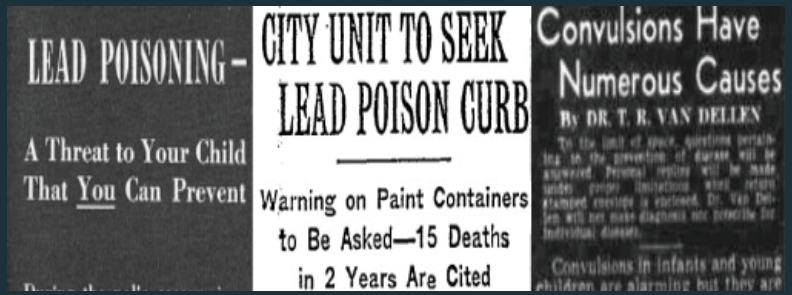
Randolph Houses, mid-renovation, c. 2007.

Randolph Houses, post-renovation, c. 2017.

LEAD PAINT VULNERABILITY

An issue that compounded housing inequities was the existence of dangerous materials embedded into the fabric of these homes. As the ubiquity of contaminants, such as lead paint, became increasingly clear, Harlem became known as part of the "anchor" of New York City's "Lead Belt" (Fernández 2020a). By 1960, the use of lead paint was banned for residential applications. As noted earlier, environmental justice activism spurred responses to these countless cases of exposure in Harlem. For example, the Young Lords sought to provide resources for closer monitoring for traces of lead in children.

Because of the increased awareness and testing for lead exposure, there have been notable declines in reported cases. Today, Harlem has fewer cases than some of the other neighborhoods that characterize New York City's lead belt, but still has more cases than the average across Manhattan.



Redbook Magazine New York, *c. 1950.* New York Times, *c.1953.* The Spokesman-Review, *c. 1950.*

NYCHA'S LEAD PAINT CRISIS

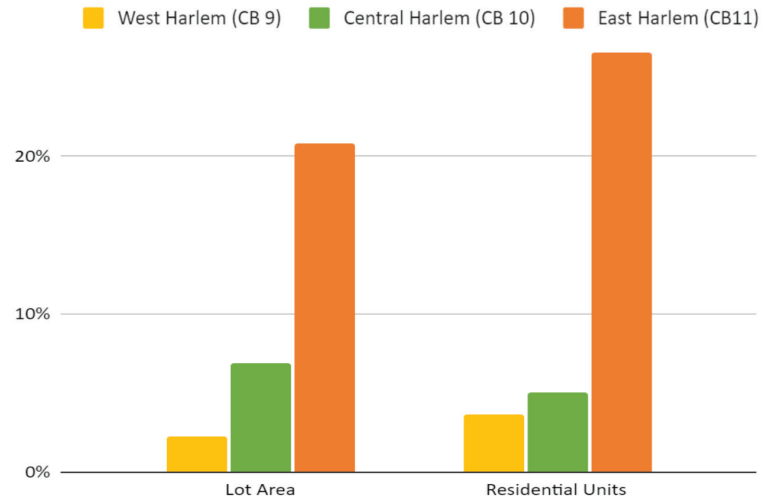
As Harlem continues to grapple with the existence of dangerous substances within its built fabric, more recent intensive and thorough testing efforts have revealed that a greater number of NYCHA housing units are contaminated with lead paint than initially projected. The execution of these new testing efforts have been significantly hampered by the onset of the COVID-19 pandemic (Smith 2020).

WE ACT has continued its efforts to help close loopholes in environmental laws through which landlords have allowed the continued exposure of tenants to lead. In light of the recent findings of NYCHA's pervasive accounts of lead content, Mayor Bill de Blasio took steps to create initiatives that would test all NYCHA homes by 2020 and rid the threat of their lead contents by 2028 (New York City 2019). The goal of testing all NYCHA units by 2020 was not met.

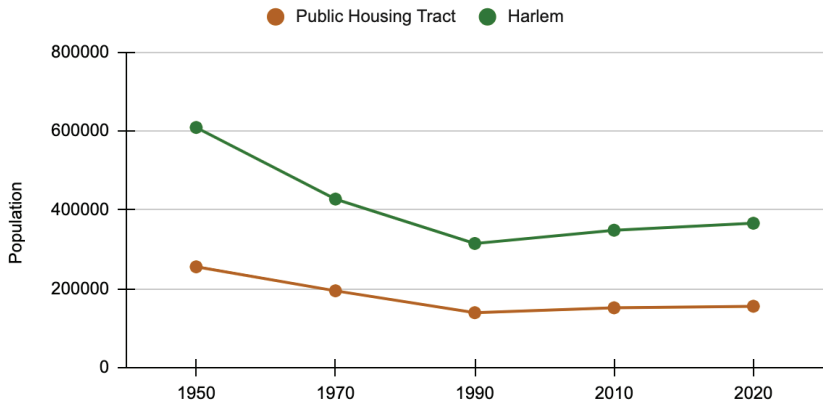
PUBLIC HOUSING DEMOGRAPHICS

Demographic data for public housing tracts was collected to reveal demographic patterns among public housing residents. Several graphs compare the demographic development in public housing tracts in the study area and Harlem. The population in both the public housing tracts and Harlem overall decreased between 1950 and 1990. From 1990 to 2020, the population increased but reached a plateau. The changes in population in the public housing tracts has always been less drastic than those in Harlem, representing that population in public housing is more consistent than other regions in the study area.

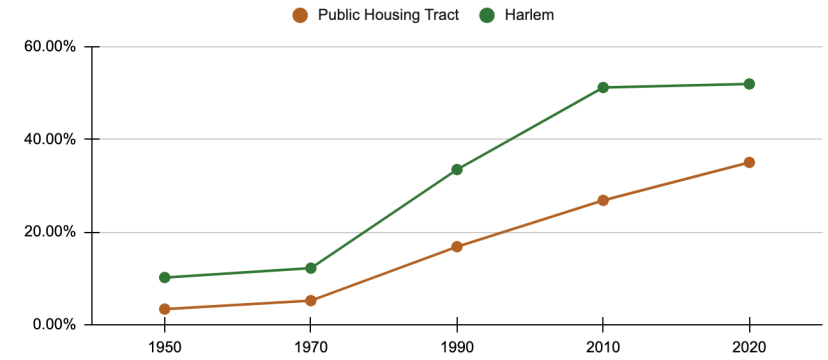
In terms of education levels, from 1950 to 2020, both public housing tracts and Harlem had an increasing proportion of the population with college experience over twenty-five years old, although the proportion has been consistently lower for public housing tracts than Harlem. The education level for Harlem residents grew rapidly from at least 1970 to 2010, and has remained stable in the last ten years. For the public housing tracts, the share of the population with college experience has grown at almost the same rate between 2010 and 2020 and between 1970 and 2010.



Share of Harlem devoted to public housing (NYCHA).
Data Source: Furman Center, Pluto.



Population in Harlem and public housing tracts: 1950-2020.
Data Source: US Census and ACS Data with Social Explorer.



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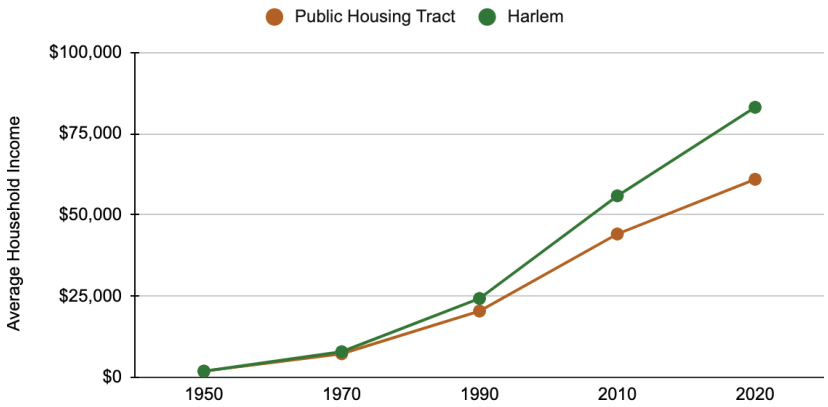

Income in Harlem and public housing tracts: 1950-2020.
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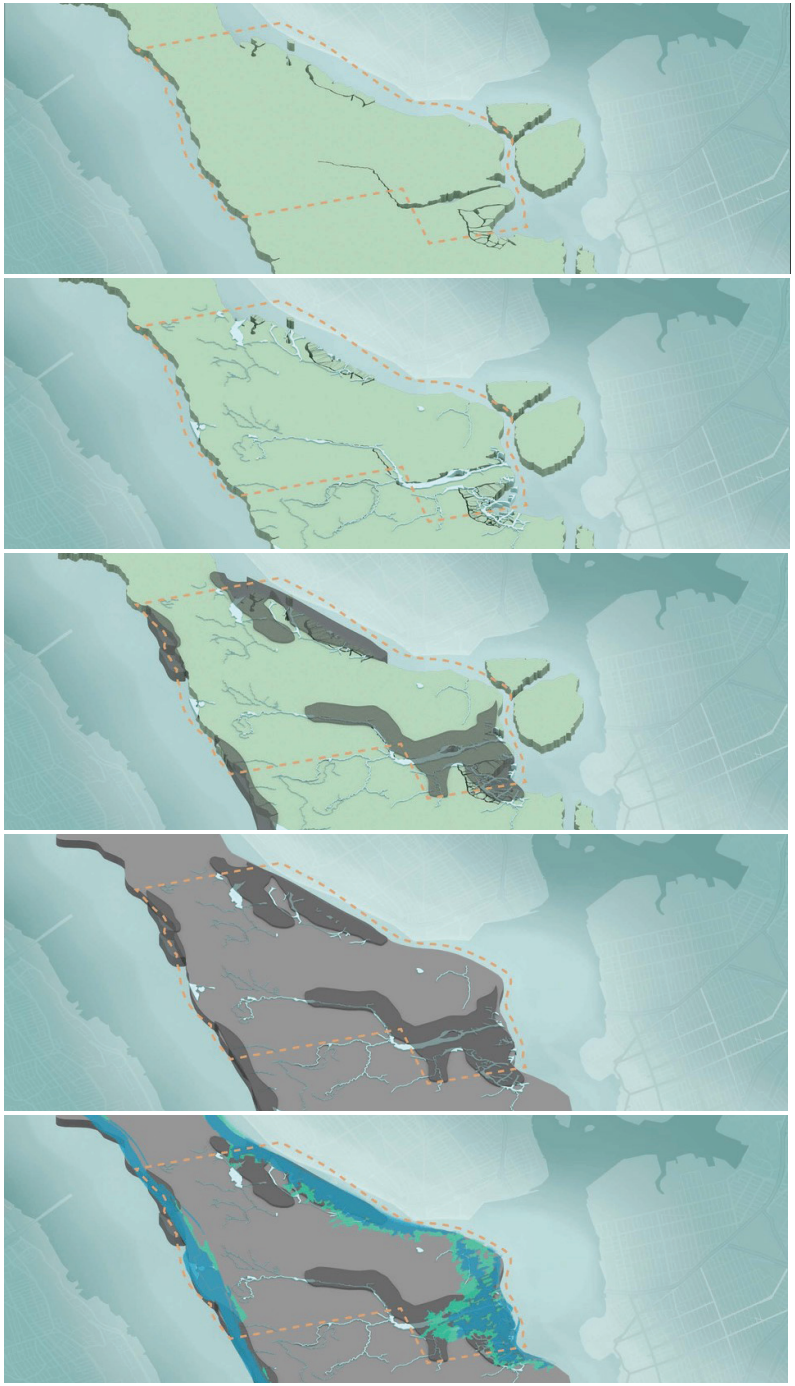


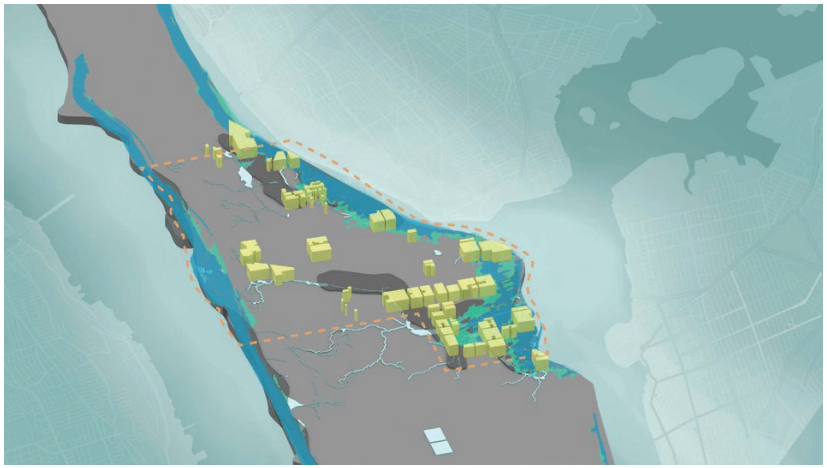
Transformation over time: Original shoreline, original waterways, post-1844 infill, FEMA floodplains, and NYCHA public housing.

PUBLIC HOUSING VULNERABILITIES

Among the Community Board districts in Harlem, East Harlem has the highest percentage of public housing, both in terms of lot area and residential units.

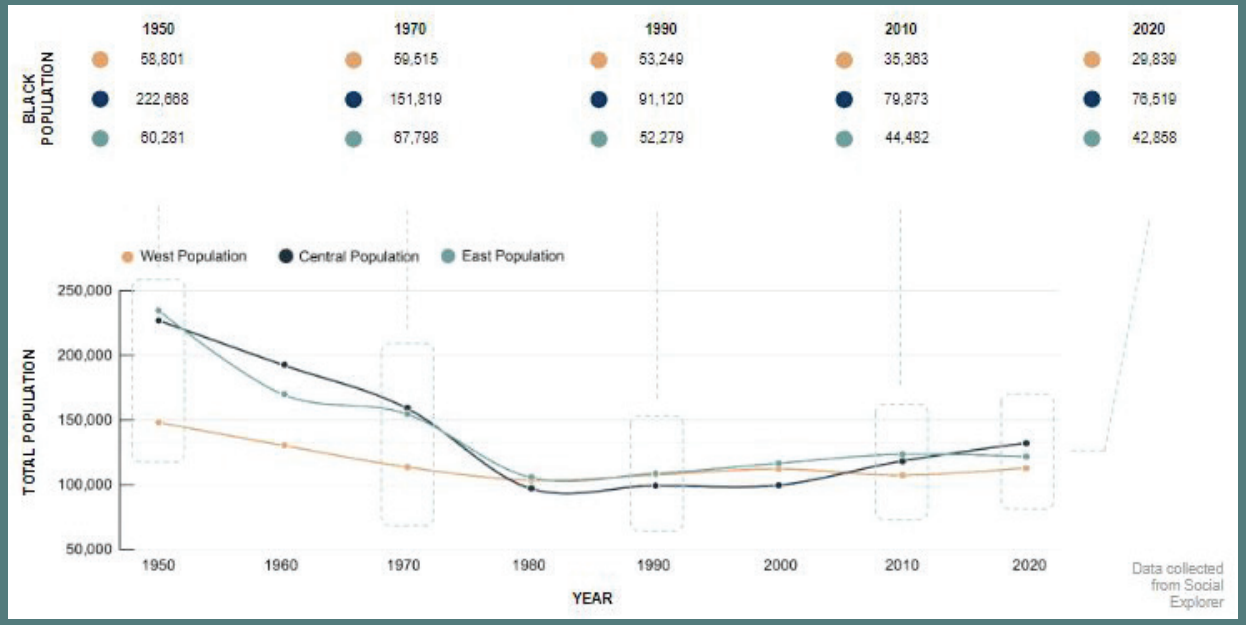
The accompanying images illustrate the sequential development of Harlem, from the image on the left, showing the original shoreline and waterways, to areas of infill, and FEMA's designation of floodplains, alongside existing government-sponsored housing on the right. The repeated vulnerability of certain geographies—specifically, those of previous natural waterways and marshes—are now concentrated sites of NYCHA public housing and FEMA floodplains.

These vulnerabilities compounded, as this accompanying sequence shows. First, the natural waterways became sites of infill, shown in dark gray, beginning in 1844. Then, we see FEMA's designation of floodplains overlaid, with a close correspondence to the areas of infill. Last, NYCHA housing is placed atop these landscapes, now vulnerable to poor soil conditions and flooding. This co-location suggests that vulnerable populations are confined to vulnerable lands through public housing policies.



DISPLACEMENT RISKS

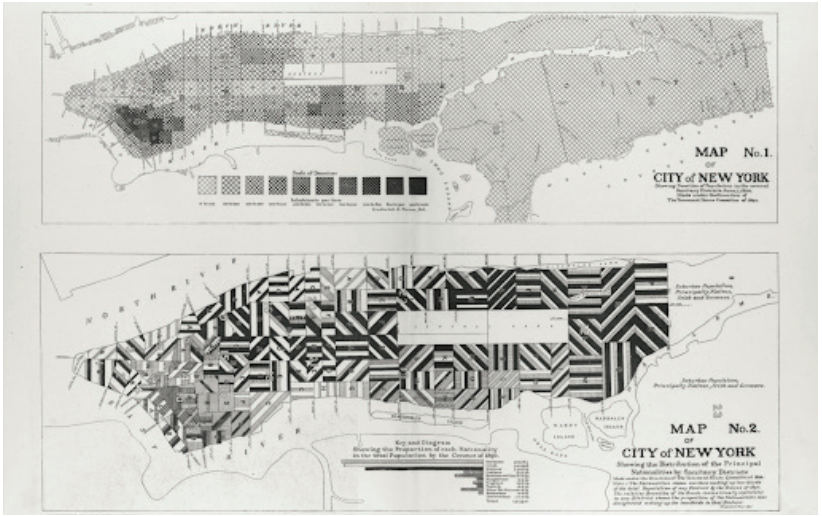
Harlem has seen significant shifts in population, both in terms of number of residents and demography. Between 1950 and 1980, the population declined sharply in Central and East Harlem, with West Harlem's also declining at a lesser rate. This decreasing population, characterized especially by the decreasing Black population, coincides with a broad spectrum of concerns relating to the displacement of individuals and publics, including redevelopment, loss of businesses, and affordability.



Population changes since 1950 in West, Central, and East Harlem. Data Source: Social Explorer.

DENSITY AND CROWDING

Density and crowding have historically informed redevelopment efforts. As seen in the map, East Harlem had already been identified as an area of heightened population density by 1895. By 1928, crowding was being used to rationalize redevelopment and resulting displacement, such as in a regional survey that read: "In dealing with established conditions of overcrowding, it may be that the only economically sound policy is to promote the removal of part of the population to other areas" (Thomas, Lewis, and McCrosky 1928). The central aim of a 1951 North Harlem slum clearance plan was a reduction of the crowded conditions, with an intended reduction of population density from 803 persons per acre to 440, leading to a significant number of forced long-term relocations for residents (NYC Committee on Slum Clearance Plans 1951). Thus, de-densification efforts, both by the City and private developers, frequently incurred displacement.



Density of population by inhabitants per acre, c. 1895.

POWER AND DISPLACEMENT

This narrative of de-densification was echoed in urban renewal efforts proctored by historically powerful entities such as Morningside Heights Inc., the New York Committee on Slum Clearance, and NYCHA. In the 1950s, Morningside Heights, Inc. announced the construction of Morningside Gardens in West Harlem, which aimed to de-densify and provide "suitable living environments" for residents. In response to the impending displacement, residents formed the Save Our Homes committee, which also protested the decreasing availability of affordable housing in the wake of urban renewal (Columbia University GSAPP 2019). In response, the city announced plans for a federally-funded, low-income housing development called the Ulysses S. Grant Houses, intended for residents who could not afford the higher rent of Morningside Gardens. The resulting displacements, compounded by issues of affordability, have contributed to present-day perceptions of change and redevelopment.

Groundbreaking of Morningside Gardens, c. 1955.

Manhattanville Houses, NYCHA, c. 1951.

DISPLACEMENT VULNERABILITY

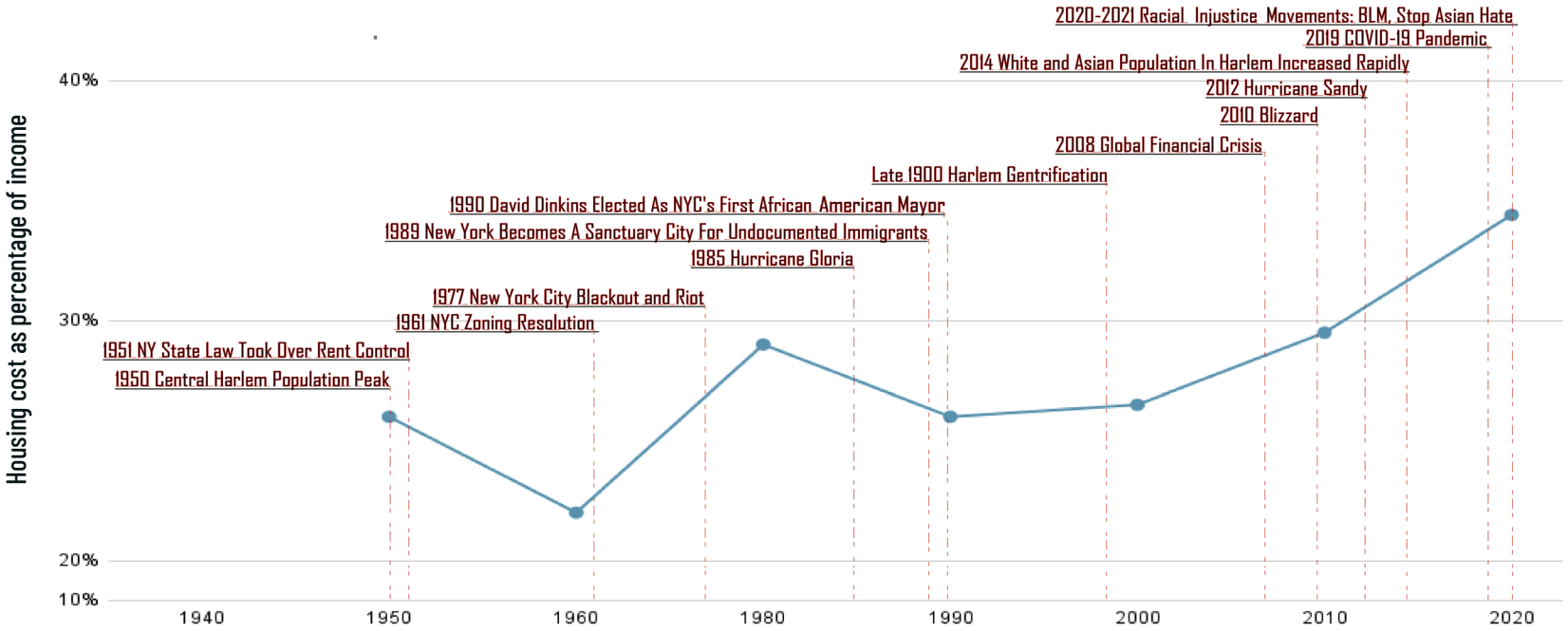
Present-day trends of displacement and vulnerable populations can also be centered around economic status or demography. In New York City, 29 percent of all unsubsidized renters are classified as low-income (Regional Plan Association 2017). Overall, 49 percent of all New York City households are considered "rent-burdened." According to the Urban Displacement Project, "In 2016, over one third of low-income households lived in low-income neighborhoods at risk of or already experiencing displacement and gentrification pressures, comprising 24 percent of the New York metro area's census tracts" (Chapple, Thomas, and Zuk 2021). The map on the right, produced by the Regional Plan Association, illustrates the census tracts defined as most "at risk" of displacement based on the proportion of added high-end or high-cost housing between 2010 and 2015. To be "at risk" is to see a significant increase in high-end housing, but a relatively stable affordable housing market. To be "at-risk with a shifting market" is to see both an influx of high-cost housing at the expense of affordable housing. Based on the findings of this study, neighborhoods of Harlem are the most "at risk" in Manhattan, with higher concentrations of vulnerability in Central and East Harlem.

Displacement risks in Manhattan, 2017.

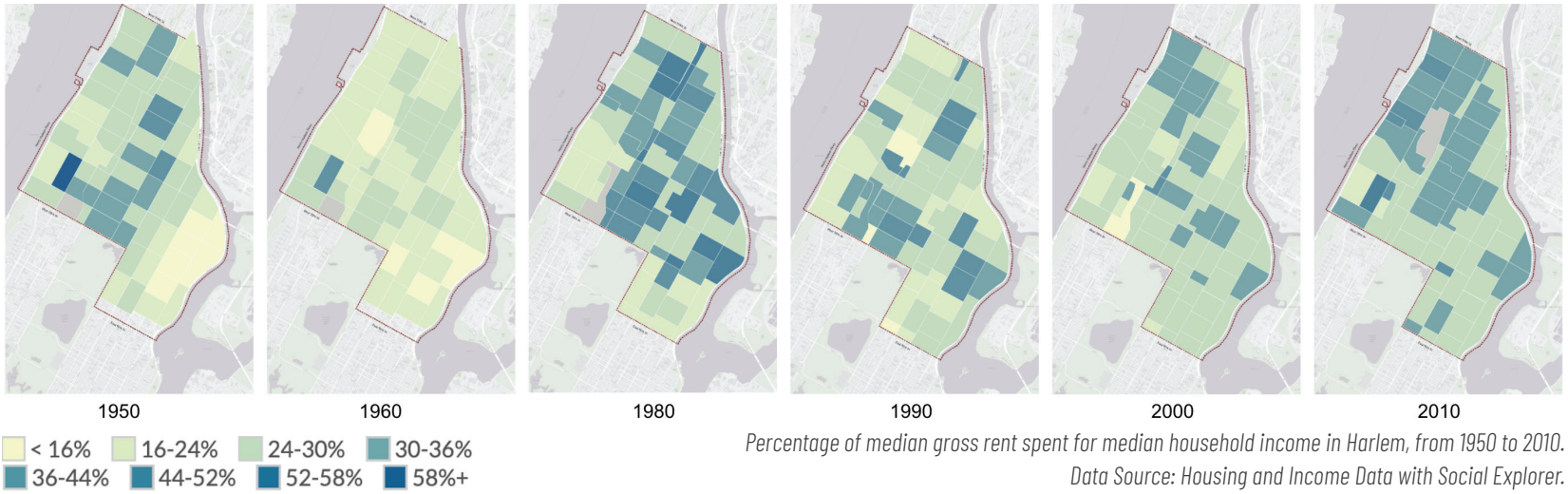
Data source: Report of the Fourth Regional Plan *by Regional Plan Assiociation, March 2017.*

CHANGING RENT BURDEN IMPACTS AFFORDABILITY IN HARLEM

In evaluating housing affordability geographically and historically, Central Harlem, especially the space adjacent to the Central Park, has typically had a greater housing-cost-to-income ratio. Generally, increases in median gross rent have exceeded increases in income, resulting in increasingly less affordable housing conditions in Harlem over time.



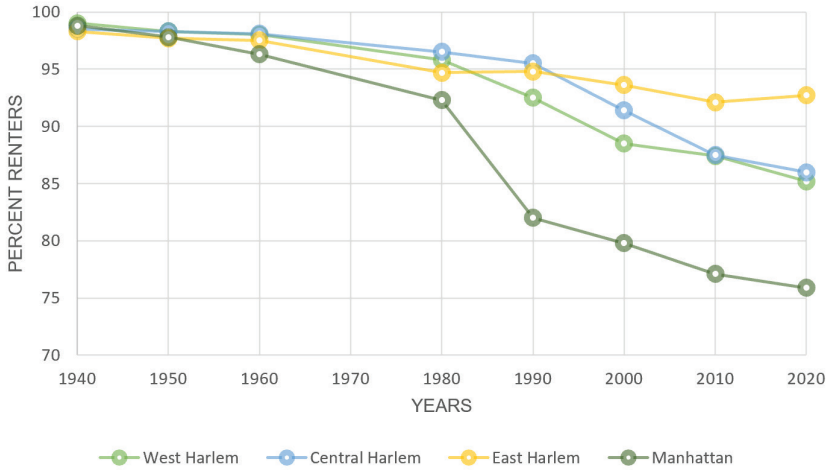
Rent cost has increased significantly compared to income. Data Source: Housing and Income Data with Social Explorer.



Percentage of median gross rent spent for median household income in Harlem, from 1950 to 2010. Data Source: Housing and Income Data with Social Explorer.

HIGH PROPORTION OF RENTERS CONTRIBUTES TO HARLEM VULNERABILITY

Rentership is another factor that can indicate a risk of displacement and resilience. The graph shows the differences both within Harlem and between Harlem and Manhattan. There is a decreasing trend in rentership (or an increasing trend in ownership) that is more dramatic in West and Central Harlem than East Harlem. Additionally, this change toward ownership is slower in all of Harlem than it is in the greater Manhattan area.

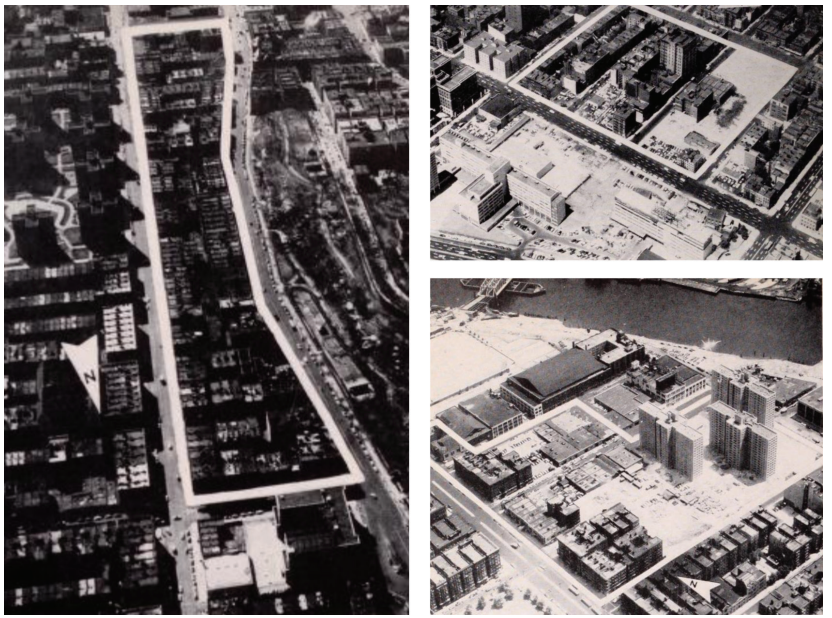


Percentage of renters from 1940 to present for West, Central, and East Harlem and Manhattan. Data Source: Census data 1940-2020 accessed through Social Explorer.

Rentership, tenure, and income are all factors that are considered markers of resilience and risk of displacement in a community. FEMA's Resilience Analysis and Planning Tool uses ownership to indicate a community's economic strength and ability to invest in the built environment and gain wealth through property (FEMA 2021). These factors can help a community to be resilient in the face of crisis, but they can also indicate vulnerability to displacement. High rentership combined with poor affordability could increase the risk of displacement, while efforts to increase affordable housing in Harlem could decrease this risk.

LOSS OF BUSINESSES

Before the emergence of large-scale housing projects, Harlem was largely home to tenement and mid-scale residential buildings, with "mom-and-pop" stores on every block. However, in order to build housing complexes, many cross streets were eliminated, allowing several blocks to be combined into a super-block. The creation of these super-blocks gradually led to the replacement of some commercial areas and eroded Harlem's local businesses.



Super-blocks led to the elimination of many cross streets. Aerials c. 1957.

The Pathmark grocery store, pictured in 2016, was an essential resource for fresh food.

Built Year	Public House	Units	No. of Buildings	No. of Stories	No. of Blocks	Stores loss	New stores
1941	East River Houses	1140	10	6,10&11	3	4	0
1948	James Weldon Johnson Houses	1310	10	14	6	175	0
1957	George Washington Houses	1515	14	12&14	7	200	0
1958	Robert F. Wagner Houses	2158	22	7&16	9	225	0
1958	George Wahington Carver Houses	1246	13	6&15	7	200	0
1959	Thomas Jefferson Houses	1495	18	7,13&14	6	170	0
1960	Benjamin Franklin Houses	1635	14	20	5	169	*
1961	Wilson Houses	398	3	20	2	120	0(30)
1962	Robert F. Taft Houses	1440	9	19	6	170	*
1963	Madison(Lehman) Houses	500	4	20	3	140	0

Data on the permanent loss of blocks and stores in Harlem before the early 1960s.
Data Source: Christopher Bell. 2012. East Harlem Remembered: Oral Histories of Community and Diversity *(Jefferson: McFarland & Company, Incorporated Publishers).*

This table shows the data on the permanent losses of blocks and stores because of public housing projects built before the early 1960s.

The loss of businesses to redevelopment continues to be a fraught issue in Harlem. The Pathmark controversy serves as an illustration of ongoing tensions. In its effort to make high density residential and commercial development more feasible, the City of New York made the site of this staple resource highly desirable and ripe for redevelopment. Just before its closure in 2015, the store served as a resource for some 30,000 customers per week. Its displacement undermined "decades" of activism and efforts on the part of the East Harlem community to bring a fresh food grocer to the area (Cohen 2018).

REDEVELOPMENT CONFLICTS

The topic of redevelopment emerged repeatedly throughout the studio team's research. Historical narratives of and justification for redevelopment, the physical complexities of changing the built environment, and the effects of past redevelopment continue to fuel public distrust today. Histories of cleanliness, contaminated sites, transportation, and energy prove that environmental injustices can be repeated and reinforced over time, even when change is advertised as progress.

CLEANLINESS AS A DRIVING NARRATIVE FOR REDEVELOPMENT

Infill and housing redevelopment, rationalized by cleanliness narratives rooted in racism, have been repeated and reinforced over time. The miasma theory, popular in the late nineteenth century, correlated bad air and noxious gasses emanating from sewage and other putrefying substances as the root of all contagious disease. Based on this prevalent medical theory, Harlem Flats was described as "a great laboratory of fever producing gasses..." containing "a sufficient supply of rotting filth to generate fetid gasses adequate to the poisoning of half the population" (Duffy 1968; Kannadan 2018).

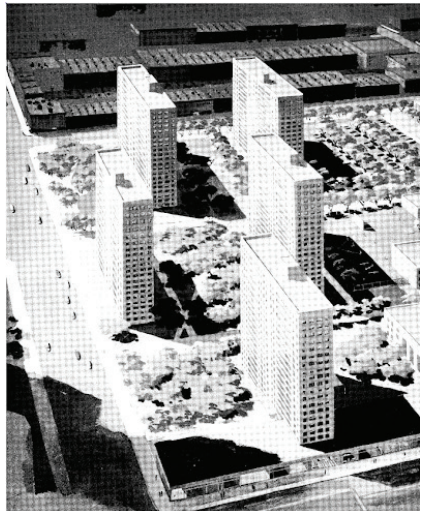
Over the course of two days in July of 1900, the health department police squad visited the region of East Harlem to sanitize two specific areas with a "germ-destroying liquid." These two areas, called Little Italy and Little Africa, were disinfected by dousing an "unknown substance," likely highly poisonous carbolic acid, which was commonly sprayed in tenement districts (Duffy 1968). Disinfecting specific quarters of the city according to the area's predominant ethnicity demonstrates the association that outside publics made with those in areas previously known for their stench (Duffy 1968). This episode framed a shifting narrative around Harlem as a germ-infested region to the outside public at the turn of the century, which would later contribute to the perception of cleanliness as one of the driving forces for future development.

Italian children in Harlem collecting horse manure on the streetc, c. 1900.

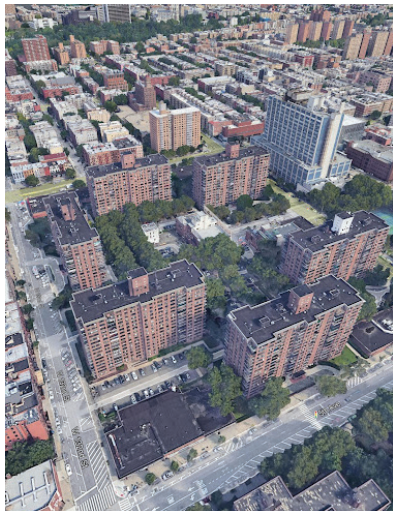
Narratives of perceived cleanliness in Harlem (or lack thereof) were repeated over decades. Government-sponsored and -distributed housing materials referred to substandard living conditions as "slums" or "blighted areas." For example, the use of the words "slum," "crime," and "disease" were used in a New York City Housing Authority and Works Progress Administration poster series promoting government "Planned Housing." This choice in rhetoric propelled a negative narrative of the predominantly Black neighborhood of Harlem, thereby othering this community by deepening the narrative of Harlem as unclean.

A collage of several posters, promoting "Planned Housing" created by the New York City Housing Authority and artists from the Works Progress Administration.

Harlem "Slum" before clearance in 1951.



Rendering by SOM within the Slum Clearance Report, illustrating anticipated new development after slum clearance, c. 1951.



Present-day aerial view of Lenox Terrace, the development that replaced the Harlem "Slum."

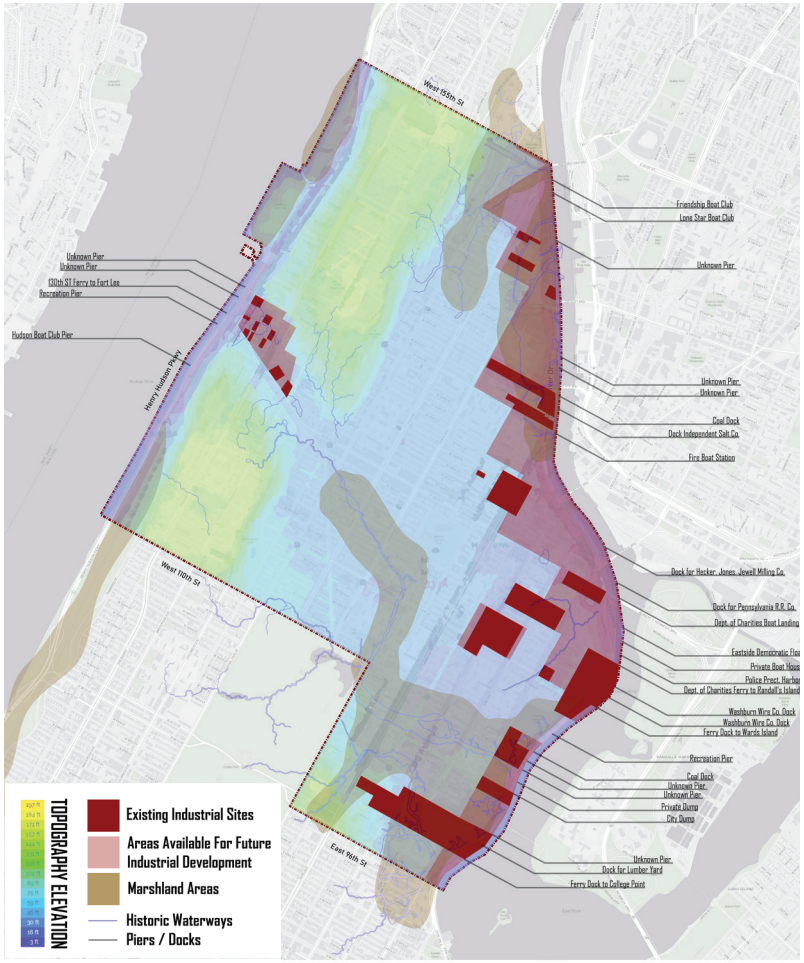
Perceptions of cleanliness can also be accompanied by other assumptions that precede a determined need for redevelopment. In 1950, the New York City Committee on Slum Clearance Plans identified seven locations throughout Manhattan as "slum" areas slated for redevelopment. Two of these seven were in Harlem. The Harlem "slum" included three blocks, where over 1,600 families lived among 164 buildings (NYC Committee on Slum Clearance Plans 1951). The need for redevelopment was driven by perceptions of factors such crowding, safety, and access to light. The slum report also used language such as "gloomy, overcrowded, poorly lighted, and unsafe" to describe the Harlem slum, anticipating that clearance, redevelopment, and modernization would introduce light, grass, trees, safety, and play, deepening the narrative of Harlem as unclean.

REDEVELOPMENT AND CONTAMINATED LAND

The studio identified forty-one brownfields in the study area, distributed among East Harlem (51 percent of brownfield sites), Central Harlem (34 percent), and West Harlem (15 percent). In characterizing the existence of these contaminated sites over time, the studio team set out to address: their relationship with industrial sites; their geographic distribution; their use over time; and their relationship with redevelopment.

Sites of contamination.

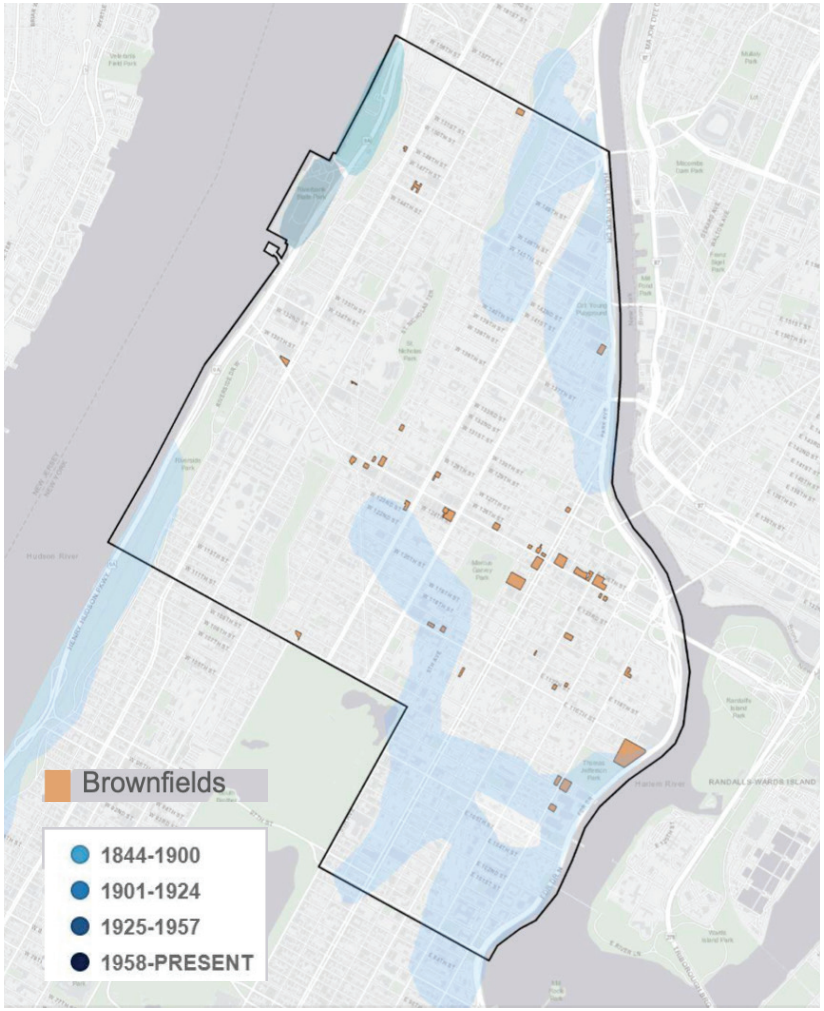
The map shows the historic concentration pattern of industrial sites. The dark red areas indicate existing industrial sites and light red areas indicate lands for future industrial development. From the map, it is clear that there are more industrial sites on the east part of Harlem than the west. By overlaying historic marshland and topographic elevation, one can see that East Harlem is at a lower elevation than West Harlem, resulting in easier and more extensive access to the waterfront and cheaper real estate for industrial land uses. A clear pattern of industrial sites adjacent to the Hudson and East Rivers is indicated by various piers and docks along both rivers between 118th and 130th Streets. Comparing this map of the historical distribution of industrial areas with the map of contaminated sites suggests a geographic overlap between the two.



Historical concentration of manufacturing industry sites.

To examine land use over time, the team examined the tax lots of brownfield sites as spaces for analysis. While this was helpful in understanding changes over time, no patterns of consistent or specific land use that may have contributed to contamination on particular sites were found.

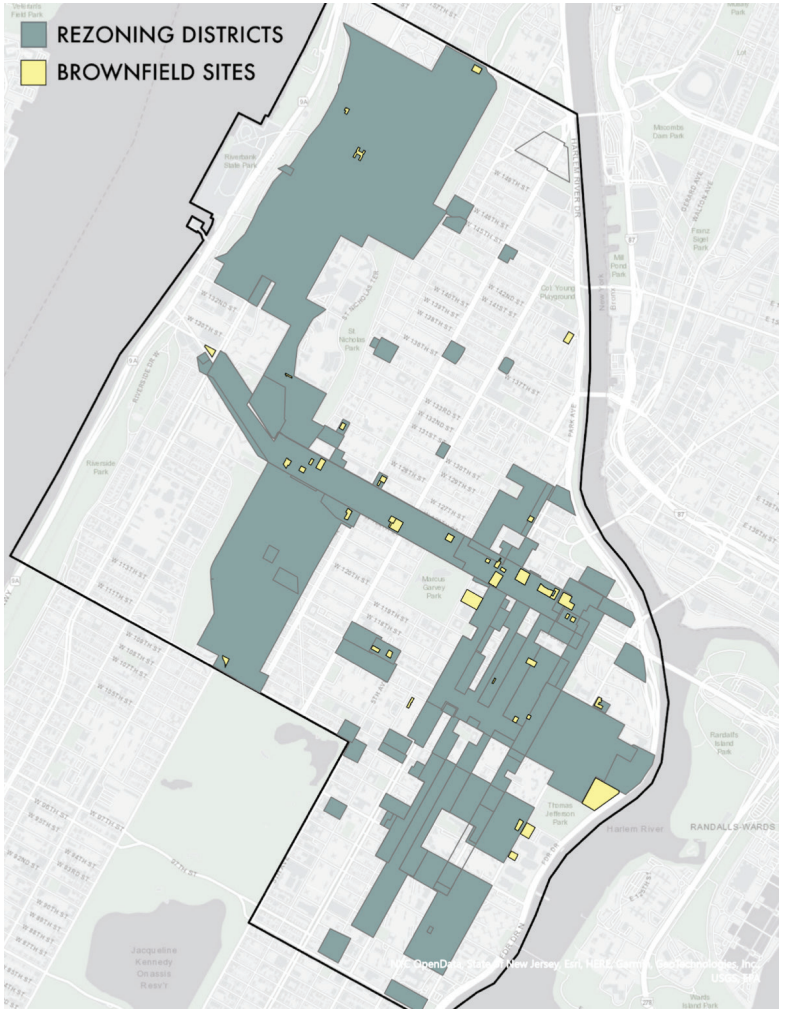
Based on the above, land use is not a clear determinant of contamination. However, studying the pattern of current contaminated sites, only 22 percent of these sites were infilled land. Although causality cannot be proven with this evidence, it is possible to suggest that redevelopment, substandard infill, and geographic patterns may be associated with these brownfield sites.



Contaminated sites and landfill.

Examination of the geographic distribution of these sites told a more defined story—that brownfields sites were geographically associated with areas slated for redevelopment.

The Brownfield Cleanup Program offers incentives that aim to facilitate the process of redevelopment. It was noted in a 2011 *New York Daily News* article that the Brownfield Cleanup Program was offering $60,000 grants to developers willing to take on these sites (*New York Daily News* 2011). Rezoning has also targeted former industrial sites that have since been categorized as brownfields. The City Planning Commission rezoned land near the East River in East Harlem between 116th and 119th Streets in 1999 (Cohen 2018).

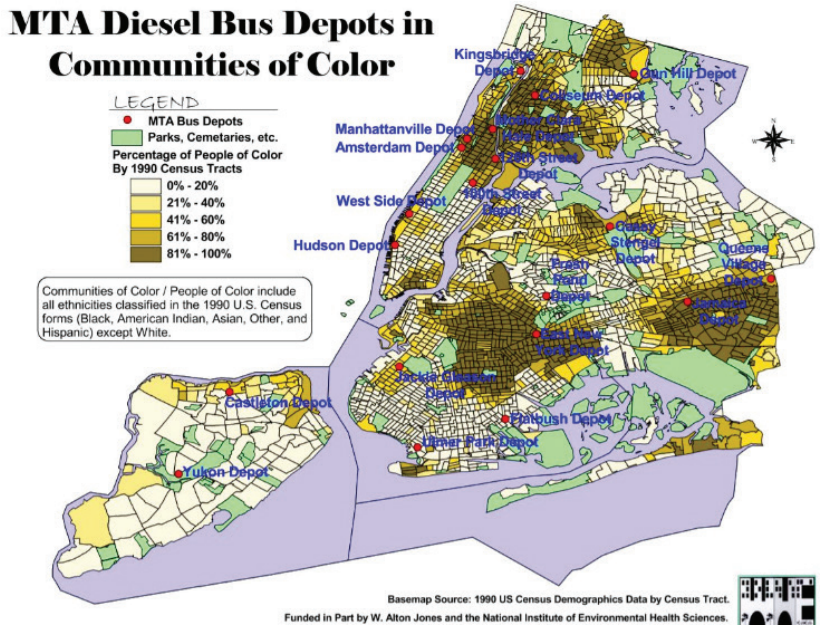


Brownfield sites relative to rezoning areas.

BURDENS ASSOCIATED WITH TRANSPORTATION

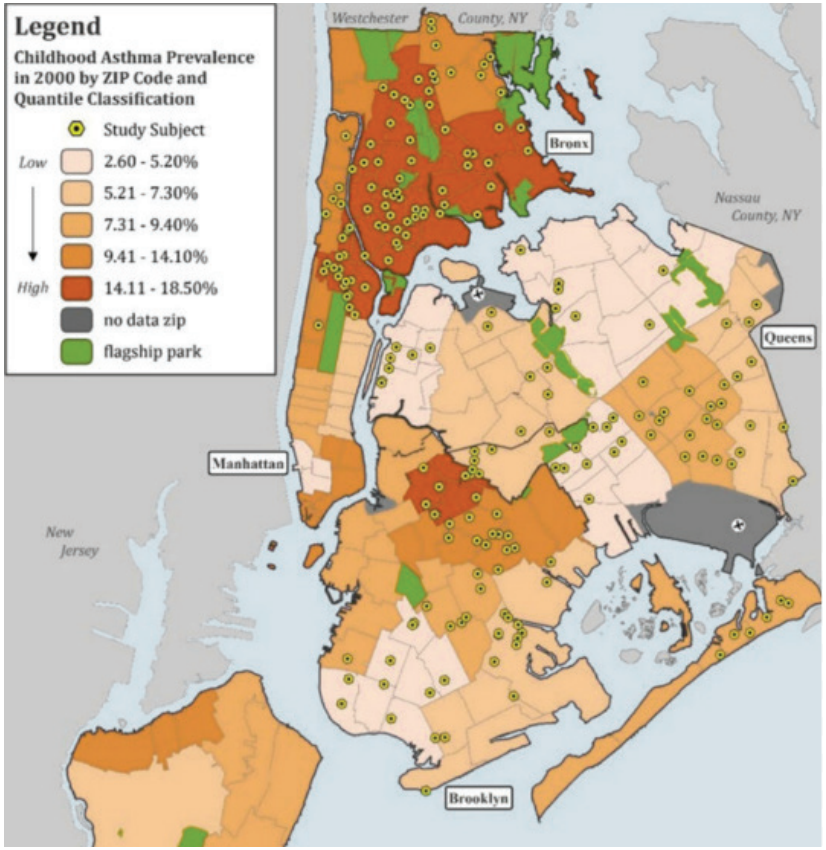
Community distrust for redevelopment does not only pertain to housing development, but also affects other projects that the community sees as a threat to Harlem's culture. In the mid-1900s, when the elevated trains were being phased out, the MTA replaced many of the routes with subway infrastructure, but never fully rebuilt the uptown Second Avenue line. Initially, the community pushed back against the decision, seeking replacement of this lost mode of transit However, as time went on, distrust of housing developers in Harlem and fears of displacement complicated potential large-scale development. Since 2018, community organizations such as WE ACT have vehemently opposed the extension of the Second Avenue line, whose construction has already begun to push out local businesses, threatening the cultural fabric and historical character of East Harlem.

Another consequence of redevelopment came in the form of bus depots, which were disproportionately located in Harlem. This map establishes the uneven distribution of MTA bus depots in communities of color across New York City. Five out of seven bus depots are located in Northern Manhattan, with four of these being located around Harlem.



Distribution of MTA diesel bus depots in NYC, c. 1990.

The location of these bus depots are the result of previous infrastructure used for trolleys. Prior to the transition to buses, there were nineteen trolley depots located around the city. When the transition began, many of the trolley depots in Harlem and northern Manhattan were repurposed as bus depots, while depots in downtown and lower Manhattan became makerspaces and shops. This disparity meant that the previously shared burden of depots was now disproportionately placed on Harlem, exacerbating air quality inequities. Contemporary studies of asthma rates in Harlem have verified the concerns about bus depots contributing to Harlem's poor air quality. The accompanying map shows the distribution of asthma in children around the entirety of New York City, illustrating the concentration of asthma within our study area, predominantly in Central and East Harlem.



Asthma prevalence by neighborhood for children in 2000.

ENERGY TRANSITIONS

While transit changes contributed to pollution in Harlem, so did various heating fuels. As mentioned previously, Harlem residents were often at the will of their landlord for heating changes on a building-by-building basis. Conversions were often expensive and not carried out until absolutely necessary, causing slow fuel changes (Pontecorvo 2019). Many landlords wait to transition heating types until existing boilers reach the end of their lifespans and require replacement (approximately fifty years), so the delayed transition from coal in the 1960s and 1970s has repercussions today. Harlem is still transitioning from heating oil to natural gas, while the next shift toward renewable energy has already begun elsewhere in the city (Mailman School of Public Health 2018).

While energy changes often happened on a building by building basis, there were also large-scale projects that advertised new energy amenities to the community. Many of the developments mentioned previously, such as the Dunbar Apartments and the Harlem River Houses, were advertised as addressing Harlem's poor housing stock with the inclusion of hot water, electricity, and heat (*New York Age* 1937). Redevelopment projects brought new energy amenities, but also displaced many residents and businesses. These clearance efforts were later justified by the apparent success of these developments. While the Harlem River Houses were seen as successful, they were referred to at the time as "only one drop" in comparison to the larger number of housing units that needed updating (*New York Amsterdam News* 1937a).

The Dunbar Apartments, built between 1926 and 1928, included many energy amenities, then lacking in many houses in Harlem.

The Harlem River Houses, built between 1937 and 1937, were a progressive housing project, including hot water, heat, and electricity.

Despite the City's acknowledgement that updating current housing would be beneficial, rehabilitation efforts were often undermined in favor of redevelopment, against community wishes (Schumach 1970). While rehabilitation avoided large-scale displacement, City and government actors feared that it would only be a temporary fix for housing stock and preferred redevelopment. The rehabilitation of the 114th Street Tenements, which was mentioned previously as being somewhat unsuccessful, was one of the very few rehabilitation efforts that attempted to address energy (Goldstein 2019).

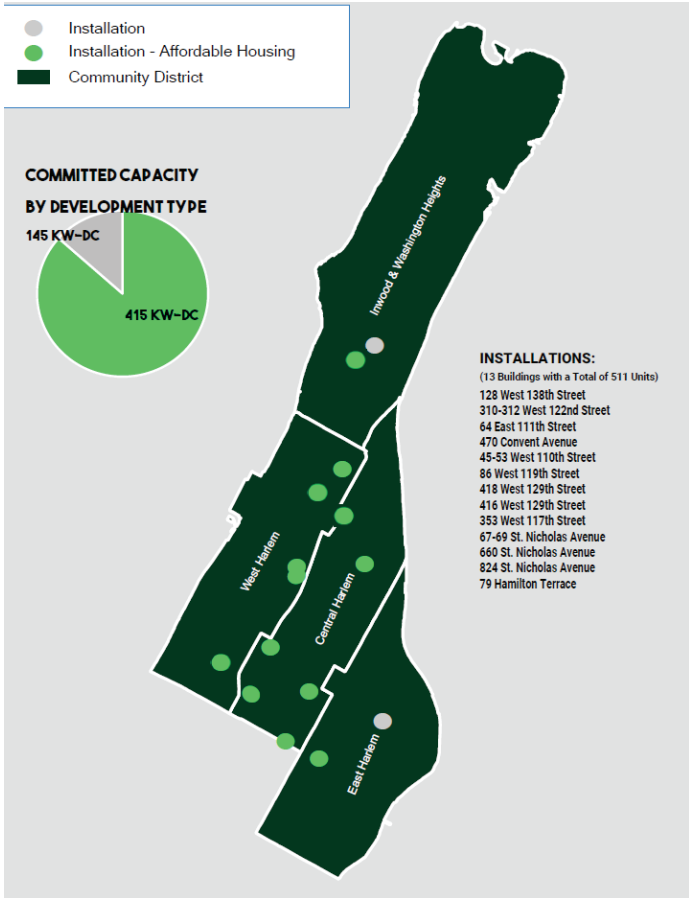
The interior rehabilitation discussed in The House on 114th Street *included the addition of new energy amenities, c. 1968.*

Efforts to rehabilitate Harlem's housing came to fruition much later in the 1990s, but these efforts were controversial, as they served a more economically diverse range of tenants, increasing the number of middle class residents in Harlem (Goldstein 2017, 199). This tug-of-war that occurred between redevelopment and adaptation shaped the built environment in Harlem and played a large role in the communities' view of both adaptation and redevelopment in the modern day.

The battle between redevelopment and rehabilitation emerges again in renewable energy options today. There are two community-based renewable energy options for Harlem: solar and geothermal. The solar energy program in Harlem is mostly led by WE ACT. They identified the need for energy independence as a priority in Northern Manhattan, where high costs, limited roof space, and high rentership rates have led to limited community input in energy resources (Callaway, n.d.). So far, solar energy faces the same repeated historical difficulties of building-by-building energy transitions. WE ACT is attempting to break the pattern by linking solar energy to multi-family affordable housing, using financial incentives where possible, and creating green jobs in the community.

Aside from building-by-building transitions, geothermal energy is more promising in achieving large-scale energy reform. Geothermal heating and cooling is a highly efficient and clean technology, but remains largely underutilized in New York City (Harlem World Magazine 2021). Recently, the city has accepted and advertised geothermal as a viable option uptown, but there is only one existing geothermal-powered townhouse at 118th Street in Harlem (Ulysses 2014). Given the growing work in decarbonization and electrification, a geothermal district demonstration project—One45—was planned in Harlem, but it has repeated past issues of integrating energy changes into large-scale redevelopment. Such a "demonstration" project faced strong opposition from the local community with a distrust of development because of its potential to dilute the Black voting bloc, create an influx of people with higher income, and cause displacement (Benitez 2022). This raises the question of if geothermal energy could be used in future equitable development.

The first and only existing geothermal townhouse in Harlem.



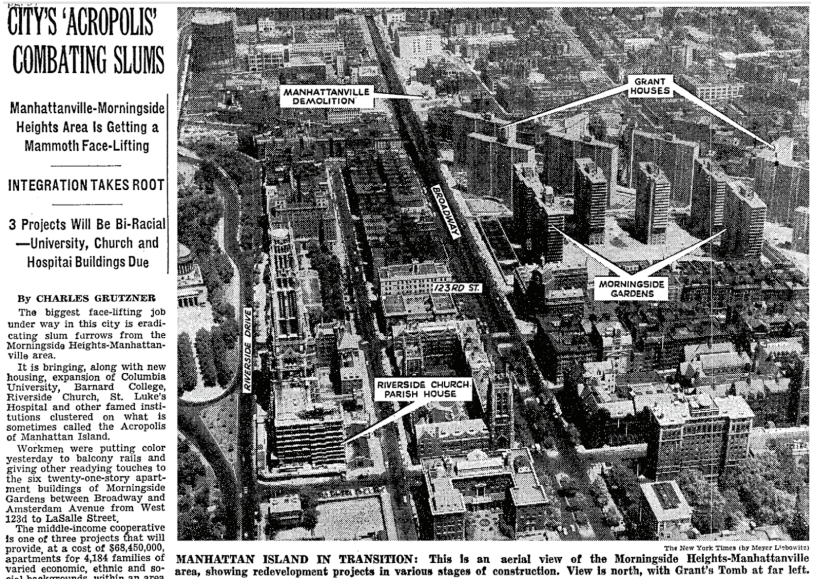
So far, solar energy covers thirteen buildings with 511 units in northern Manhattan.

A geothermal energy system is included in the proposed One45 project, to be built beneath the towers.

HISTORICAL PRECEDENTS FOR COMMUNITY DISTRUST

Modern redevelopment projects such as the Second Avenue Subway and the One45 development faced public criticism, but this distrust is largely rooted in historical precedent. In West Harlem, the major actors in displacement were Columbia University and Morningside Heights, Inc. created its own blight reports to justify the demolition of large sections of West Harlem (Hepner 1955). Community members, with the help of the Architects Renewal Committee in Harlem, fought against demolition and argued for the rehabilitation of poor housing stock. However, Morningside Heights, Inc. went forward with the demolition of residential units and turned them into student and middle-income housing (Shapiro 1966). These efforts threatened low-income tenants and people of color. While the new housing developments claimed they would give preference to displaced residents for apartments, the price of new units were too high for the area's previous tenants. Today, the university is still seen as a powerful entity that makes unilateral decisions without sufficient community collaboration.

Preliminary sketch from the Blight Report created by the Morningside Heights, Inc. Development Corporation used to justify large-scale redevelopment in the area, c. 1950.



CITY'S 'ACROPOLIS' COMBATING SLUMS

Manhattanville-Morningside Heights Area Is Getting a Mammoth Face-Lifting

INTEGRATION TAKES ROOT

3 Projects Will Be Bi-Racial —University, Church and Hospital Buildings Due

By CHARLES GRUTZNER

The biggest face-lifting job under way in this city is eradicating slum furrows from the Morningside Heights-Manhattanville area.

It is bringing, along with new housing, expansion of Columbia University, Barnard College, Riverside Church, St. Luke's Hospital and other famed institutions clustered on what is sometimes called the Acropolis of Manhattan Island.

Workmen were putting color yesterday to balcony rails and giving other readying touches to the six twenty-one-story apartment buildings of Morningside Gardens between Broadway and Amsterdam Avenue from West 123d to LaSalle Street.

The middle-income cooperative is one of three projects that will provide, at a cost of $68,450,000, apartments for 4,184 families of varied economic, ethnic and so-

The New York Times (by Meyer Liebowitz)

MANHATTAN ISLAND IN TRANSITION: This is an aerial view of the Morningside Heights-Manhattanville area, showing redevelopment projects in various stages of construction. View is north, with Grant's Tomb at far left.

New York Times *article displaying the extent of redevelopment around the Columbia University campus, c. 1957.*

In addition to its role in the redevelopment of Morningside Heights, the City of New York was the major developer in Central and East Harlem for much of the twentieth century. As discussed previously, the City's slum clearance and urban renewal projects were major drivers of redevelopment until the 1980s. After this time, community development corporations drove the rehabilitation of Harlem after disinvestment from 1970 to 1990 (Goldstein 2017, 200). While these corporations were often created by community actors, such as church groups, they were increasingly dependent on private investment to achieve rehabilitation and redevelopment. This increasing role of the city and private developers once again sparked distrust within the community (Williams 2008).

An example of one such corporation is the Abyssinian Development Corporation (ADC), formed out of the Abyssinian Baptist Church in the late 1980s. The ADC is credited for being a major driver in the revitalization of Harlem, but it is critiqued for creating changes in the community that favored chain stores over small businesses (Williams 2008). The ADC acquired the historic Renaissance Ballroom and Casino and then sold it to outside developers in 2014. The developers went on to demolish the building to build condominiums (Gregory 2014b). This example is one of many in a pattern of outside actors redeveloping areas of Harlem in a way that ignores the needs of the most vulnerable parts of the community, further perpetuating distrust within the community.

The Renaissance Ballroom and Casino photographed in 1925 was a cultural hub for Harlem.

Protest outside the Renaissance Ballroom and Casino against the building's sale and consequent demolition.

OPEN SPACE DISPARITIES

The creation, access, and management of open and green spaces has always been a key environmental justice issue. Open spaces are important assets to the community, since they protect a community's natural green infrastructure, supply areas for recreation, provide important environmental and ecological functions, and improve residents overall quality of life (U.S. Environmental Protection Agency 2021). The definition of "open space" in this report includes any piece of land that is accessible to the public, such as parks, community gardens, green resources, waterways, and entertainment facilities.

In Harlem, only a number of formalized open spaces have existing historic preservation protections. Three major Harlem parks are protected by New York City's landmarks law, including Riverside Park, Morningside Park, and Jackie Robinson Park. Additionally, the Thomas Jefferson Pool building is also protected, but not the surrounding green space. Most interestingly, a number of critical community green spaces are not protected, including Marcus Garvey Park (only the park's firetower is protected) and St. Nicholas Park. Newer parks like Riverbank State Park are also unprotected, despite their clear ties to histories of environmental justice.

Map of Upper Manhattan, illustrating the Battle of Harlem Heights. c. 1776.

Prior to colonial settlement, the Lenape had large farmlands, planting fields, and fishing camps throughout Harlem. Harlem's ecosystem changed dramatically after the first colonial settlement in Harlem in 1639 (K. Williams 2015), which established more formalized farmlands.

The Commissioner's Plan of 1811 subdivided the farming communities into smaller lots for sale (Harrison, Noonan, and Presa 2015). Exclusivity and private ownership took over, causing displacement and reduced public open spaces. Public spaces were created for air circulation, yet they did not benefit all equally and were primarily located on private property (McNeur 2014). While the Commissioner's Plan of 1811 included Mount Morris (now Marcus Garvey) Park, it did not include many of the other parks that were built in the nineteenth century and would eventually come to define Harlem, including Morningside Park and St. Nicholas Park. In the twentieth century, improvements to Riverside Park, the expansion of Jackie Robinson Park, and the creation of Riverbank State Park would expand park access to Harlem residents. In the twenty-first century, new parks along the Hudson and Harlem Rivers, as well as expanded public plazas (such as Montefiore Square), have continued the trend of increasing open space access.

An illustration created by William Wade from 1845 illustrates the abundance of trees and green spaces in Harlem compared to the rest of Manhattan. Its abundant greenery illustrates that Harlem experienced urbanization later than lower Manhattan.

Abundance of trees in Harlem, c. 1845.

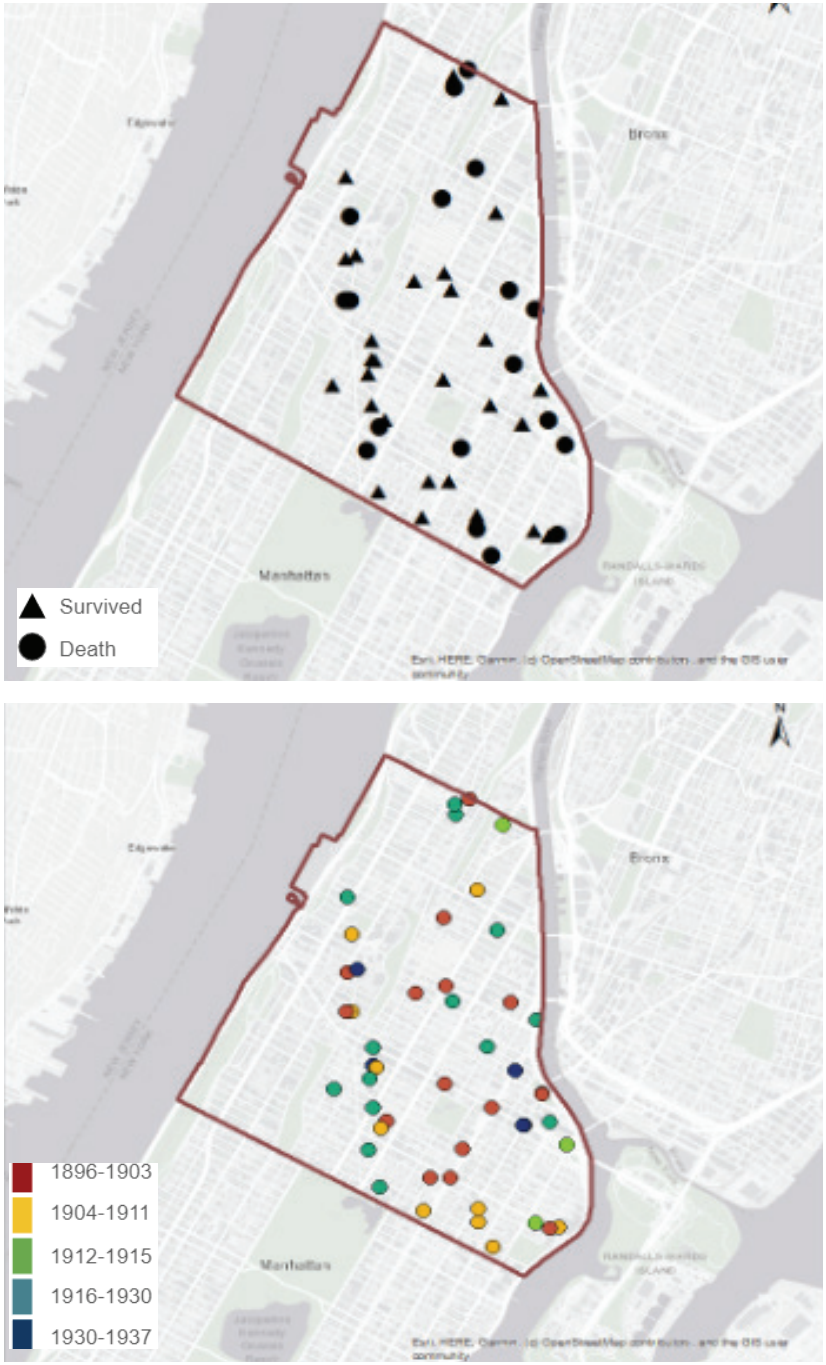
Commissioner's Plan of Manhattan from 1811.

PUBLIC PARKS, PLAYGROUNDS, AND COMMUNITY GARDENS

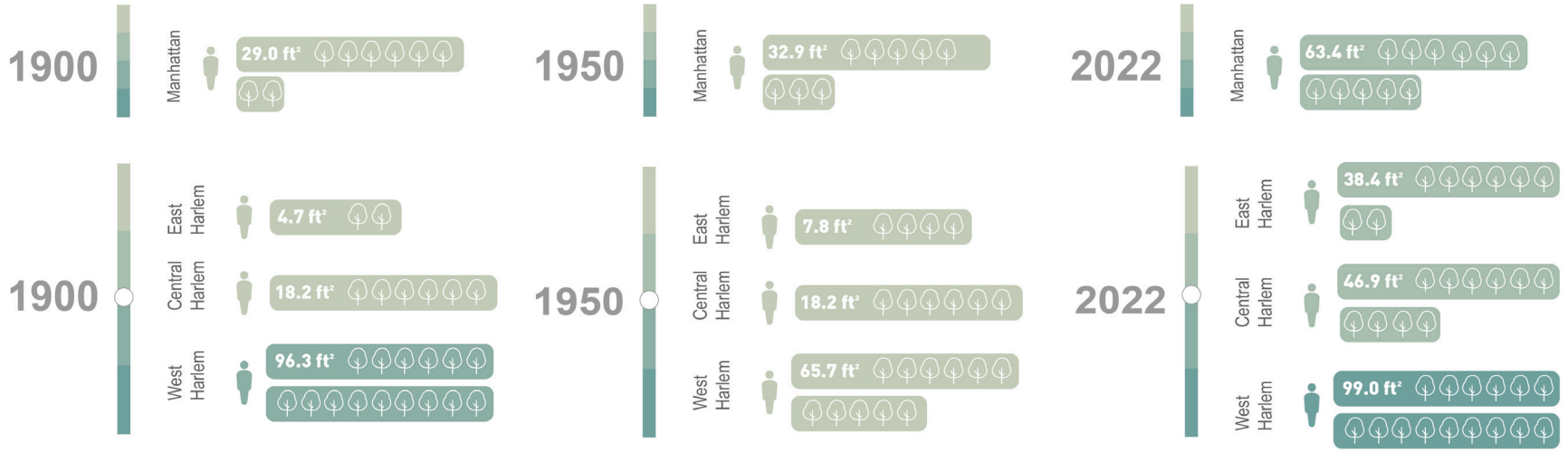
By 1900, Jackie Robinson Park, Morningside Park, St. Nicholas Park, and Marcus Garvey Park had been created. However, there was still not enough open space in Harlem, and what existed was not equally distributed (Slum Clearance Committee of New York 1934). The Children's Aid Society in 1930 estimated that Central Harlem comprised only 15 percent of the recreational facilities that its population required (*New York Times* 1930). Children were put at risk as they were forced to play on the street and sidewalks. The *New York Times* featured a map in 1930 illustrating 340 street deaths of children that were killed by cars, largely concentrated in Harlem.

The issue of open space distribution is essential to explore following the findings on the lack of public gathering facilities in the past, which forced residents in East and Central Harlem to hold events in informal places like undeveloped lands, sidewalks, and streets. Additionally, the studio team found evidence in historical media of extreme heat vulnerability in those neighborhoods, indicated by accounts of heat prostration, with victims concentrated in East and Central Harlem. Even recently, an article from *New York Times* mentioned that East Harlem is thirty-one degrees hotter than Central Park West, which adds to the importance of understanding the bigger picture of open space as a heat mitigation resource during extreme weather (Leland 2021).

To analyze the adequacy of available open space, the studio team used the World Health Organization (WHO) city plan requirement for open space area per person as a standard to examine whether Manhattan and Harlem have met the needs of their residents. The WHO suggests a minimum of 96.8 square feet per resident (WHO Regional Office for Europe 2010). In order to explore the relationship between green space and demography, atlases, NYC open data, and social data from NHGIS were used to construct historical information from 1900 to 2022. Due to data availability, 1900, 1950, 2000, and 2022 were chosen as points in time to study and analyze. Utilizing this method, the team found that even in Manhattan in general, the amount of open space area is still far from enough, but there has been significant increase over time. It is also essential to mention that the New York City government set an "open space goal" in 2014, which suggests that there should be 108.9 square feet of open space per resident, which is an even farther goal from the current condition (NYC Mayor's Office of Environmental Coordination 2014).



Maps on heat prostration shows historic heat victims across the study area between 1880-1940.



Disparity in open spaces in Harlem, 1900-2022.

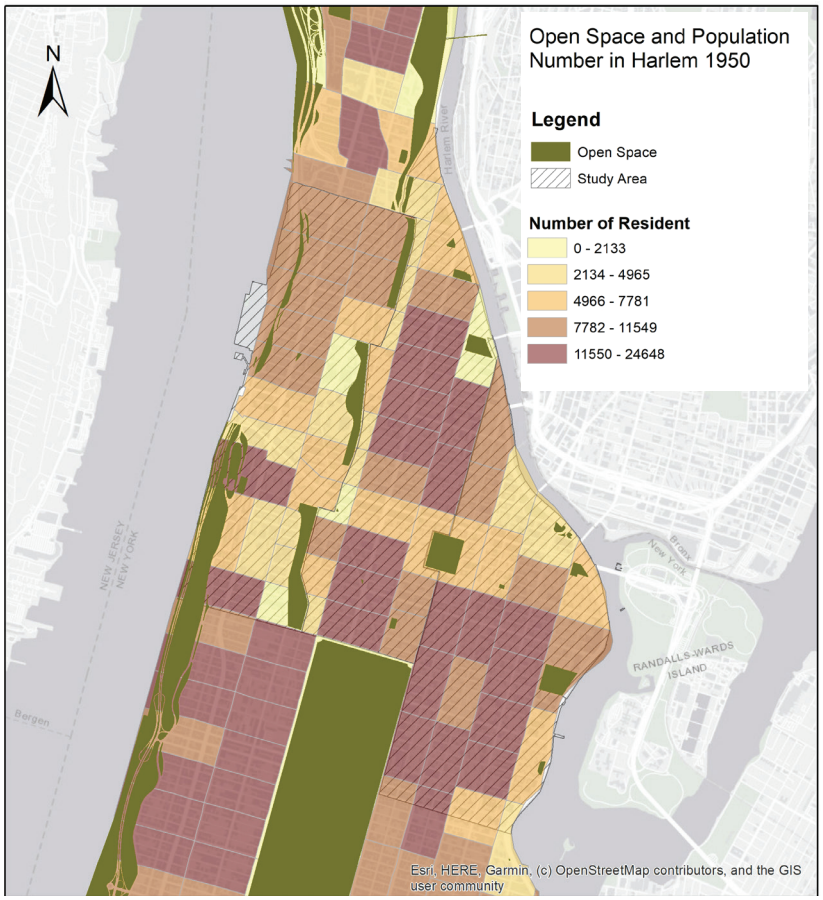
Similar to Manhattan, the open space area in some parts of Harlem are insufficient relative to their residents. In 1900, East and Central Harlem were very inadequate in green space. During this period, East Harlem had 4.7 square feet of green space per person, and Central Harlem had 18.2 square feet of green space per person. However, West Harlem had 96.3 square feet of green space per capita, close to the WHO standard.

The number of residents in 1950 appeared to increase significantly. Based on this change, the open space per capita dropped abruptly for West Harlem, which almost had sufficient open space in 1900. There were no significant changes in East Harlem and Central Harlem. East Harlem only increased from 4.7 to 7.8 square feet per resident, and Central Harlem did not have any improvement in ratio, maintaining the 18.2 square feet per capita. Considering the WHO and NYC Government goal standards, this was still very far from the required amount.

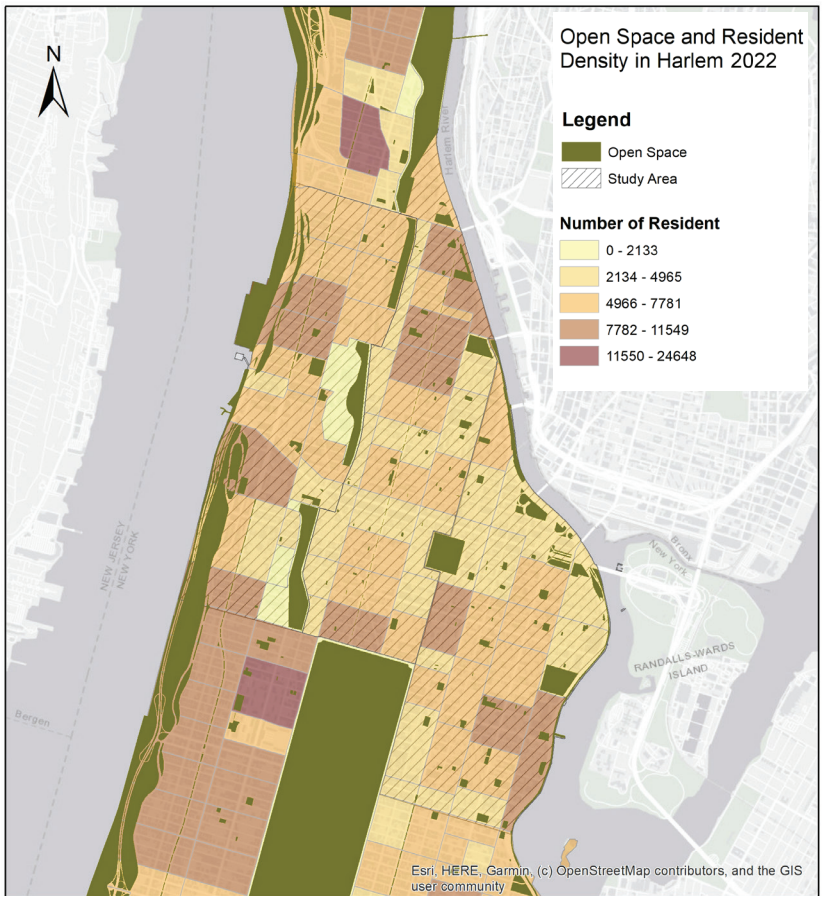
By 2000, the area of green spaces had not changed mucht. However, there was a drastic decrease in the number of people. Therefore, the green space per capita increased. Although the situation was better than in 1950, it was still insufficient. This was especially the case in East Harlem, which had 12.7 square feet per resident, and Central Harlem which had 39.3 square feet per resident. Meanwhile, West Harlem's situation clearly improved, increasing to 93.6 square feet per resident, close to the standard.

Finally, based on the current open space distribution and resident number, West Harlem reached 99 square feet per capita. This fulfills the amount of open space required by WHO, but still needs improvement to reach the NYC government goal. On the other hand, it shows how East Harlem and Central Harlem are still far from providing their residents with adequate open space. Even though the ratio of open space per resident has almost tripled from 2000, East Harlem encompasses less than 40 percent of the WHO open space standard, still a lower bar than the NYC government goal. Even worse, the ratio in Central Harlem decreased from 39.3 square feet per person in 2000 to 38.4 square feet per person.

The disparity of green spaces in Central Harlem and East Harlem in comparison to West Harlem is apparent over the time period chosen for this study. East Harlem's green space ratio was abysmal, especially in 1900, showing the evidence of green space inadequacy in historical context. Meanwhile, West Harlem appears to be the only neighborhood that has almost enough green space per capita according to the WHO standard and NYC government goal. The only time the ratio in West Harlem was insufficient was in 1950, but this was due to the population increase. There has been, however, a significant improvement in East Harlem's ratio between 1950 and 2022, during which time the ratio tripled. During this same interval, Central Harlem also showed progress wherein the ratio has doubled.



Lack of green spaces in the entire Harlem neighborhood.



Formal parks: Community gardens and green spaces.

The significant improvement in East Harlem and Central Harlem's green spaces is closely linked to the development of community gardens, mainly initiated during the 1970s by Liz Christy and the Green Guerillas to mobilize people to transform unofficial public spaces filled with trash into community gardens (NYC Dept. of Parks and Recreation, "History of the Community Garden Movement," n.d.). The map shows the area of the green space in 1950, before community garden initiatives, which portrays the green spaces available in Harlem as only consisting of parks, and very inadequate in amount.

In the 2022 map, it is noticeable that many smaller green spaces, including community gardens, were developed in East Harlem and some parts of Central Harlem. These additional resources tripled the green space per capita in these neighborhoods, meaning that this change in ratio was mainly driven by community members, as part of their fight against a system of oppression and marginalization in green space distribution.

Parks have also been a critical community resource for Harlem as a space of convening and social interaction. Marcus Garvey Park is one such example. Marcus Garvey Park was home to the watershed 1969 Harlem Cultural Festival, which celebrated African American culture and pride (Brooks 2019).

Open spaces in Harlem, such as parks and playgrounds, have been the subject of historical and ongoing restorative justice activism. WE ACT's advocacy during the construction of the North River Plant led to the creation of Riverbank State Park on top of the existing treatment plant. Today, acts of restorative justice in open spaces are ongoing, such as in the renaming of public parks and the Trust

for Public Land's NYC Playgrounds initiative. The NYC Trust for Public Land (TPL) revitalizes playgrounds, mostly schoolyards, to become vibrant community hubs, open to the public after school hours and designed to meet the needs of neighbors as well as students. Playgrounds play a vital role in mitigating climate change, capturing stormwater to reduce flooding, and combating the urban heat island effect. In recognizing the critical lack of open space in East Harlem, the TPL seeks to rectify this disparity as a form of restorative justice for the community.

Harlem Cultural Festival on 128th Street, c. 1967.

Harlem Cultural Festival, c. 1969.

Students at the Academy of Environmental Sciences in their new flood-resistant schoolyard, East Harlem, c. 2006.

TREES

Trees served as an important green resource in Harlem. Although street trees were historically seen as a private possessions throughout Manhattan, they were planted in public spaces with public access. Yet, in 1791, the Common Council of New York put a ban on street trees, indicating that they damaged sidewalks, impeded street traffic, and endangered people and vehicles (McNeur 2014). The ban on street trees was lifted in the 1830s, given the new creation of public parks (McNeur 2014). Later, The Tree Planting Association, a civil organization, took the responsibility to advocate for street tree plantings (Dümpelmann 2019).

In the late nineteenth century, mainly civil organizations advocated for street trees. The Parks Department had little authority over street trees in the beginning of the twentieth century, limited to providing assistance to private organizations and individuals to plant trees (Page 1999).

A poignant example of the lack of government stewardship of trees in the early twentieth century is the Tree of Hope. It was planted during the 1920s in Harlem in front of the Lafayette Theater at 131st Street and Seventh Avenue, known as the Boulevard of Dreams, as a symbol of luck and possibility. It was chopped down in 1934, due to the widening of Seventh Avenue. The Tree of Hope was a promise for Harlem, yet was taken away from the community (Troshynski 2020). In 1971, Algernon Miller created a permanent sculpture to memorialize the Tree of Hope (NYC Dept. of Parks and Recreation, "NYC Public Art Map," n.d.).

The Tree of Hope, c. 1920-1930.

The Tree of Hope sculpture by Algernon Miller, c. 2004.

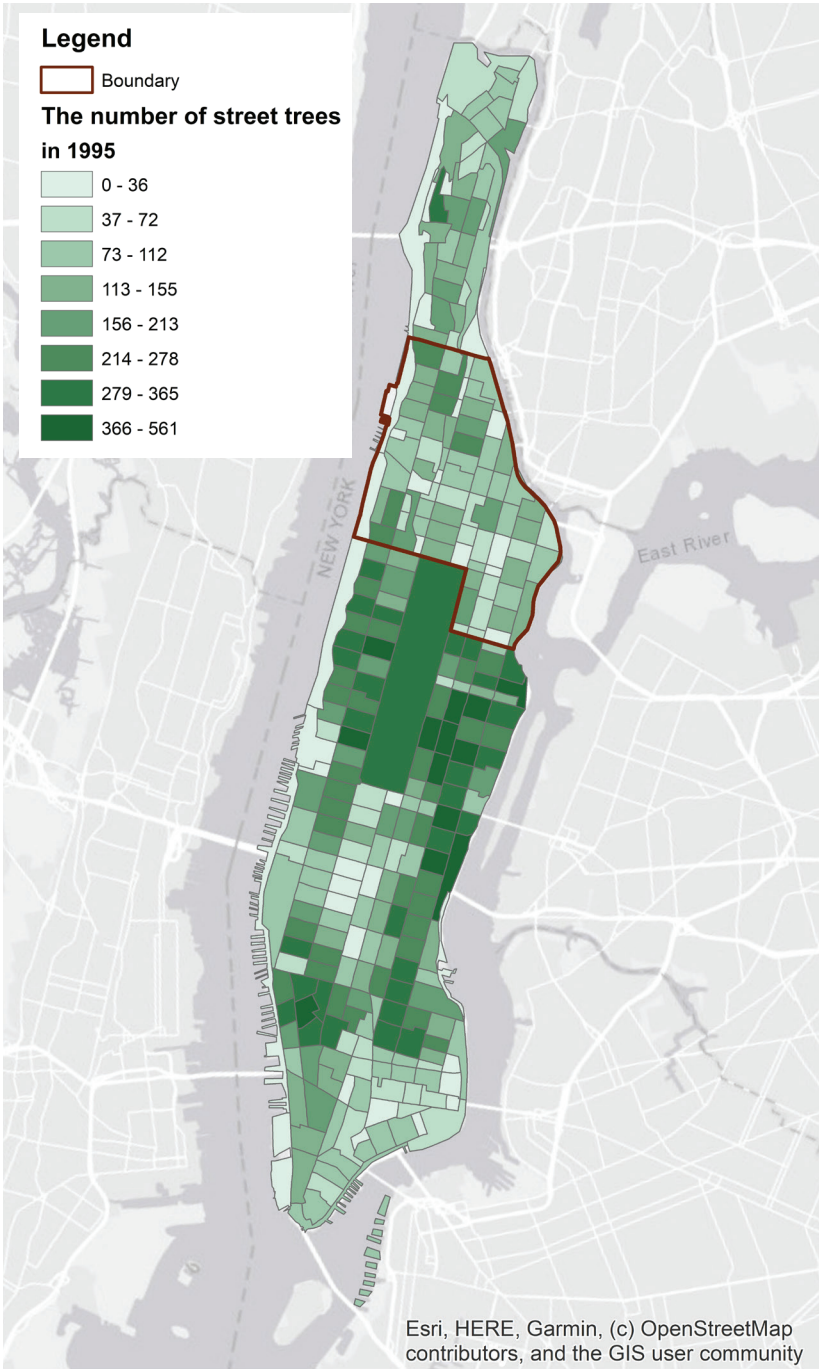
Children at the tree trunk of the Tree of Hope, c. 1937.

Distribution of NYCHA trees, street trees, and park trees.

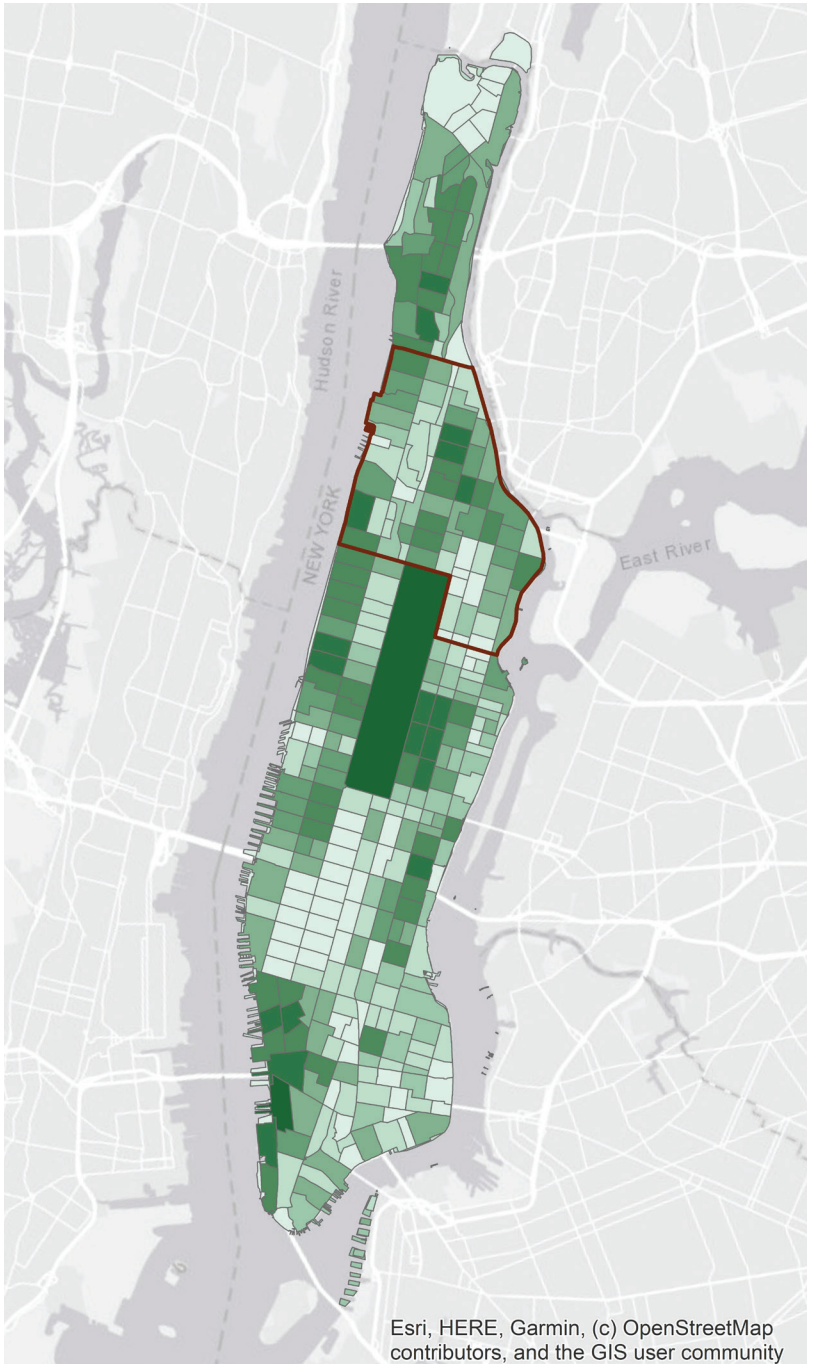
In the late twenty century, the government became the major protector of green resources. In 1984, the Natural Resources Group was established in the NYC Parks Department to develop strategies to conserve park areas (Page 1999). Tearing down trees newly required consent from the Parks Department (Page 1999), and the Parks Department had jurisdiction over all the trees in public spaces, including streets, parks, and public housing properties.

In 2007, the Million Trees NYC initiative was launched by the Parks Department with non-governmental organizations to plant new trees across the city. The number of street trees in Harlem in 1995 was less than that in the Upper West Side and Upper East Side. In 2015, when the initiative finished, the number of street trees in Central Harlem increased, but some areas in East Harlem still lacked street trees, suggesting ongoing disparities.

Trees were planted around public housing developments since the 1950s, which makes NYCHA trees especially important in neighborhoods lacking open spaces. (NYCHA 2021a). In East Harlem, NYCHA is a predominant tree "provider," compensating in part for the areas lack of parks.



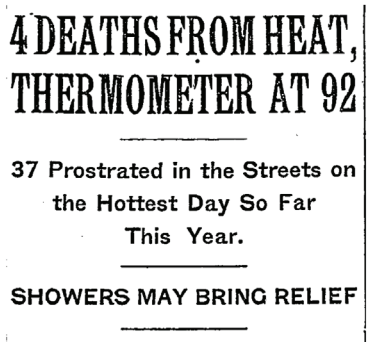
Density of street trees in Manhattan in 1995.



Density of street trees in Manhattan in 2015.

HEAT VULNERABILITY AND COOLING

Harlem has been documented to have high vulnerability in extreme heat conditions and is one of the warmest neighborhoods in New York City (Vant-Hull et al. 2014). As wind generally moves from south to north during a heatwave, buildings on the southern end of Manhattan warm the wind before it reaches Harlem to the north. Additionally, as aforementioned, there is a 30- to 35-meter ridge on the west side of Harlem. This reduces the velocity of the prevailing surface wind when it reaches the district and contributes to a heat island effect, which is particularly pronounced in East Harlem (Ramamurthy et al. 2017).



4 DEATHS FROM HEAT, THERMOMETER AT 92

37 Prostrated in the Streets on the Hottest Day So Far This Year.

SHOWERS MAY BRING RELIEF

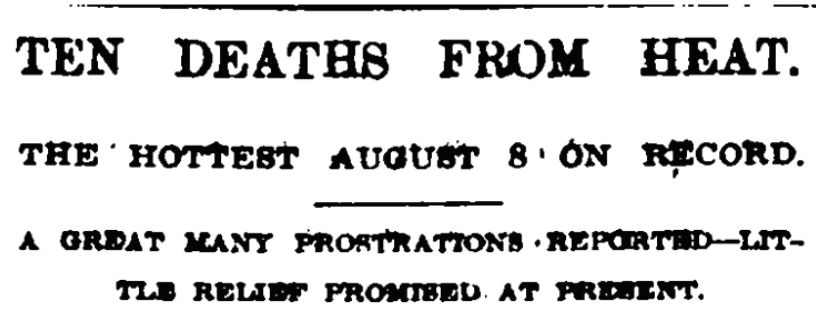
Heat prostration reports in historical newspapers about heat victims in Harlem, c. 1905.

DEATH IN HEAT WAVE OF RECORD INTENSITY

First Time 91 Degrees Has Been Registered on May 20.

Three Persons Fatally Affected—Short Downpour of Rain Skipped Harlem and the Bronx.

Heat prostration reports in historical newspapers about heat victims in Harlem, c. 1903.



TEN DEATHS FROM HEAT.

THE HOTTEST AUGUST 8 ON RECORD.

A GREAT MANY PROSTRATIONS REPORTED—LITTLE RELIEF PROMISED AT PRESENT.

Heat prostration reports in historical newspapers about heat victims in Harlem, 1896.

Harlem Gasps for Cool Breath of Air on Hot Nights After Weather Prophet Orders Worst

Those With Money Go to Beaches, but the Poor and Lowly Creep to Piers and Parks to Await Morning

ST. NICHOLAS PARK, with its cooling green, draws its share of Harlemites nightly. Here are a few trying to escape the heat.

Eastern Features Photo.

the scene a faint illumination. The crowds here seem younger—a little less tired. Here and there a ukelele twangs—three or four youthful swim-

ble forests of radio aerials like wearied travelers lost and exhausted in the wilderness of some futuristic jungle. Conversations here are usually

Newspaper article reporting Harlem residents sleeping in parks to escape extreme heat inside their houses, 1931.

Many sources portray how Harlem residents have struggled to stay cool during the hot weather. Historically, Harlem residents have escaped hot temperatures in their homes by sleeping outside during the night. They utilized open spaces, rooftops, and fire escapes in an attempt to sleep more comfortably. It is also crucial to understand the inequalities of heat. The author of a *New York Amsterdam News* article from 1931 wrote: "those with money go to beaches, but the poor and lowly creep to piers and parks to await the morning," amplifying how heat mitigation injustice was apparent in the past (Poston 1931).

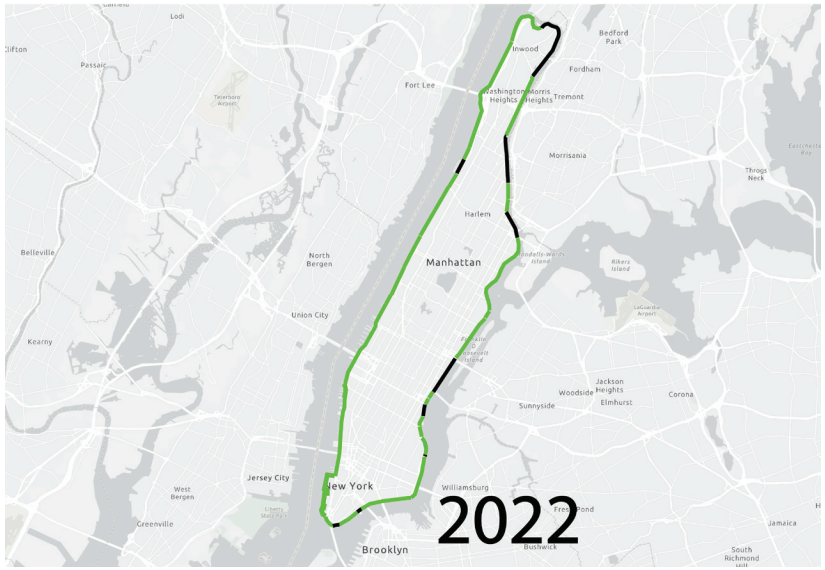
The heat risk in Harlem increased the urgent need for cooling facilities in this neighborhood, including water sources. While trees have historically been used for shade to cool the air, natural waterways were also seen as both a recreational asset and a cooling resource in Harlem. Reports from the nineteenth century document the many swimming competitions held in the Harlem River (*New York Tribune* 1885).

However, over time, swimming in New York City's natural water bodies was gradually restricted due to both drowning dangers and increased fear of pollutants. By 1937, the city health commissioner officially prohibited swimming in areas including the East Harlem and Hudson Rivers (*New York Amsterdam News* 1937b). Not only had the water become dangerous through pollutants, but access was severely restricted through industrial development and highway construction. Where water had once been perceived as a recreational resource, it was now the subject of environmental fear and criticism.

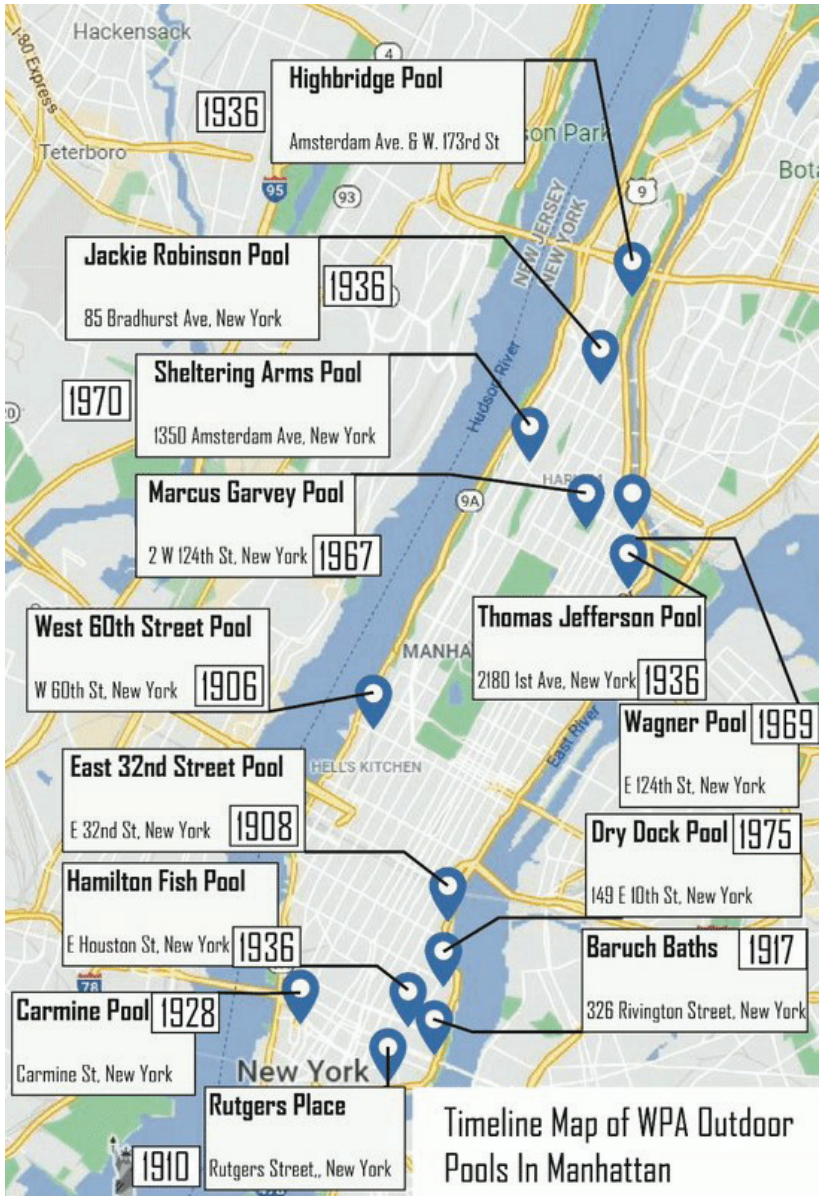
Historically, parts of Manhattan's waterfront have had formalized public park-based access for hundreds of years, dating to Battery Park in the eighteenth century. However, northern Manhattan, including parts of the studio study area, still has no parks providing access to the waterfront. In particular, East Harlem is severely lacking in formalized park access to the Harlem River.

Over the past twenty years, large portions of Manhattan's west and east sides were afforded improved waterfront access through riverside greenways. The fact that parts of Harlem's waterfront still lack a park is a clear environmental injustice. However, there has been some progress, including the new West Harlem Piers and a small portion of new parkland along the Harlem River. Additionally, there is planned and ongoing construction to complete additional portions of the Harlem River Park.

The establishment of public pools also portrays how authorities perpetuated the unequal distribution of cooling facilities and entertainment. One newspaper article from 1936 reported heat prostration casualties and the lack of public cooling facilities in Harlem with the caption, "Cooling Spots for Grownups Hard to Find" (*New York Amsterdam News* 1936). Jackie Robinson Pool is documented as the first public pool open for adults in Harlem, meaning that this type of cooling facility was not available before 1936. Considering that the first pool built in Manhattan was the West 60th Street pool, developed in 1906, cooling facility and public space development in Harlem lagged behind other areas of the island.



Formalized waterfront parks (in green) and areas without a waterfront park (in black) in 2022.



Public outdoor pool timeline map.

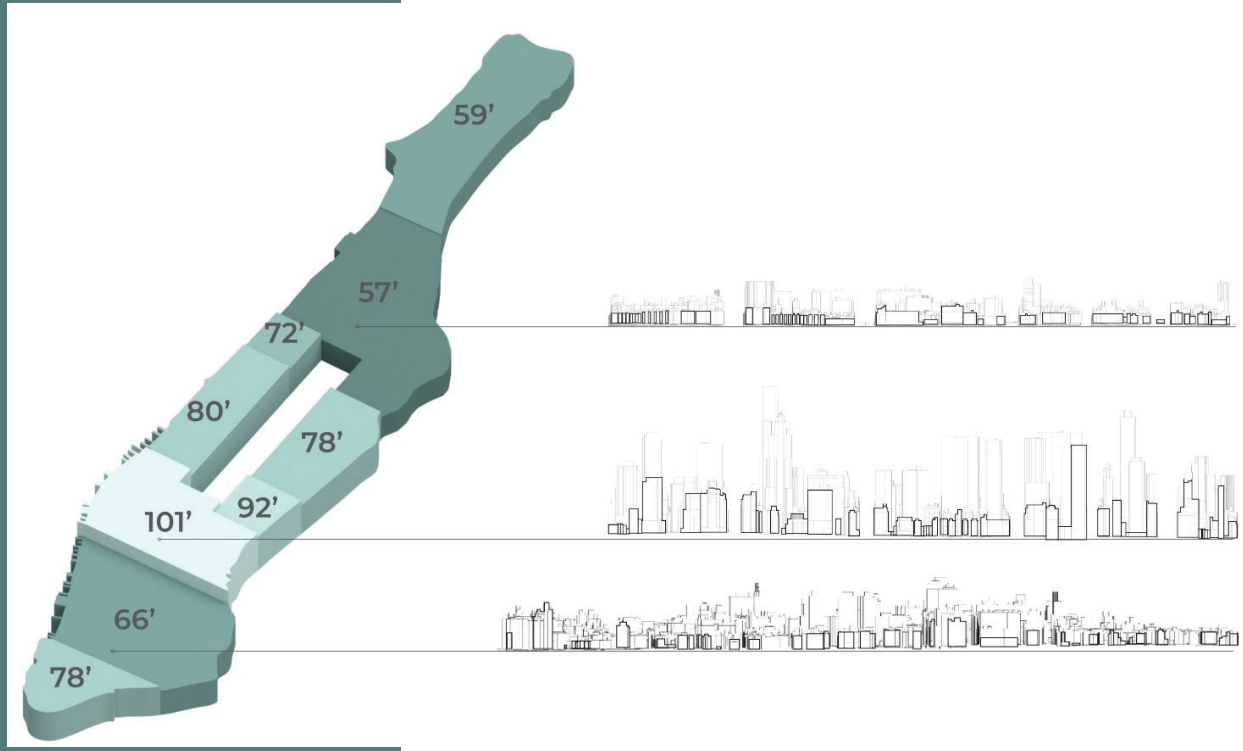
HARLEM SKY TENSIONS

Many histories and assets in the context of Harlem represent conflicting values, and this is poignantly evident in the access to and preservation of the sky in Harlem.

During an interview with a Community Board 10 member, Karen Horry, the Harlem sky was cited as an asset and key characteristic of the Harlem community. Assessment of access to the Harlem sky makes apparent many characteristics that are in conflict. Beside trees, other conflicting values emerge such as building heights and shadow, daylighting and heat, and unused floor-area ratios (FAR) and matters of development economy. These values also hold tangential connections to population density, fresh air, and access to open space.

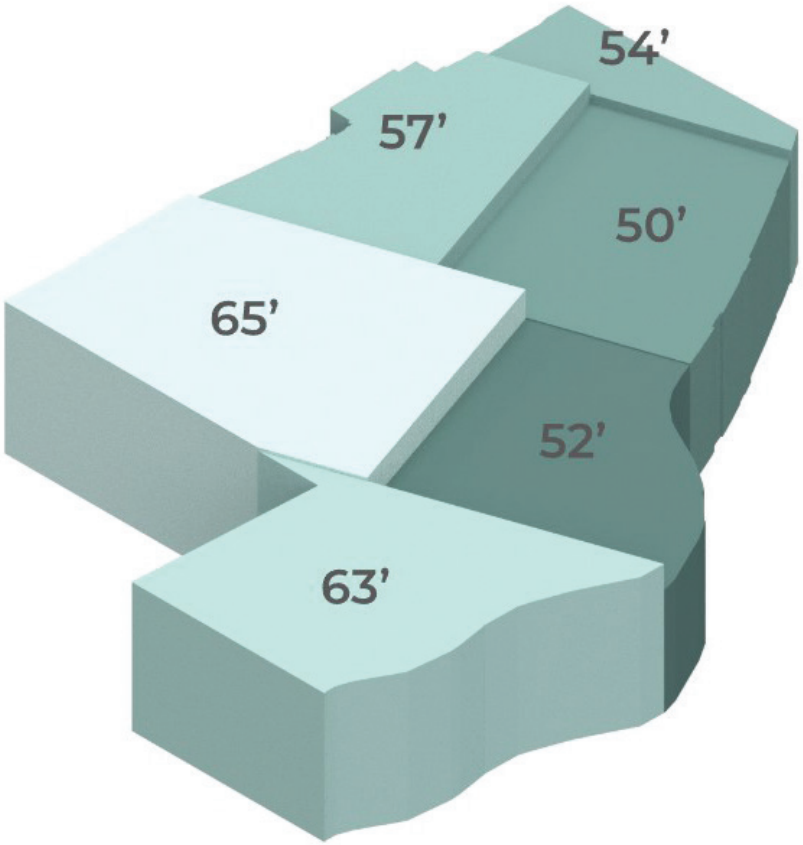
HARLEM SKY TENSIONS

The sky in Harlem is an open space resource that interacts with building height. From the ground, the height of a building can limit one's access to the open space above, so this analysis first assesses averages of building heights throughout Manhattan. As a finding, the average building height in Harlem is 19 feet below the Manhattan average. This diagram illustrates generalized building heights throughout Manhattan, though it does not account for topographical differences. Further analysis of the streetscapes in Harlem, Midtown, and Soho seek to illustrate typical conditions of building height and street wall to better understand what characterizes access to the sky in each neighborhood.

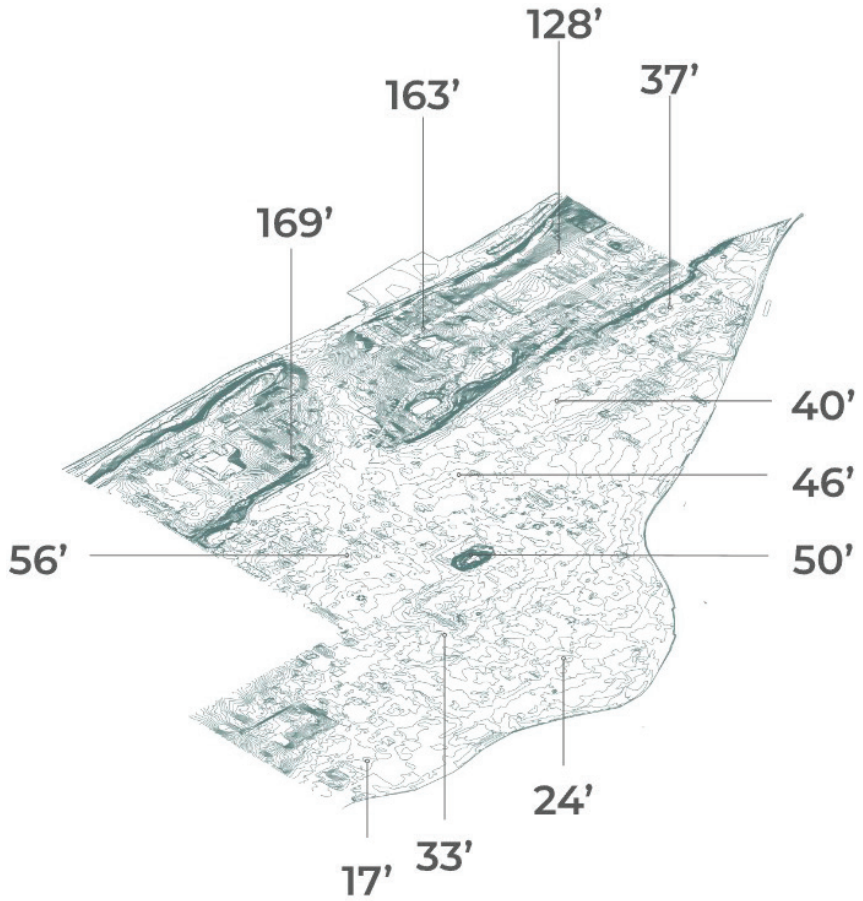


Average building heights (without consideration of topographical changes) across Manhattan.

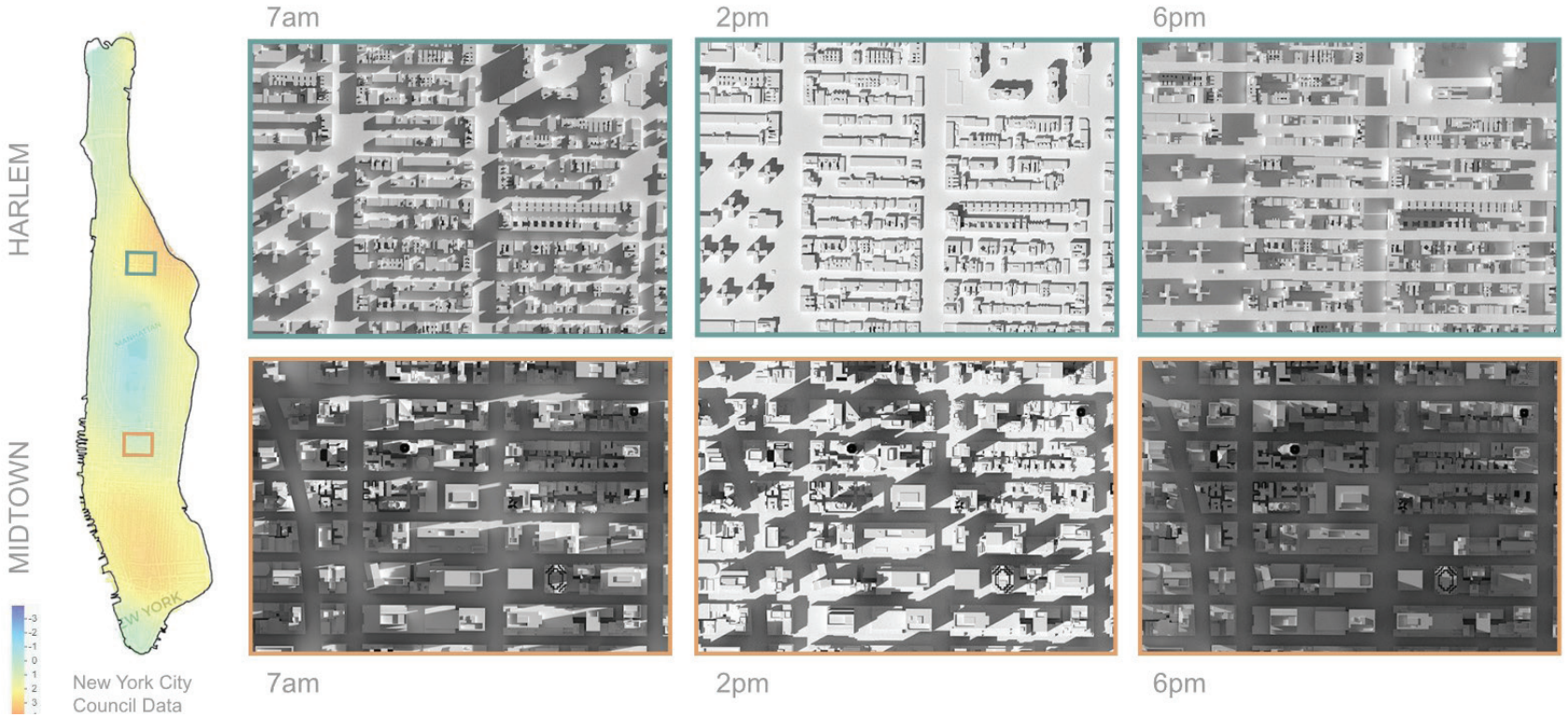
Moving to the building heights across Harlem, specifically, the illustration on the left shows average building heights assuming a neutral topography while the illustration on the right shows topographical elevations only. In both studies, both building heights and topography were found to be lower in East Harlem. Overall, the Harlem average for building height is 57 feet, with higher averages on the west side.characterizes access to the sky in each neighborhood.



Average building heights (without consideration of topographical changes) across Harlem.



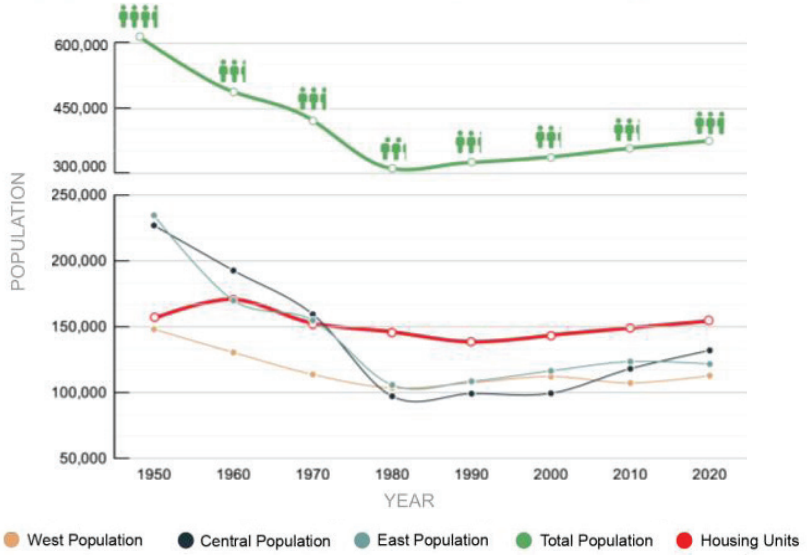
Topographical elevation (in feet above sea level) in Harlem.



Comparison of sunlight and heat between Harlem and midtown.

Lower building height, while providing access to the sky as an open space resource, is also associated with other environmental factors such as daylighting, shadow, and heat. These diagrams illustrate shadows over Sixth and Seventh Avenues in both Harlem and midtown across three times throughout the day. While more daylight reaches the street in Harlem than in midtown, this area of Harlem also experiences average temperatures two to three degrees higher than the Manhattan average. Here, air-related conflicts play out. Building height correlates to more of the street in shadow, while more street daylighting also raises average outdoor temperatures, placing higher demands on energy for cooling.

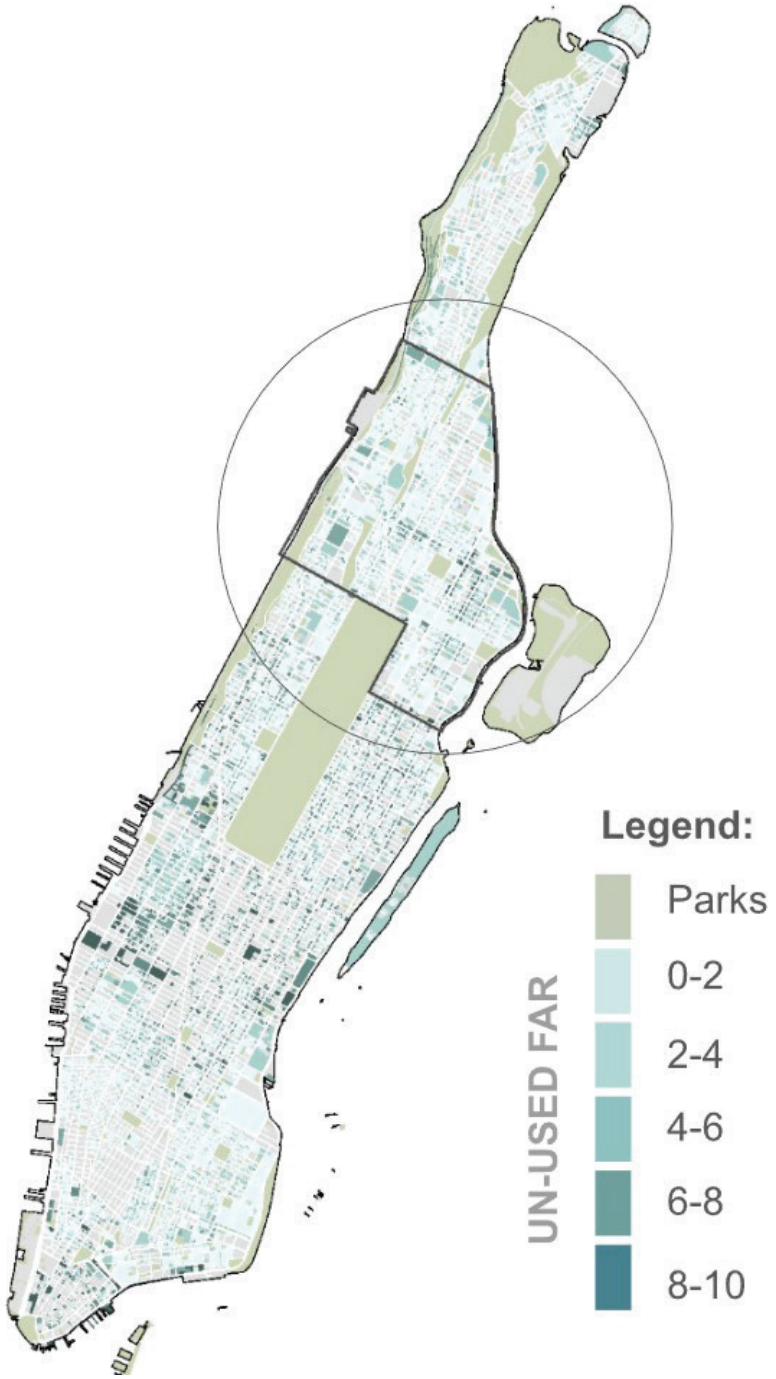
With an average building stock that is 19 feet shorter than the Manhattan average, analyzing the population-to-housing ratio recognizes that the population in Harlem is outpacing housing availability. Despite fluctuations in Harlem's population since 1950, the ratio of housing availability to population has historically remained relatively steady, with between 2.1 and 3.7 people per available housing unit, amounting to an overall average of 2.5 and current ratio of one housing unit for every 2.3 individuals living in Harlem. However, this ratio is on an upward trend, meaning fewer housing units are becoming available per individual.



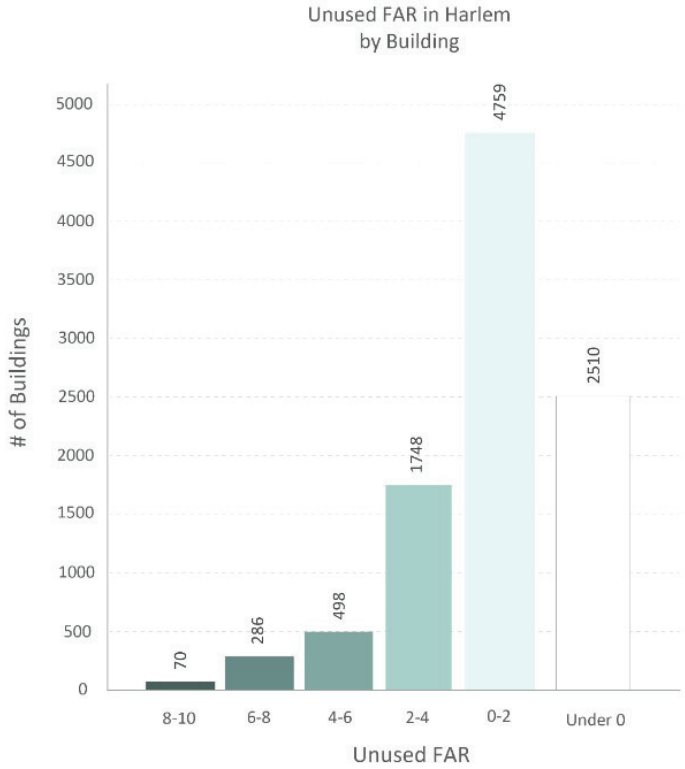
Population outpacing housing availability.

As pressures to densify and maintain affordability mount amid the increasing population, properties with taller height allowances become more valuable and more vulnerable to redevelopment. By analyzing unused FAR, or floor area ratio allowances, throughout both Harlem and Manhattan, highest concentrations of unused air rights in areas such as Hell's Kitchen, 125th Street in Central Harlem, and Park Avenue and Second Avenue in East Harlem could be seen. These areas contain properties that have the most unused height allowances—creating pockets of vulnerability of existing businesses and building stock.

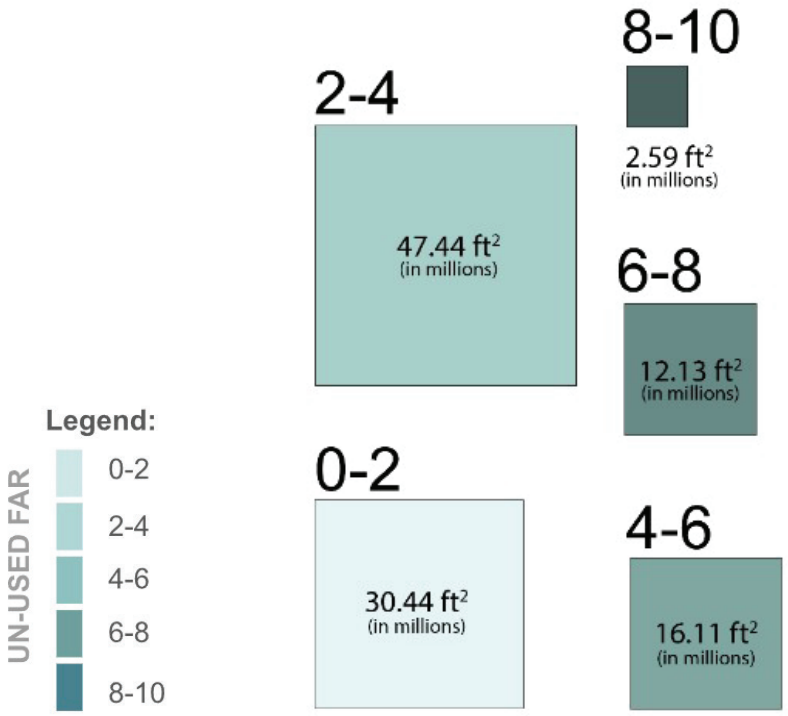
Map showing unused residential FAR in Harlem.



Map showing unused residential FAR in Manhattan.



Unused FAR in Harlem by building.



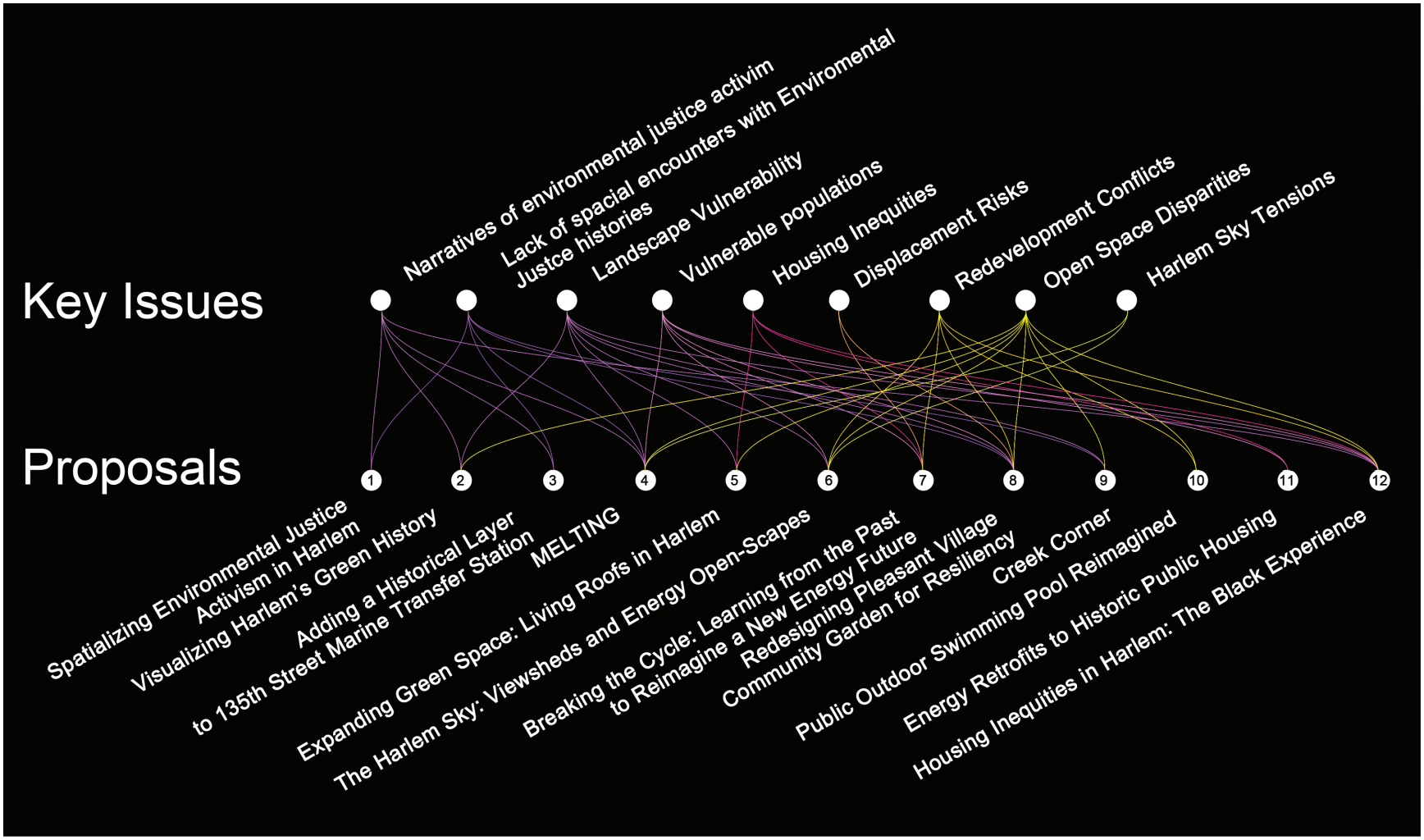
Area of buildable square footage by FAR zoning allowances.

Lastly, the studio visualized the amount of unused FAR by building and by total area. The bar graph on the left illustrates the number of buildings throughout Harlem with various ratios of unused FAR. For example, a building with an unused ratio between six and eight means its floor area can be between six and eight times the amount of its lot area. Meanwhile, this unused floor area accounts for approximately twelve million square feet, according to the area diagram on the right. Although properties within the range of zero to two unused FAR ratios outnumber the other categories, buildings that have between two and four times their lot size stand to add the most total floor area to Harlem if they were to utilize all available, but currently unused, FAR allowances. Overall, Harlem has over 100 million square feet of unused FAR allowances, leaving much room for growth. However, conflicts arise when we consider what may get redeveloped, who may be displaced, how energy will be supplied, how tall buildings will be, and whose sky they may block.

Skyline in Harlem

PROPOSALS

PROPOSALS



Proposals are firmly rooted in the key issue research the studio conducted, as well as heavily informed by community input via interviews with connector organizations. Proposals were crafted either by solo studio colleagues or small groups, depending on size and scope. Each proposal aims to address one or more of the key issues identified via designed interventions into the built environment of the study area. The proposal phase allows the studio's inquiry to be applied, activating our illuminations and research in the contemporary fabric along with the help, design guidance, and support of the community itself.

SPATIALIZING ENVIRONMENTAL JUSTICE ACTIVISM IN HARLEM

Kerrian France

This proposal addresses the lack of physical representations of environmental justice activism history in Harlem, and the gap that currently exists in the designation and memorialization of sites related to that history. As determined in the key issues analysis, the narratives of environmental justice activism are rich in Harlem, ranging from protests, changes to public policy, and restorative justice to address issues of inadequate housing conditions, sanitation negligence, open space equity, and others. However, based on the survey of site designation reports, memorials, monuments, plaques, and public art, there is no permanent spatialization of the full environmental justice activism history of Harlem.

KEY ISSUES ADDRESSED

- > NARRATIVES OF ENVIRONMENTAL JUSTICE ACTIVISM
- > LACK OF SPATIAL ENCOUNTERS WITH ENVIRONMENTAL JUSTICE HISTORIES
- > LANSCAPE VULNERABILITY
- > VULNERABLE POPULATIONS
- > HOUSING INEQUITIES
- > DISPLACEMENT RISKS
- > REDEVELOPMENT CONFLICTS
- > OPEN SPACE DISPARITIES
- > HARLEM SKY TENSIONS

The Young Lords' Garbage Offensive in 1969 was a major event in Harlem's environmental justice activism.

Artist Miguel Luciano led a walking tour of his Mapping Resistance project, describing the history of the Young Lords' activism, 2019.

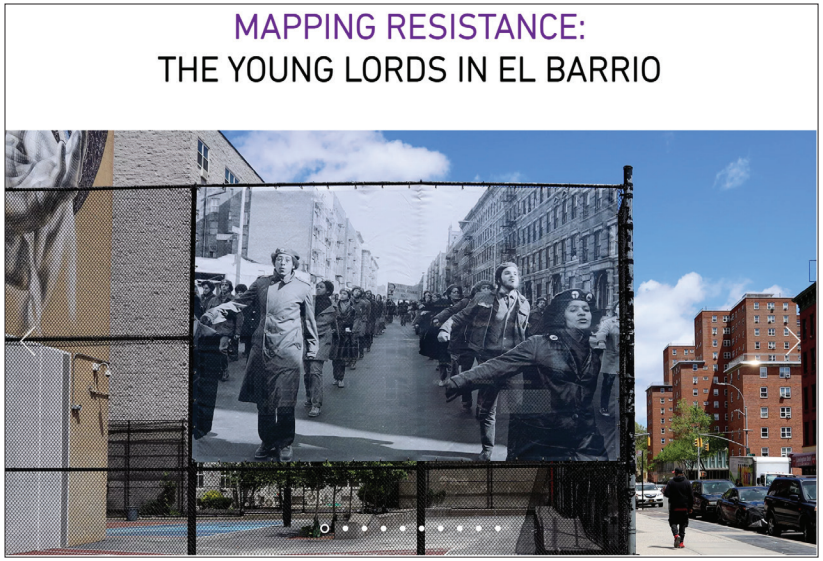
BACKGROUND, SIGNIFICANCE, AND RATIONALE

Two projects provide points of reference for spatialized environmental justice activism: the Mapping Resistance project and the EJ ATLAS website. Mapping Resistance, implemented by Miguel Luciano, mapped and provided physical photo references to the activism history of the Young Lords in East Harlem (Mapping Resistance, n.d.). The EJ ATLAS website maps environmental conflict and spaces of resistance on a global scale (EJAtlas, n.d.). Though both projects are effective in spatializing activism, Mapping Resistance was a temporary installation only focusing on the Young Lords, and the EJ ATLAS only maps one event in Harlem, the WE ACT North River Treatment Plant protest. This proposal builds on their research and framework to be both comprehensive and Harlem-specific.

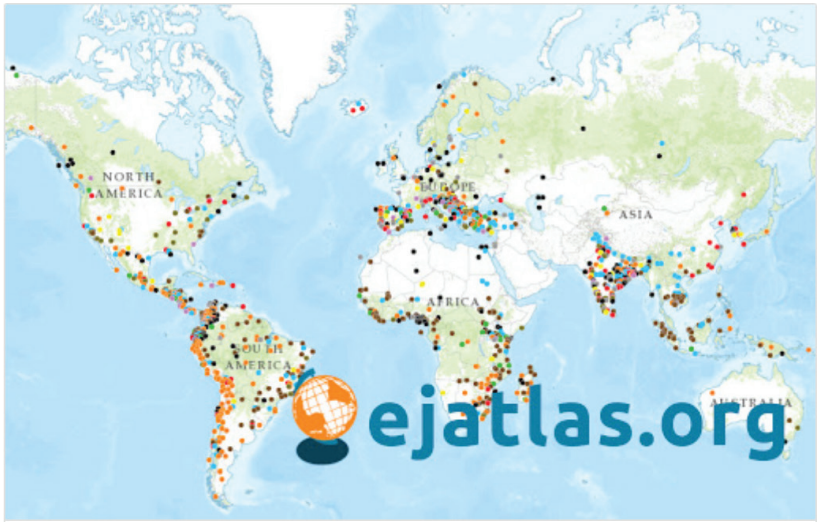
DESCRIPTION

The project uses three components:

1. Spatialize: The first part of the proposal comprises site markers, which create a physical representation of significant sites of environmental justice activism. The markers would use signage inspired by the actual protest signs, showing the expressive phrases used by the activists, which would draw viewers to the marker. An informational plaque would provide a brief history of the event, the movement, the key figures and organizations involved, and a description of whether the current state of the site is a result of restorative justice or policy changes in response to activism. The marker would also act as a platform for community organizations to implement a feature that speaks to their goals of environmental justice. For example, if relevant community groups choose to address key issues relevant to them, such as a lack of trees, water fountains, or recycling receptacles, they could propose to implement one of those physical options at the site marker. Through community engagement, environmental justice solutions responding to community needs can be represented spatially as part of the ongoing history of environmental justice activism.



The Mapping Resistance (2019) project shows one example of spatializing environmental justice activism.



The EJ ATLAS website is one example of spatializing environmental justice activism.

Site marker poster for the WE ACT Dirty Diesel Campaign, the Young Lords Garbage Offensive, the WE ACT North River Treatment Plant protest, and the Harlem Rent Strikes.

Brochure for the Environmental Justice Activism Walking Tour.

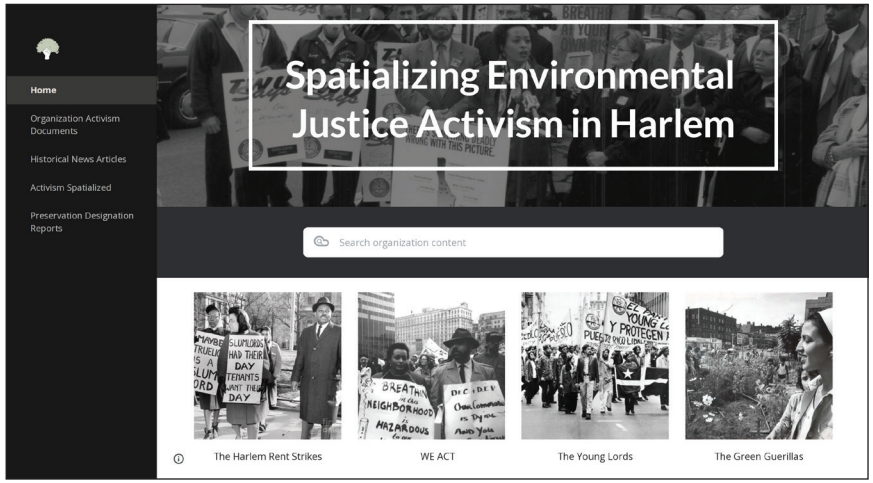
Example of the site marker for the WE ACT North River Treatment Plant protest at Riverbank State Park.

2. Contextualize: The second part of the proposal is a guided walking tour. The tour would put each site marker into context to emphasize the connected and comprehensive history of environmental justice activism in Harlem. Though the goal is to contextualize and relate these histories to one another, participants can choose to focus on the sites related to a specific issue, movement, or organization as well.

3. Expand: The last component of the project is a finding aid website. The informative plaque at the markers would include a QR code that links to the website, which would include further research into and resources for Harlem's environmental justice activism history. The website would allow people to be engaged with the environmental justice activism history, beyond their encounter with just the spatial representation of one site marker. The finding aid would include access to more information on activism movements, relevant organizations, catalogs of organization activism documents such as protest flyers and the Young Lords' *Pa'lante* newspaper, historical news articles, other spatialized resources, including the Mapping Resistance project the EJ ATLAS, and designation reports of sites relevant to environmental justice activism history.

Example of using a QR code at the Harlem Rent Strike site marker to access the finding aid website.

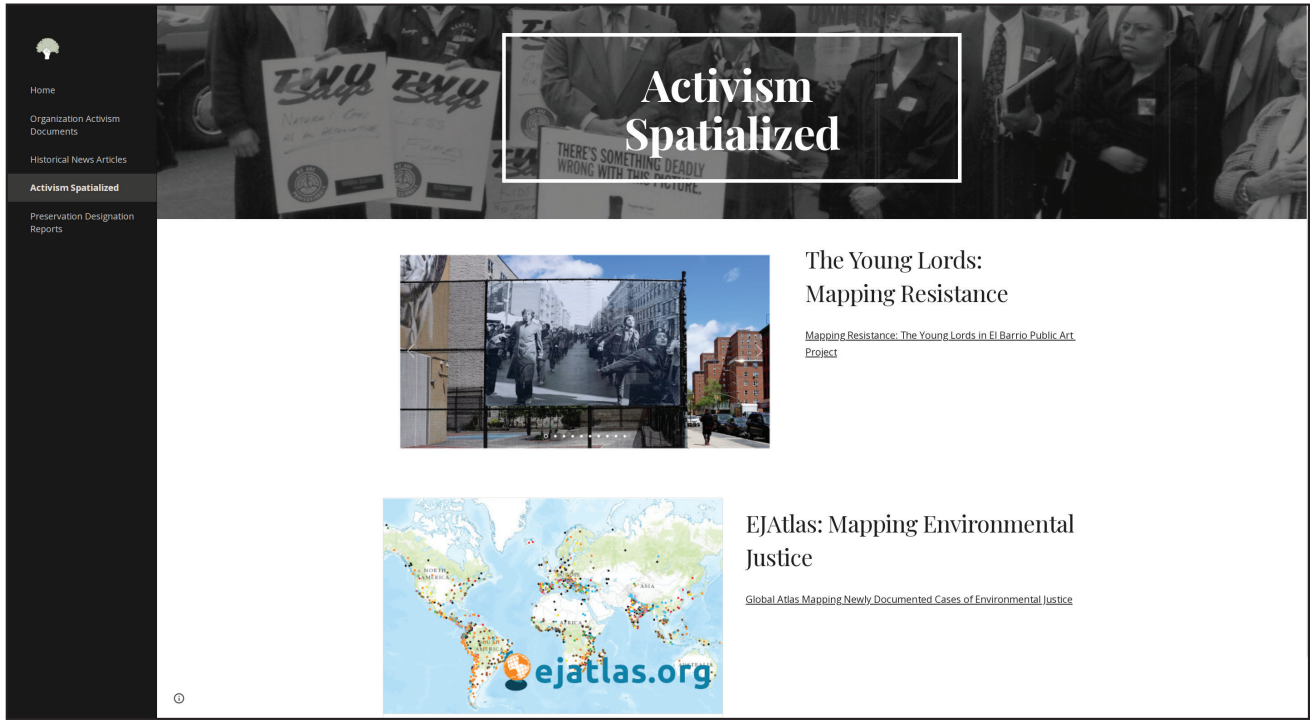
The finding aid website can be used to access more information about environmental justice activism history in Harlem.



The finding aid website homepage.

The finding aid website provides access to organization activism documents.

The finding aid website provides access to historical news articles.



The finding aid website provides access to examples of environmental justice activism spatialized.

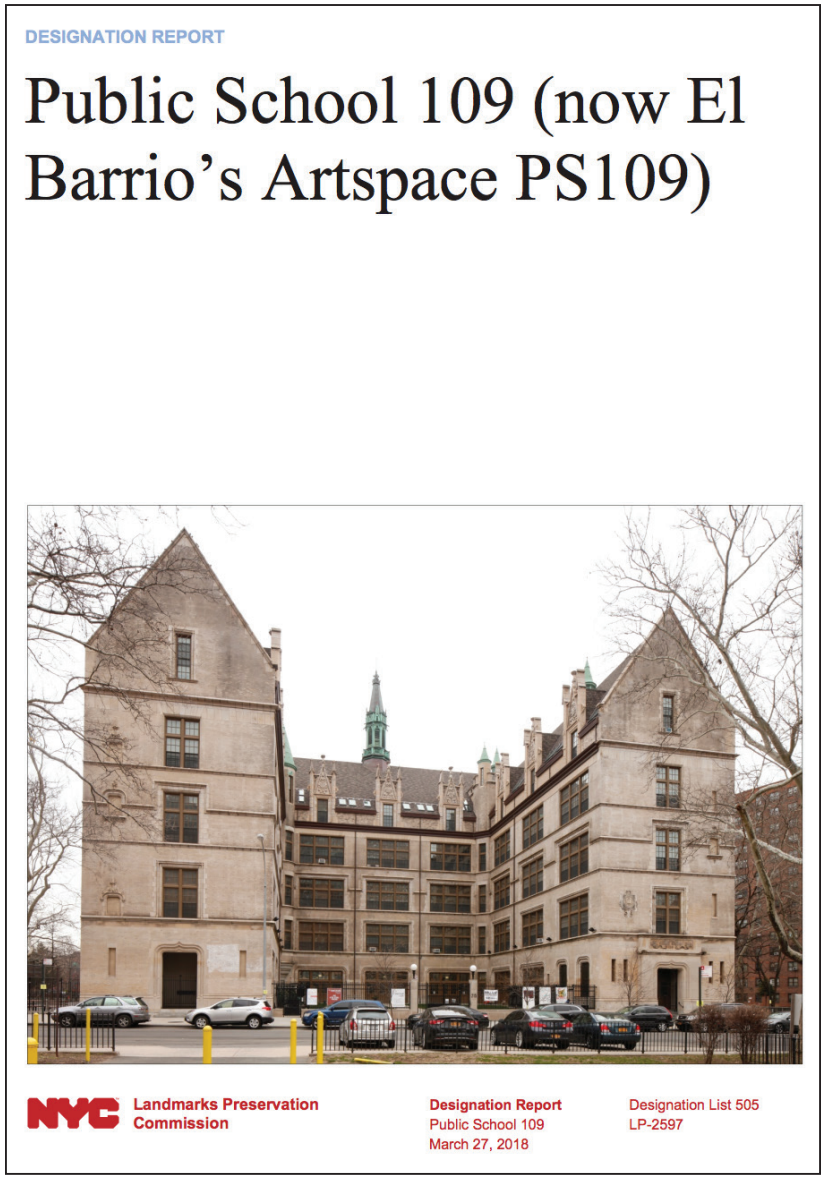
The finding aid website provides access to designation reports of sites related to environmental justice activism.

IMPLEMENTATION

The implementation of the project would ideally involve organizations such as WE ACT and the Green Guerillas, relevant community connectors such as El Museo del Barrio and the Shabazz Center, municipal organizations such as Grow NYC and NYC Parks GreenThumb, and governmental organizations that can provide funding and a framework for operations, such as the New York City Mayor's Office of Climate and Environmental Justice and the New York State Office of Parks, Recreation, and Historic Preservation.

ADDITIONAL IMPACT

Aside from the goals of each component of the proposal, this project also creates an opportunity to change site designation values. As mentioned, landmarked sites with a history tied to environmental justice activism are not primarily recognized for this in their designation reports—for example, the report for Public School 109 does not acknowledge its siting as a Young Lords protest site (Herman 2018). By bringing environmental justice activism to the forefront of designation narratives, significant sites of its history could be saved and potentially designated in the future.



The designation report for Public School 109 is among those that do not mention the environmental justice activism that took place at the site.

VISUALIZING HARLEM'S GREEN HISTORY

Jacqueline Danielyan and Daoxin Chen

Green resources and open spaces have been an important part of Harlem, throughout the history of the neighborhood to the present day. Through our proposal, we have created an illustration and proposed exhibit to foreground the green history of Harlem. Through the key issues addressed, this proposal focuses on various connections between environmental and climate justices in Harlem. We first concentrate on "Landscape Vulnerabilities," which have been impacted through interventions of development, as well as "Open Space Disparities," tackling the effects that these changes have had on the neighborhood and community of Harlem. This proposal also focuses on the "Narratives of Environmental Justice Activism," as we are advocating for these histories to be understood, remembered, and preserved.

With these considerations, we created an illustration implementing our understandings brought forth from prior key issues and research. Through a collage, we put together different types of green resources from different periods of time, creating an imagined landscape of Harlem.

BACKGROUND, SIGNIFICANCE, AND RATIONALE

Open spaces and green resources have drastically changed throughout Harlem over time, influencing the neighborhood's relationship to environmental and climate justices and injustices. Throughout this illustration, we focus on the following concepts: density of trees, the Tree of Hope, parks and open spaces, public housing and trees, as well as community gardens. The removal of the original Tree of Hope and the establishment of parks relate to the exclusionary history of green resources in Harlem. Trees around public housing and community gardens indicate the efforts to combat environmental injustice, providing green resources for the neighborhood.

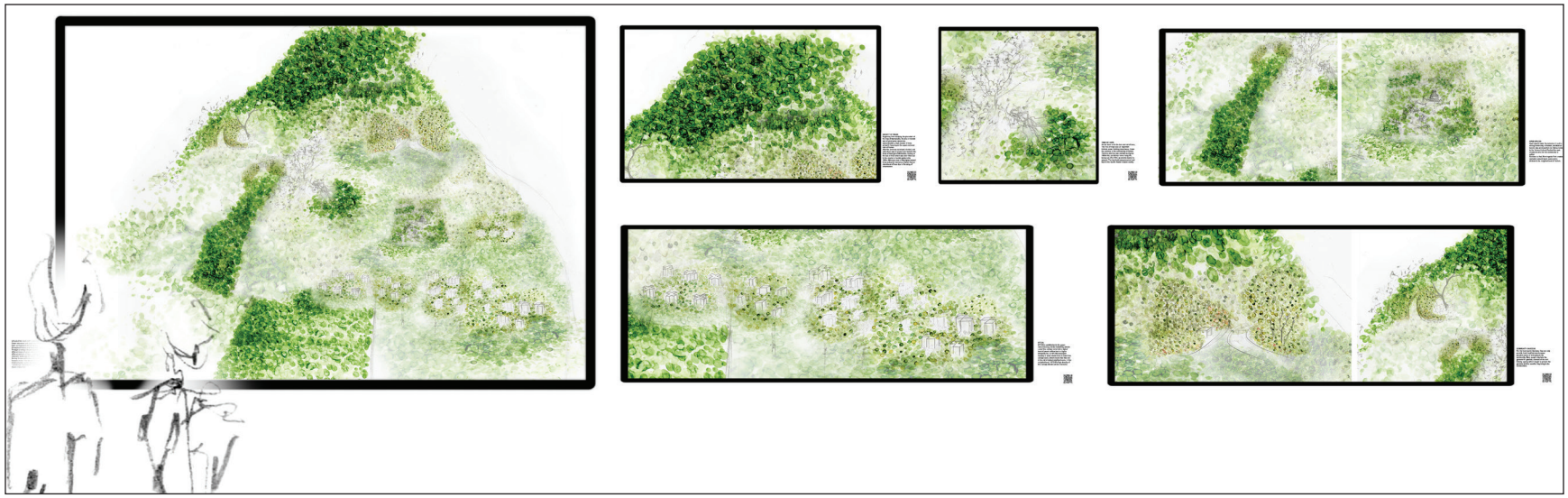
KEY ISSUES ADDRESSED

- > NARRATIVES OF ENVIRONMENTAL JUSTICE ACTIVISM
- > LACK OF SPATIAL ENCOUNTERS WITH ENVIRONMENTAL JUSTICE HISTORIES
- > LANSCAPE VULNERABILITY
- > VULNERABLE POPULATIONS
- > HOUSING INEQUITIES
- > DISPLACEMENT RISKS
- > REDEVELOPMENT CONFLICTS
- > OPEN SPACE DISPARITIES
- > HARLEM SKY TENSIONS

Studying the accompanying early map of Mannahatta, Harlem had great green resources, with a high density of trees. After the implementation of the grid plan in 1811, most of Manhattan lacked green resources, but Harlem had an abundance of trees due to the delay of urbanization in Upper Manhattan.

Map of Mannahatta demonstrating an abundance of trees in Upper Manhattan.

Illustration of Harlem's green history.



Exhibition composition.

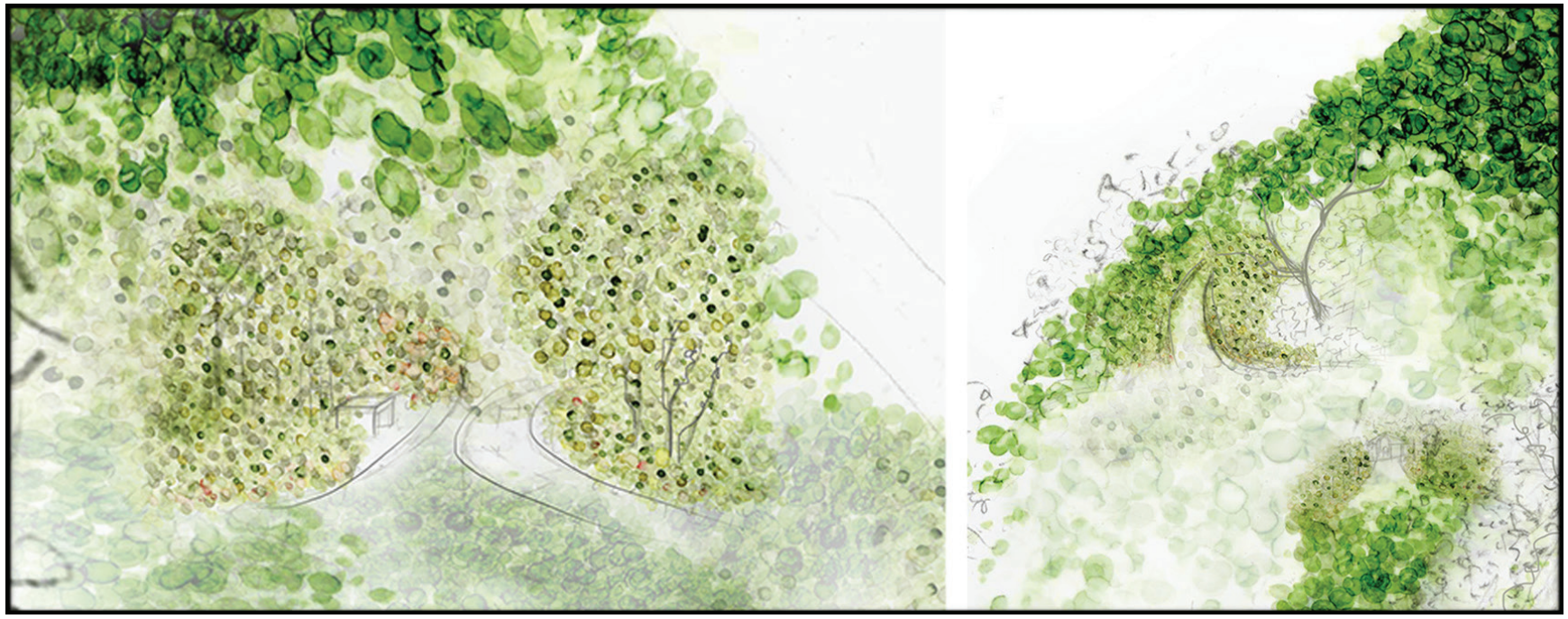


Illustration of community gardens.

COMMUNITY GARDENS
Community gardens not only provide fresh food but also increase people's sense of belonging to the community. Many people may take the gardens for granted, unaware of the gardens' rich history, the activism to protect the gardens, and the benefits they bring to the communities.

Planted in the 1920s, the Tree of Hope was a site of great significance to the community of Harlem. Yet, in 1934 it was removed due to the expansion of streets. The trunk of the Tree of Hope has been preserved in the Apollo Theater in remembrance of its history (Troshynski 2020).

Open spaces have been impactful for Harlem communities. Marcus Garvey Park was home to the Harlem Cultural Festival, providing important areas for community gathering. By contrast, Morningside Park represents a division in the neighborhood, separating Harlem from Morningside Heights.

NYCHA's contribution to green resources is under-acknowledged. Lower tree density and a higher level of paved surfaces lead to higher temperatures. NYCHA developed housing in the city's hottest neighborhoods. In Harlem, NYCHA trees stand out as a significant resource.

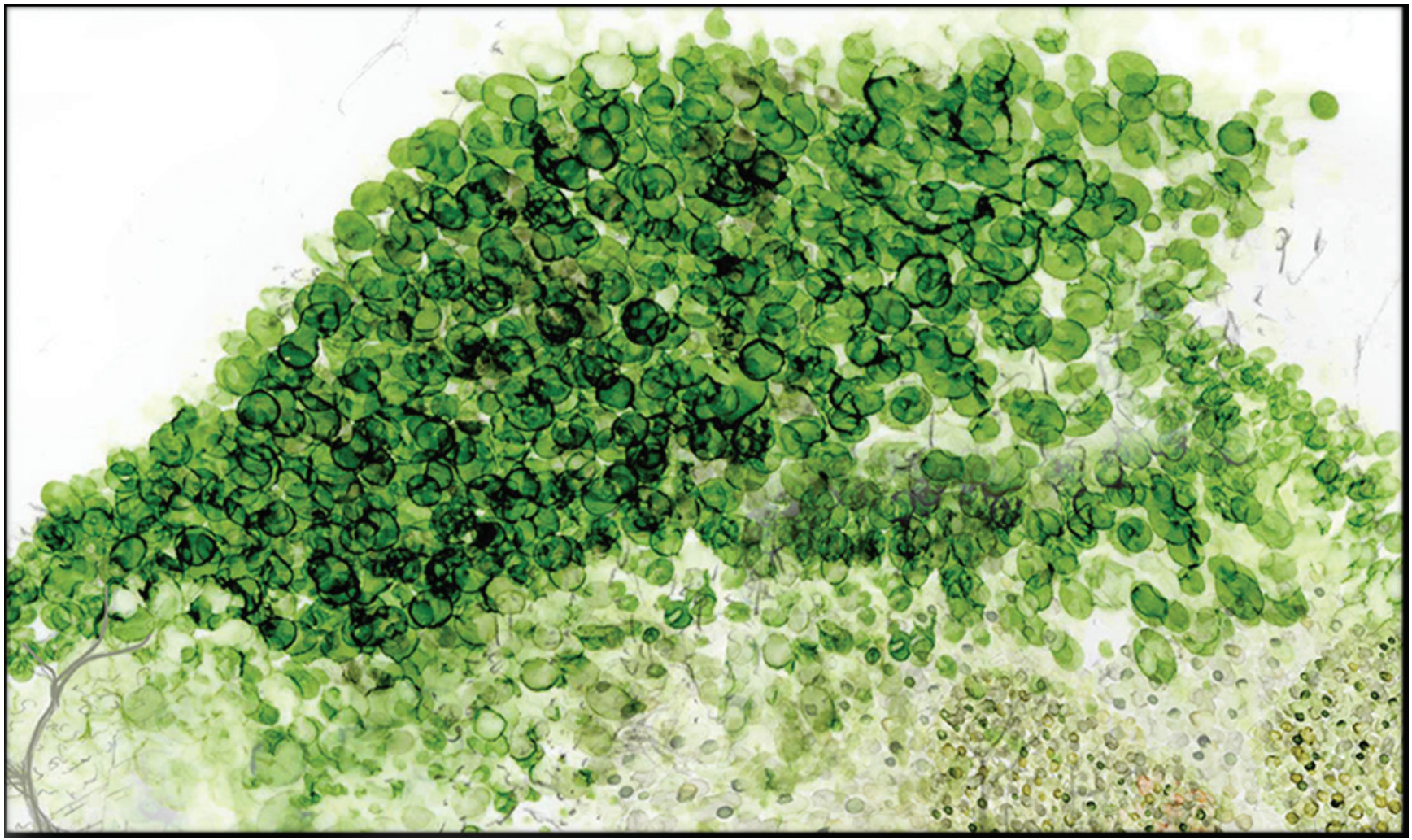
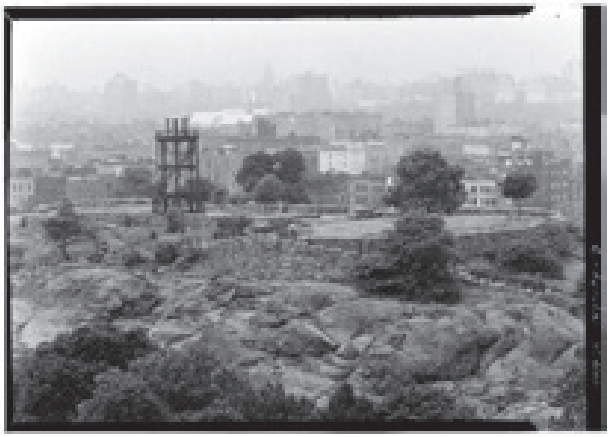


Illustration of trees in Upper Manhattan.

DENSITY OF TREES
Beginning from studying the precedent of the map of Mannahatta, the area of Harlem was of great green resources, demonstrating a high density of trees primarily focusing on the northern and western Harlem. After the land was colonized, divided, and sold, there was no proper care towards the trees all throughout Manhattan, leading to the ban of trees which was later lifted due to the creation of public parks in the 1830s. Although most of Manhattan lacked trees and green resources, Harlem had an abundance of trees because of the delay of urbanization.

TREE OF HOPE
As we move on to the ban and cutting of trees, The Tree of Hope was an important historic asset, and a promise to the community of Harlem. The lone elm tree was planted during the 1920s-30s, yet did not have a long life, being cut off in 1934, as streets started to expand. The tree trunk was preserved and kept in the Apollo Theater located nearby.

Illustration of the Tree of Hope.



The landscape of Marcus Garvey Park, c. 1975.

The landscape of Morningside Park, c. 1911.

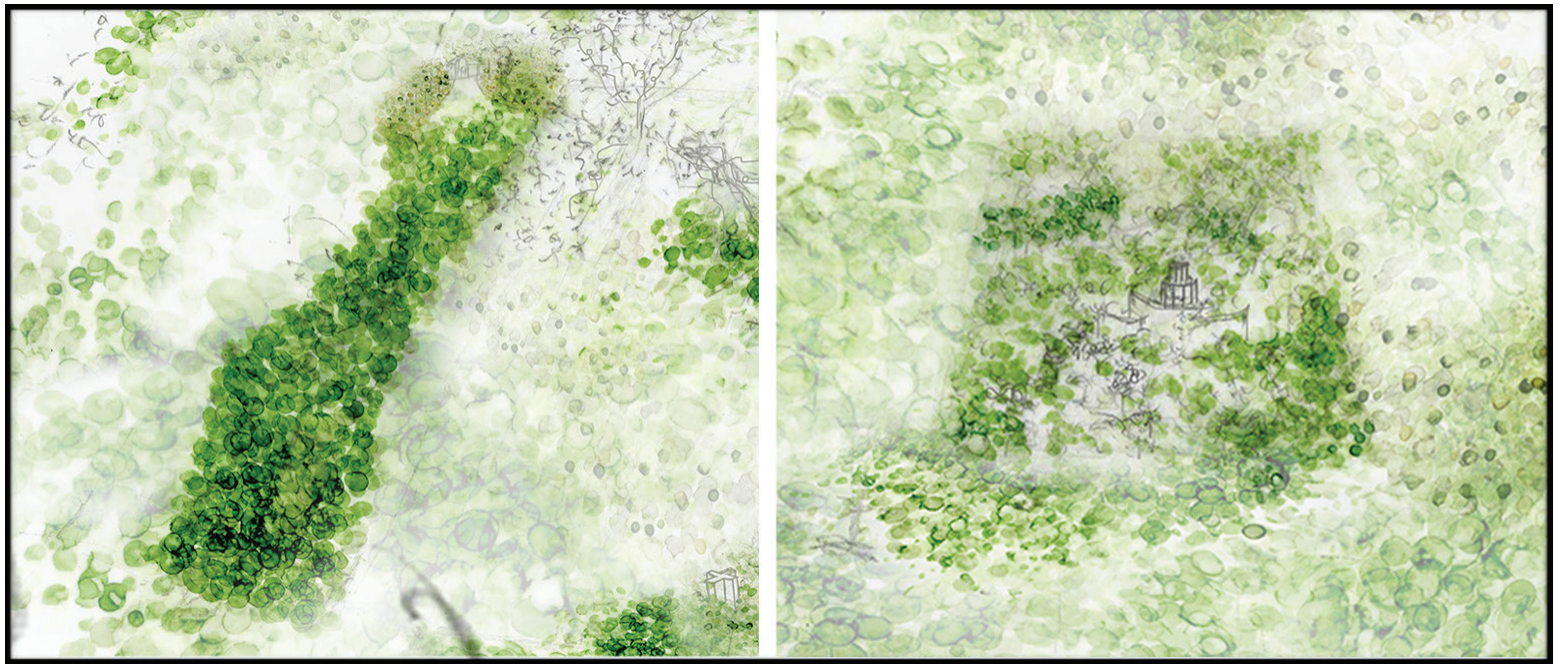


Illustration of open spaces and parks.

OPEN SPACES
Open spaces were the outcome of a strong community in Harlem. Marcus Garvey Park was influential as the home to the Harlem Cultural Festival, creating an area for the community to gather. Contrary to that, Morningside Park creates exclusion around open space and a division in the neighborhood of Harlem.

Illustration of public housing and trees.

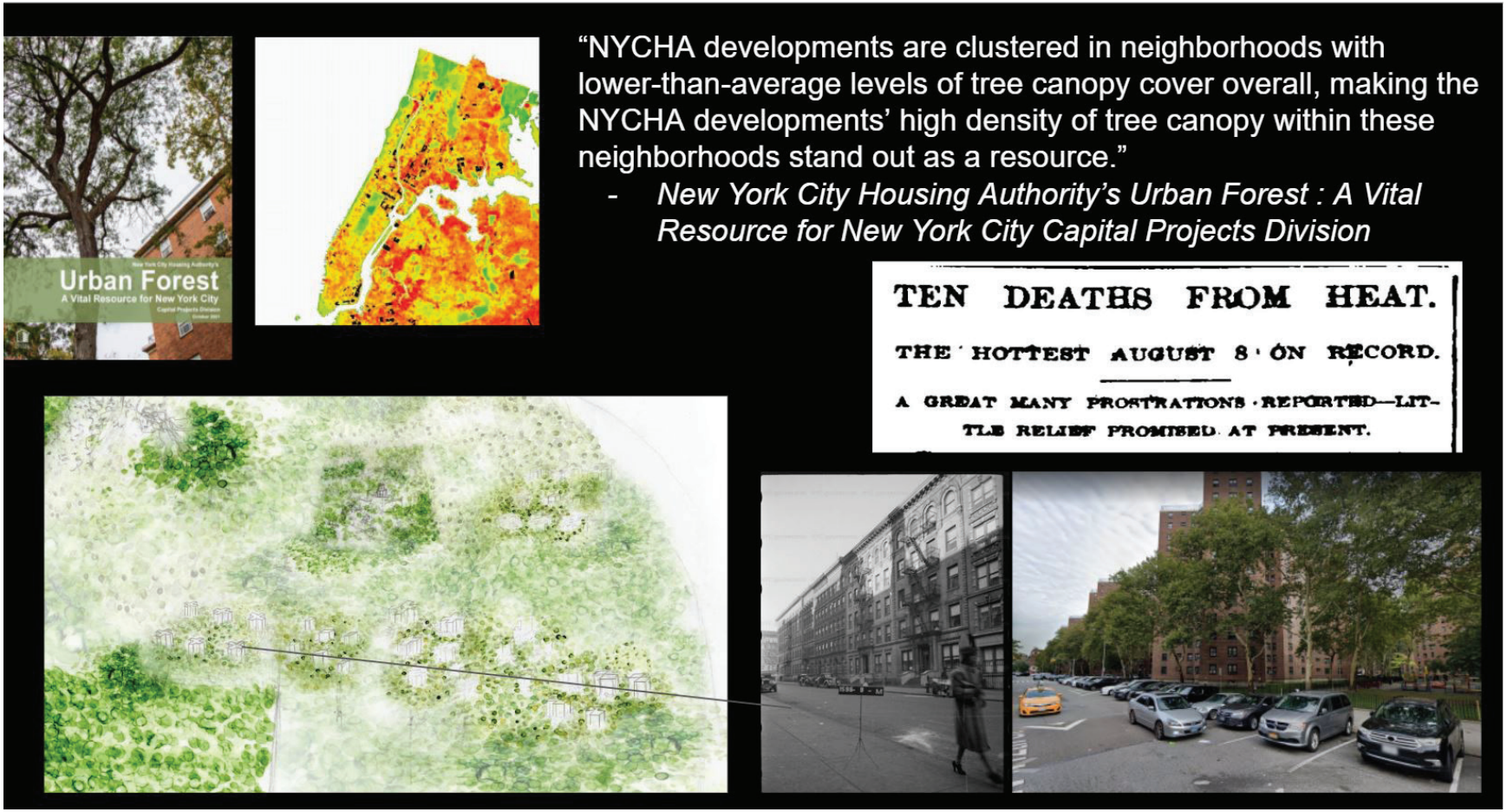
NYCHA
NYCHA's contribution to the green resources may not be realized by people. Lower tree canopy cover and a higher level of paved surface lead to higher temperatures, so NYCHA developed housing in areas where there is lower tree canopy cover, which means that they are in the city's hottest neighborhoods. In this neighborhood, NYCHA's high density of tree canopy stands out as a resource.

Many community gardens were established in Harlem through the advocacy of the Green Guerrillas and with the support of the organization GreenThumb. In Harlem, community gardens not only provide fresh food, but also increase people's sense of belonging to the community. The rich history and the benefits of community gardens and agencies to protect the gardens are worthwhile to commemorate.

DESCRIPTION AND IMPLEMENTATION

The proposed exhibition will be held in the Apollo Theater, a place where people gather for performances, school programs, and education, and as a space to understand the history of the site of the theater, of Harlem, and justice movements. The significance of the theater relies on the fact that the tree trunk of the Tree of Hope was preserved in the theater, as a symbol of the environmental injustice related to the history of green spaces. It is believed that the tree trunk brought luck to Harlem, and those who touched it would have great luck with their performances (Liebermann 2015). The old tradition was kept in the Apollo Theater. This exhibition in the theater will contextualize the importance of the Tree of Hope and give the public a comprehensive image of the green resources in Harlem.

Perspective of the exhibition at the Apollo Theater.



Example of online information about public housing.

The exhibition will be composed of a large illustration and focus points for each category of green resource, allowing the audience to appreciate the illustration in detail. Interactive technology will be used in the exhibition, such as a QR code to provide online information, such as official reports, newspapers, interviews, and images from different time periods related to each section.

The implementation of the exhibition will involve several agencies. Permission would be obtained from the Apollo Theater and organizations related to green resources, including NYC Department of Parks and Recreation, GreenThumb, NYCHA, WE ACT, and organizations promoting urban farming, like Harlem Grown, would be invited to participate. Additional materials could be collected for the exhibition from these organizations.

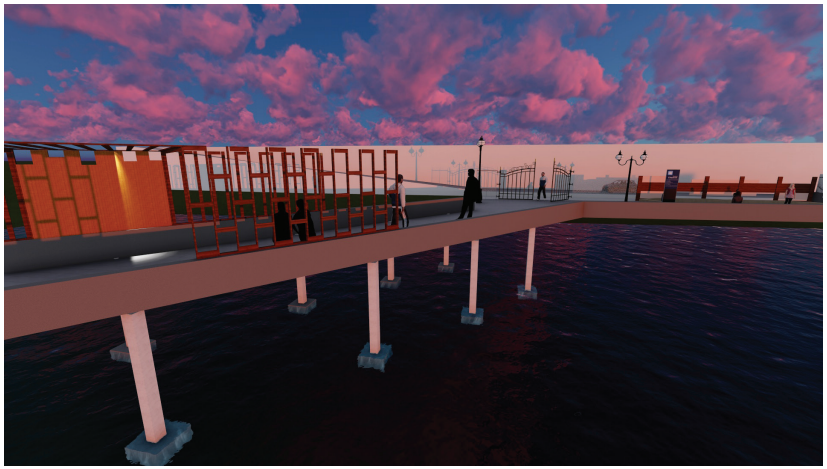
ADDING A HISTORICAL LAYER TO THE 135TH STREET MARINE TRANSFER STATION

Shivani Rajwade

This proposal adds a layer of visual representation of the history of practices of waste disposal in the Harlem neighborhood through a permanent display area. It aims to address the lack of physical representations of environmental justice activism, history of solid waste management, and the resulting protests in Harlem. The display area is proposed at the 135th Street Marine Transfer Station (MTS) along the Hudson River, as an addition to the reuse proposal by WE ACT for the MTS.

KEY ISSUES ADDRESSED

- **> NARRATIVES OF ENVIRONMENTAL JUSTICE ACTIVISM**
- **> LACK OF SPATIAL ENCOUNTERS WITH ENVIRONMENTAL JUSTICE HISTORIES**
- > LANSCAPE VULNERABILITY
- > VULNERABLE POPULATIONS
- > HOUSING INEQUITIES
- > DISPLACEMENT RISKS
- > REDEVELOPMENT CONFLICTS
- > OPEN SPACE DISPARITIES
- > HARLEM SKY TENSIONS

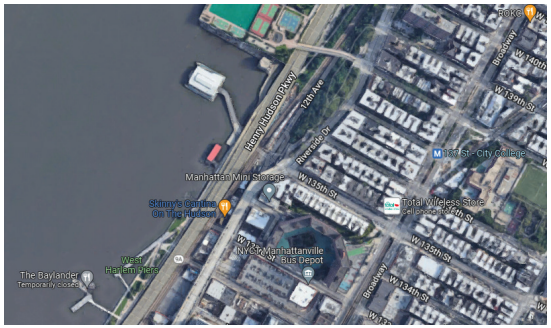


A view of the proposed display area.

BACKGROUND, SIGNIFICANCE, AND RATIONALE

The MTS opened in 1955 and served as the main facility receiving waste generated by the borough of Manhattan for more than forty years. Prior to its temporary closure, it handled between 1,100 and 2,500 tons of waste per day, operating nonstop with as many as ninety sanitation trucks idling along surface streets, waiting for their turn to dump waste into the facility. All-day operations added to noise, foul odors, and harmful diesel exhaust from garbage trucks. Later, the waterfront area immediately adjacent to MTS was targeted as a dumping ground for all sorts of hazardous wastes. The MTS has been closed since November 1999 and is presently under the jurisdiction of the New York City Department of Sanitation.

135th Street MTS.



Location of the MTS.

In 1998, WE ACT with Community Board 9 spearheaded a ten-year community-based planning initiative to redevelop the waterfront area immediately adjacent to the MTS. In 2004, as a result of WE ACT and other local leaders' extensive organizing and advocacy, Mayor Michael Bloomberg guaranteed that the 135th Street MTS would not reopen as a waste transfer facility. The city appointed WE ACT and Manhattan Community Board 9 to determine its reuse alongside the community.

Current condition of the MTS.

WE ACT board meeting.

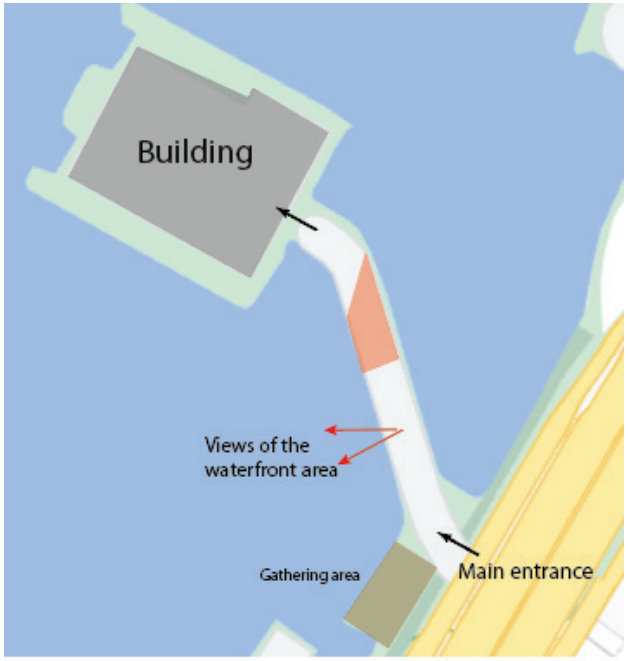
WE ACT's Trash to Treasure Campaign continues with the MTS redevelopment project in its initial planning stages. After meetings with stakeholders, they have proposed reuse options for the MTS, including:

1) Waterfront environmental center
2) Hydroponics and aquaculture "aquaponics" center with a restaurant
3) Recreational waterfront facilities and boathouse
4) Trade show with exhibition space

The vision is to redevelop the MTS to upgrade the quality of life and improve economic development along the West Harlem waterfront.

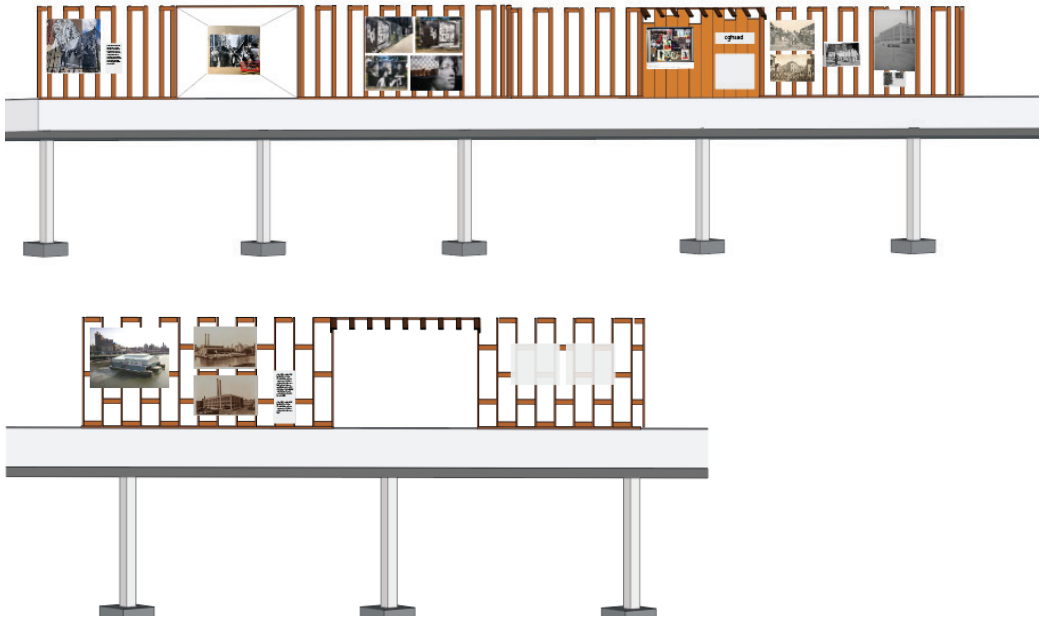
DESCRIPTION AND IMPLEMENTATION

In conjunction with WE ACT efforts, this proposal would make use of an area at the MTS entrance to display visuals of waste collection and disposal from the 1650s to the development of infrastructure and the narratives of the Young Lords' protest in the 1960s. It takes the visitor to the building through this interpretive layer of significant histories, introducing the function of the MTS and the engagement of WE ACT, as displayed along the entrance way. The display sections would cover initial solid waste management programs from the 1600s, the establishment of the Department of Sanitation, dumps, the history of incinerators, developing infrastructure, and the history of the MTS. It would also aim to hold public art projects that explore activist history of protests like the Young Lords in Harlem. It would put forth historical images and data about the management and injustices in the neighborhood. The displays would also exhibit the work that organizations like WE ACT are doing for environmental justice. The proposal also provides a small public area for organizations like WE ACT to engage with the community in public interactions and discussions.

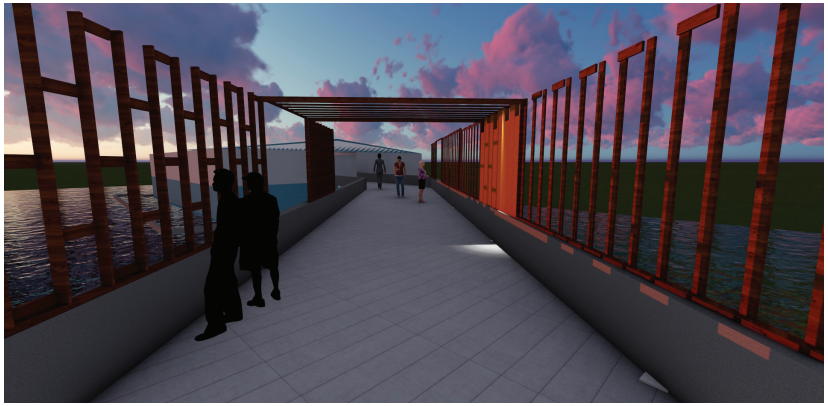


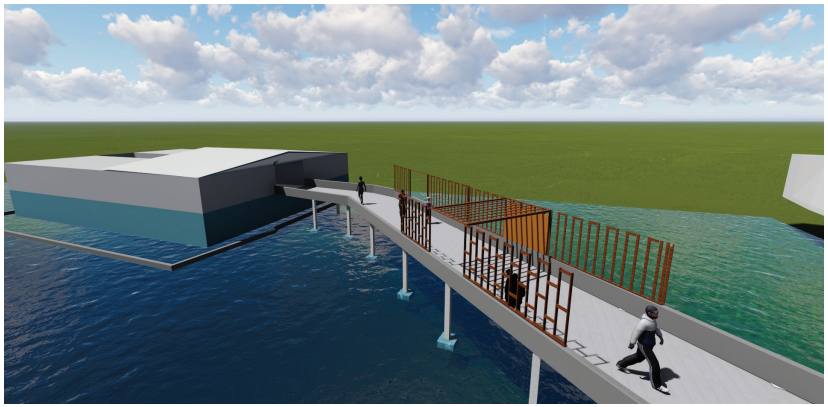
Area proposed for display.

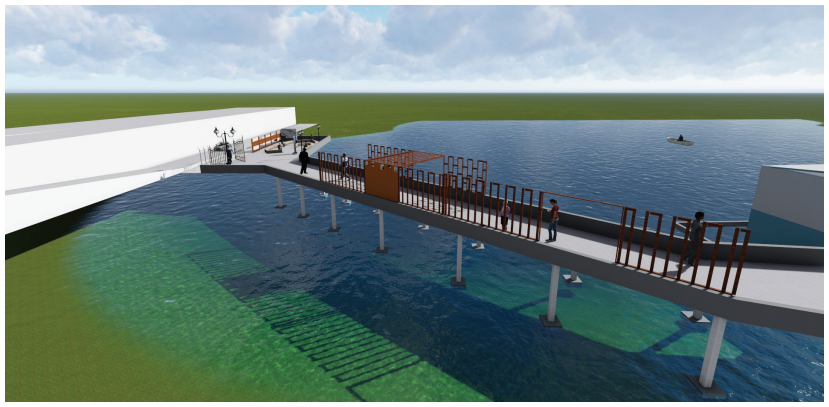
View of the display panels.



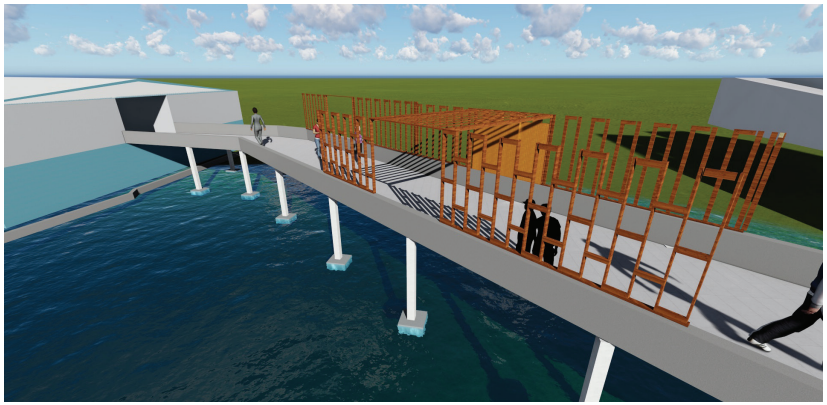
Panels for display.

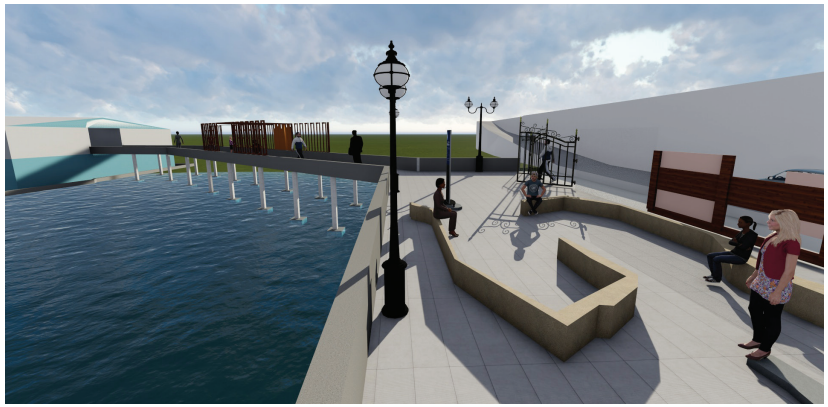






The project would involve WE ACT to advocate for and organize the space. The proposal invites other organizations working for environmental justice to reach the public through public gatherings and displays, and provides opportunities for artists to engage by creating a platform for public art. The project execution would also involve a partnership with the New York Sanitation Foundation for their work on the "Treasures in the Trash" museum.





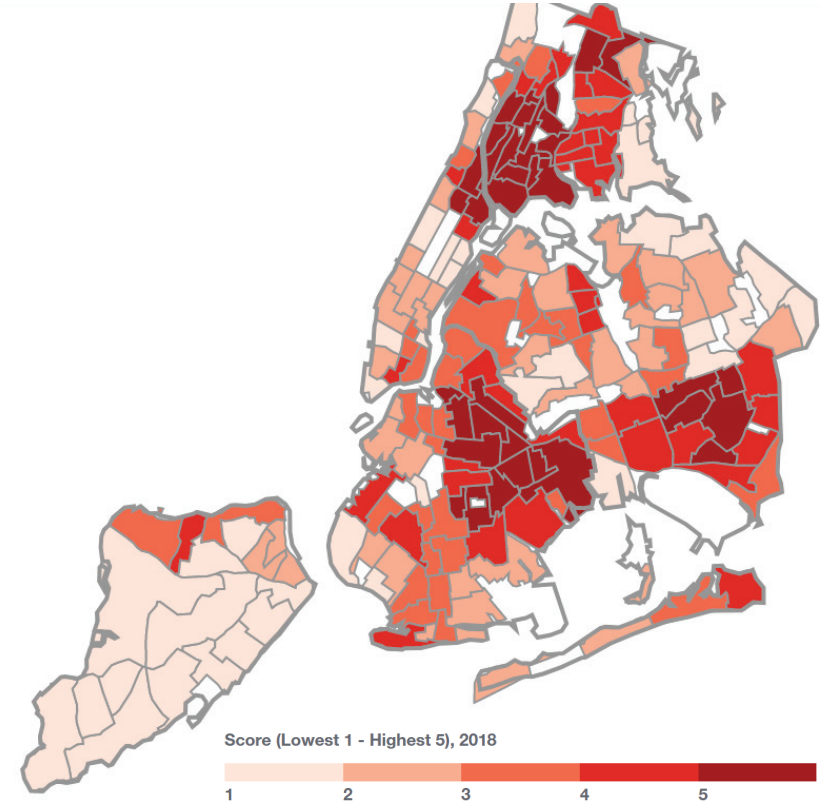
Views of the proposed display area.

The aim of the project is to make people aware of the history of the poor trash practices in the neighborhood, activism, injustices prevailing in low-income areas, and the development of sanitation methods over decades. It is important to establish self-awareness among people to dispose of trash responsibly and to be a part of the work of EJ organizations.

MELTING: EXPERIENCING HEAT IN HARLEM

Kemuning Adiputri and Elaf Alsibyani

MELTING is a temporary art installation used to provoke viewers' thoughts about heat vulnerability in Harlem. In response to the high risk of heat in Harlem and the temperature differences between Manhattan neighborhoods, this installation would interpret the environmental injustices of heat risk (Leland 2021).



Central Harlem and East Harlem are the most heat-vulnerable neighborhoods in Manhattan.

KEY ISSUES ADDRESSED

- > NARRATIVES OF ENVIRONMENTAL JUSTICE ACTIVISM
- > LACK OF SPATIAL ENCOUNTERS WITH ENVIRONMENTAL JUSTICE HISTORIES
- > LANSCAPE VULNERABILITY
- > VULNERABLE POPULATIONS
- > HOUSING INEQUITIES
- > DISPLACEMENT RISKS
- > REDEVELOPMENT CONFLICTS
- > OPEN SPACE DISPARITIES
- > HARLEM SKY TENSIONS

Ice model prototype.

SIGNIFICANCE AND DESCRIPTION

This installation proposes to link the past to the present and commemorate those who died or were affected by extreme heat in Harlem. This installation also aims to provoke peoples' thoughts on the environmental problem and educate them on contributing factors, both in the past and the present contexts, since Harlem is still suffering from the heat.

Office said last night that not less than 125 deaths had been caused by the heat during that time.

DEATHS.

The record of deaths and prostrations for yesterday is as follows:

BINE, MORRIS, forty years old, at his home, at 224 Seventh Street.

BOLAND, MARGARET, forty-five years old, of 246 East Eighty-fifth Street; stricken at the corner of Lexington Avenue and Thirty-fourth Street, and died before the arrival of an ambulance.

BROWN, WILHELM, fifty-five years old, of 5 First Avenue, at his home.

CAKCIRO, ISAAC, twenty-three years old, of 95 Rutgers Street; in the Presbyterian Hospital.

ANDERSON, Mrs. ANNIE, fifty years; died at her home, 423 Park Avenue, Brooklyn.

COOGAN, TERENCE, forty-two years old, of 410 East Twentieth Street.

CONNOR, JOHN twenty-two years; 100 Baltic Street, Brooklyn.

COOPER, HENRY, forty years, an insurance agent, of 1,557 Lexington Avenue; Harlem Hospital.

CORBETT, WILLIAM, forty-three years; 230 Sackett Street, Brooklyn.

DUNNING, GEORGE, fifty-one years, 371 Manhattan Avenue, Brooklyn; died at home.

EARLY, JEREMIAH, one month, at 628 Classon Avenue, Brooklyn.

FARRELL, JOHN, forty-five years, of 1,838 Bergen Street, Brooklyn; at Seney Hospital.

FORSYTHE, JEREMIAH, twenty-nine years, a blacksmith's helper; was found dead in the shop where he was employed at Wyckoff Avenue and Worth Street, Brooklyn.

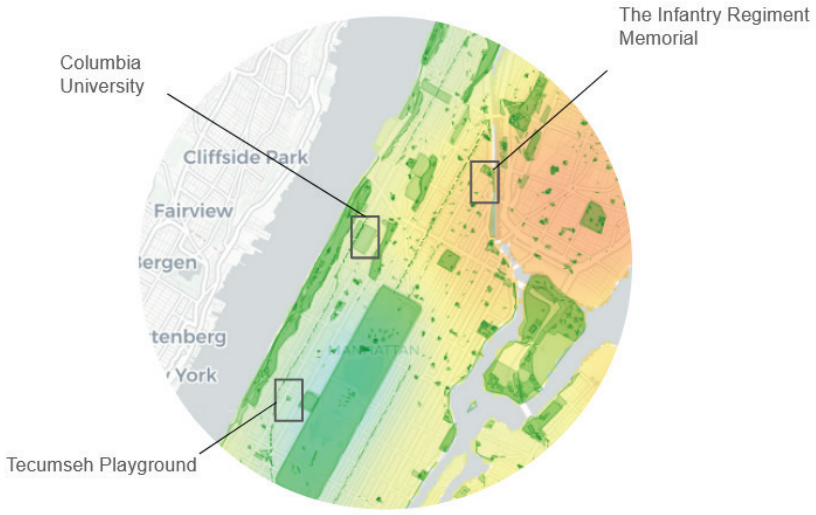
BRANDENBERG, WILLIAM, twenty-nine years, a messenger, of 2,244 Fifth Avenue; died in Harlem Hospital.

Heat prostration reports in historical newspapers about heat victims in Harlem.

Inspired by some previous projects such as *we do not all breathe the same air* by Tomás Saraceno (Studio Tomás Saraceno, n.d.) and *Melting Men* by Nele Azevedo (Chin 2009), MELTING is a temporary ice sculpture in the shape of real-size humans and will be placed in different locations to demonstrate temperature differences. The melting process will be recorded over its duration and compared across neighborhoods. Later, the results will be exhibited with historical context.

Prototype development was conducted to understand the possible methods, utilizing a 3D printed human figure and silicone mold-making kit, to give an idea of how the experience would look and feel. This experiment aimed to understand the challenge and limitations that could occur during the actual installation development process, such as understanding the possible transporting method, camera set-up, and group involvement.

The preferable sites are indicated on the adjacent map. Three locations that have different temperatures on the heat map were chosen. Some additional conditions were considered, such as minimal shade from trees or buildings. The installations would be placed simultaneously, and would be displayed in areas where many people can see and gather.



Chosen locations for the experiment over heat maps.

To provoke critical thought, the installation provides an intense scene where people experience the heat visually and spatially. While people are walking in the neighborhood, they will see this human-sized ice sculpture melting in front of them, leaving a pool of water that represents the suffering of people who experienced heat, and imagine themselves in the place of those models. It aims to build empathy to realize that some people experience more heat than people from other neighborhoods.

Human ice sculpture placed in Harlem.

The human ice sculpture melts faster in East Harlem compared to Central Park West.

The human ice sculpture melts more slowly on Central Park West compared to East Harlem.

The passerby in East Harlem would experience the sight of a half-melted human-sized ice sculpture, while at the same time, people in Central Park West witness the other figure, placed simultaneously on the same day, still intact—both in Manhattan! What would come across people's minds when they pass and gather around that scene? Will they think about heat, suffering, vulnerability, or even about inequality and injustice?

IMPLEMENTATION AND INTENDED OUTCOME

Partnerships with several parties are proposed to execute this project, including ice artisans in Harlem to empower local artists, NYC Parks to obtain permission to hold the temporary installations, and WE ACT to organize and advocate for the event. As this project would require a follow-up exhibition after the temporary installation, possible partnerships also include museums such as The Shed, MoMA PS1, and other institutions to take part in their temporary exhibitions. Additionally, some specific museums focusing on the environment, such as Arcadia Museum and The Climate Museum, could act as potential partners as well.

By conducting the on-site temporary installation and follow-up exhibition, this project aims to spread awareness of heat issues in Harlem by utilizing the following processes.

For the temporary on-site installation:

- The first objective is to have people gather around, which could provoke conversation about the heat issue in Harlem.
- The second aim is to encourage social media sharing, to expand the discussion and bring more attention to the subject.
- The hope is that people from other places will be made aware of the issues through this process.
- As the indicator of whether this installation achieved the intended outcome, a talk-back component would be designed to allow people to share their thoughts about this event.

During the follow-up exhibition:

- Develop a side-by-side comparison of the duration of melting to highlight the issue of temperature injustice.

Follow-up exhibition.

- To broaden the audience's understanding, historical and scientific data regarding the experiment would be provided, including the average temperatures during the temporary installation.
- By creating an exhibition, this project aims to "preserve" the experiment and reach a bigger audience.
- Similar to the temporary on-site installation, a follow-up survey will also be conducted, but social media pages would be used to provide more benefit for this iteration.

One of the project objectives is to encourage the establishment of more heat mitigation resources in Harlem. Some examples include promoting more tree plantings and shaded areas, and supporting nonprofit organizations to help families with low income to get air conditioning in the summer.

EXPANDING GREEN SPACE: LIVING ROOFS IN HARLEM

Jerry Schmit

In light of the findings of this studio surrounding the intersections between environmental justice and housing, as well as parks and open spaces, this proposal details a pilot project in which historic tenements of Harlem are fitted with green roofs.

From studying the history of environmental justice in Harlem, a variety of compounding factors that informed the well-being of community residents became evident. Heat prostration, water handling, energy use, access to green spaces, and climate change are among the key issues with which Harlem has been faced and continues to face. This proposal seeks to address these issues through an intervention with its historic tenements—a typology that represents a great portion of Harlem's built fabric.

KEY ISSUES ADDRESSED

- > NARRATIVES OF ENVIRONMENTAL JUSTICE ACTIVISM
- > LACK OF SPATIAL ENCOUNTERS WITH ENVIRONMENTAL JUSTICE HISTORIES
- > LANSCAPE VULNERABILITY
- > VULNERABLE POPULATIONS
- > HOUSING INEQUITIES
- > DISPLACEMENT RISKS
- > REDEVELOPMENT CONFLICTS
- > OPEN SPACE DISPARITIES
- > HARLEM SKY TENSIONS

BACKGROUND AND SIGNIFICANCE

According to the Nature Conservancy, it is estimated that the introduction of a green roof can yield anywhere between a 50 to 90 percent reduction in stormwater runoff from the given surface. In addition, these types of roof coverings can combat the effects of the urban heat island effect, which is said to raise ambient temperatures by as much as 22 degrees Fahrenheit (Urban Green Council and The Nature Conservancy 2019). This aspect of this proposal aims to confront issues of landscape vulnerability with regard to flooding and the inadvertent spread of contaminants through stormwater runoff.

Regarding housing inequities, the implementation of extensive green roofs, especially in older tenement buildings, presents a more external, less invasive measure to keep homes cooler during the summer months.

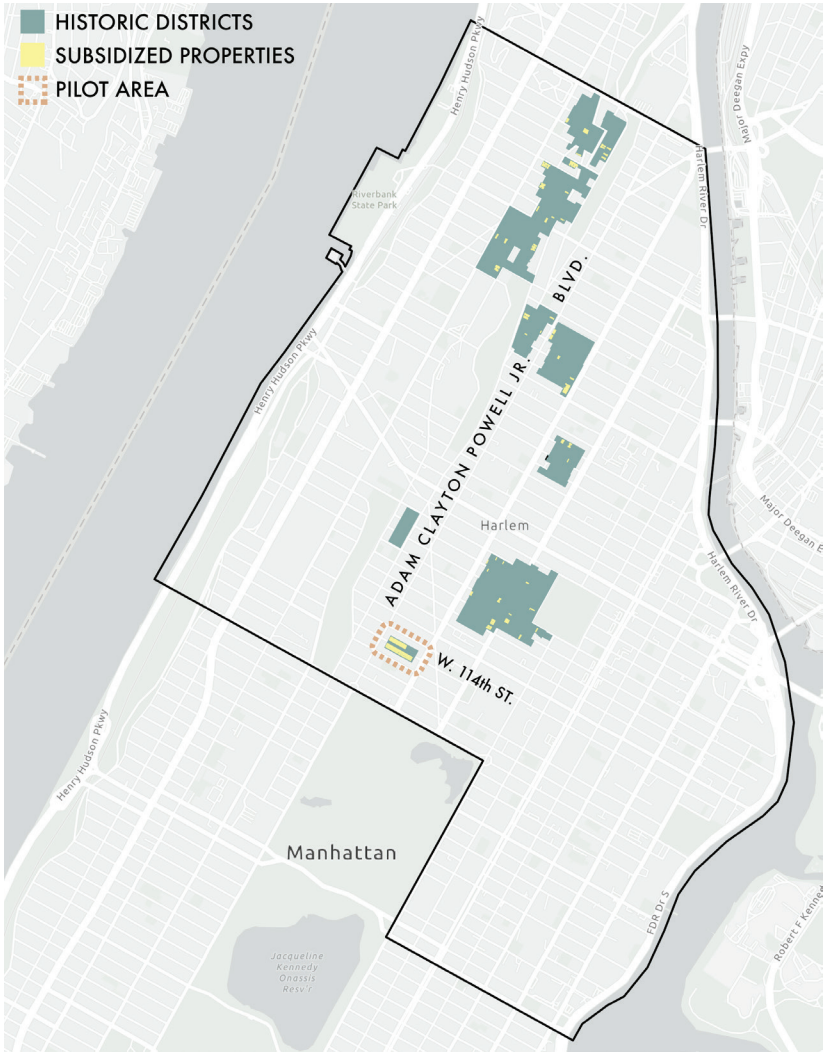
Finally, the addition of green space equal to that of these building footprints has the potential to drastically increase Harlem's usable open space.

In addition to these key issues examined by our studio, this proposal also considers Local Laws 92 and 94 of the New York City Climate Mobilization Act, which states that all buildings, with some exceptions, undergoing substantial roof alterations must implement either green roofs, solar panels, or some combination thereof.

Aerial view of green roofs in the NYCHA-owned Randolph Houses.

DESCRIPTION AND IMPLEMENTATION

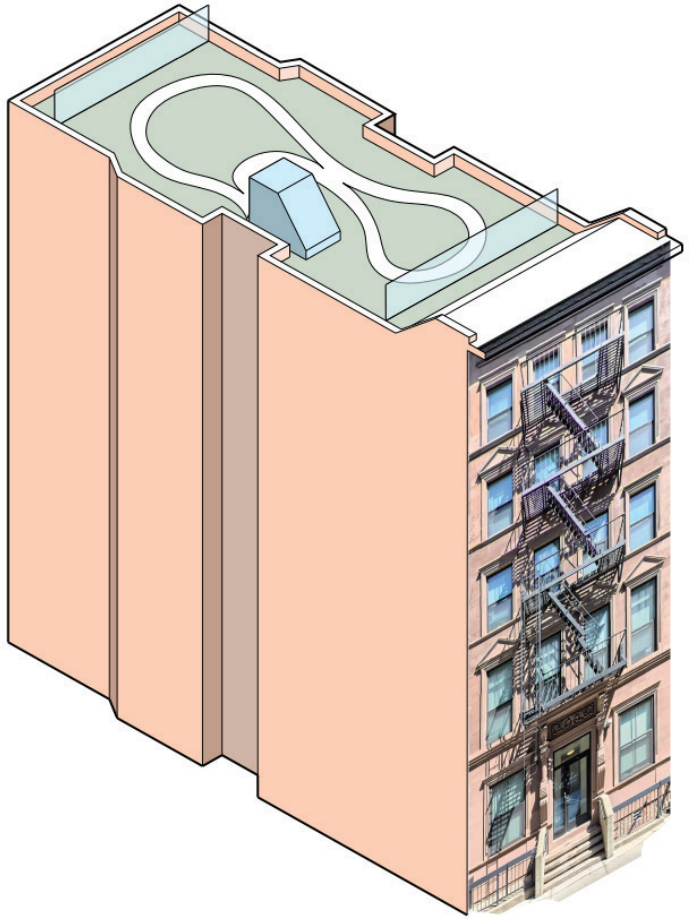
To address potential funding for a pilot project, two geographic determinants have been considered: situation within historic districts, based on either the National Register or the NYC Landmarks Preservation Commission; and, within these, properties that are government-subsidized. Geographic sighting also considers the potential need to relocate air-handling units to rooftops with the effects of climate change. Buildings employing green roofs in these areas would of course account for additional space for such needs. On the maps shown, historic districts are called out in blue and subsidized properties in yellow.



Locations showing NYCHA properties within historic districts.

Since tenements have been the subject of much of the studio's research, and because they represent a concentration of NYCHA ownership in this block along West 114th Street, the Randolph Houses could serve as the pilot location for the implementation of these coverings to historic residences in Harlem.

The green roofs proposed here would be extensive, meaning they would be around 2 inches thick and roughly 10 pounds per square foot. The Randolph Houses represent a potential for upwards of 50,000 square feet of extensive green covering. This figure accounts for voids, elevator overheads, and walking paths. If New York receives an average of 40 inches of rain per year, the Randolph Houses have the potential to retain one million gallons of rainwater.



Isometric view showing a possible arrangement of the green roof.

Plan view showing concept of Randolph Houses with green roofs implemented.

THE HARLEM SKY: VIEWSHEDS AND ENERGY OPEN-SCAPES

Schuyler Daniel

As the studio's historic contexts and key issues have established, preservation is entangled with many super-environmental forces, which together can perpetuate or dismantle systemic injustices. This proposal seeks to reconcile the relationship between preservation, energy, development, and economic justice through the implementation of a solar district.

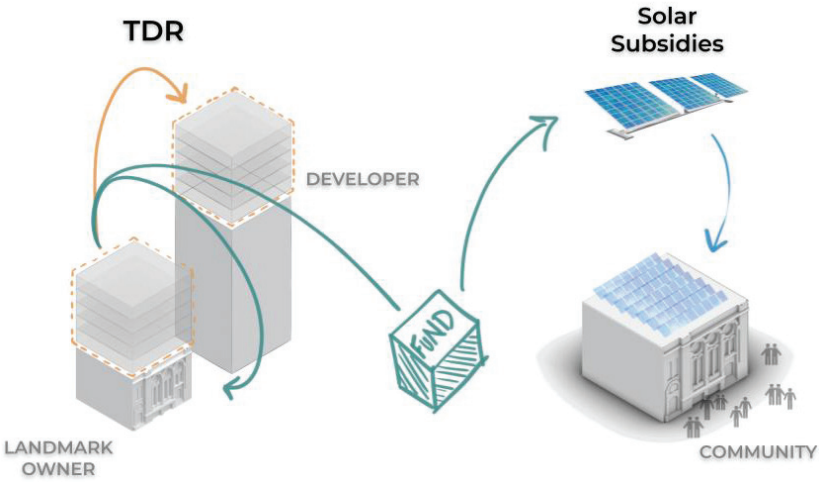


Diagram illustrating exchange of TDR, including the subsidization of solar retrofitting, and the entities involved.

KEY ISSUES ADDRESSED

- > NARRATIVES OF ENVIRONMENTAL JUSTICE ACTIVISM
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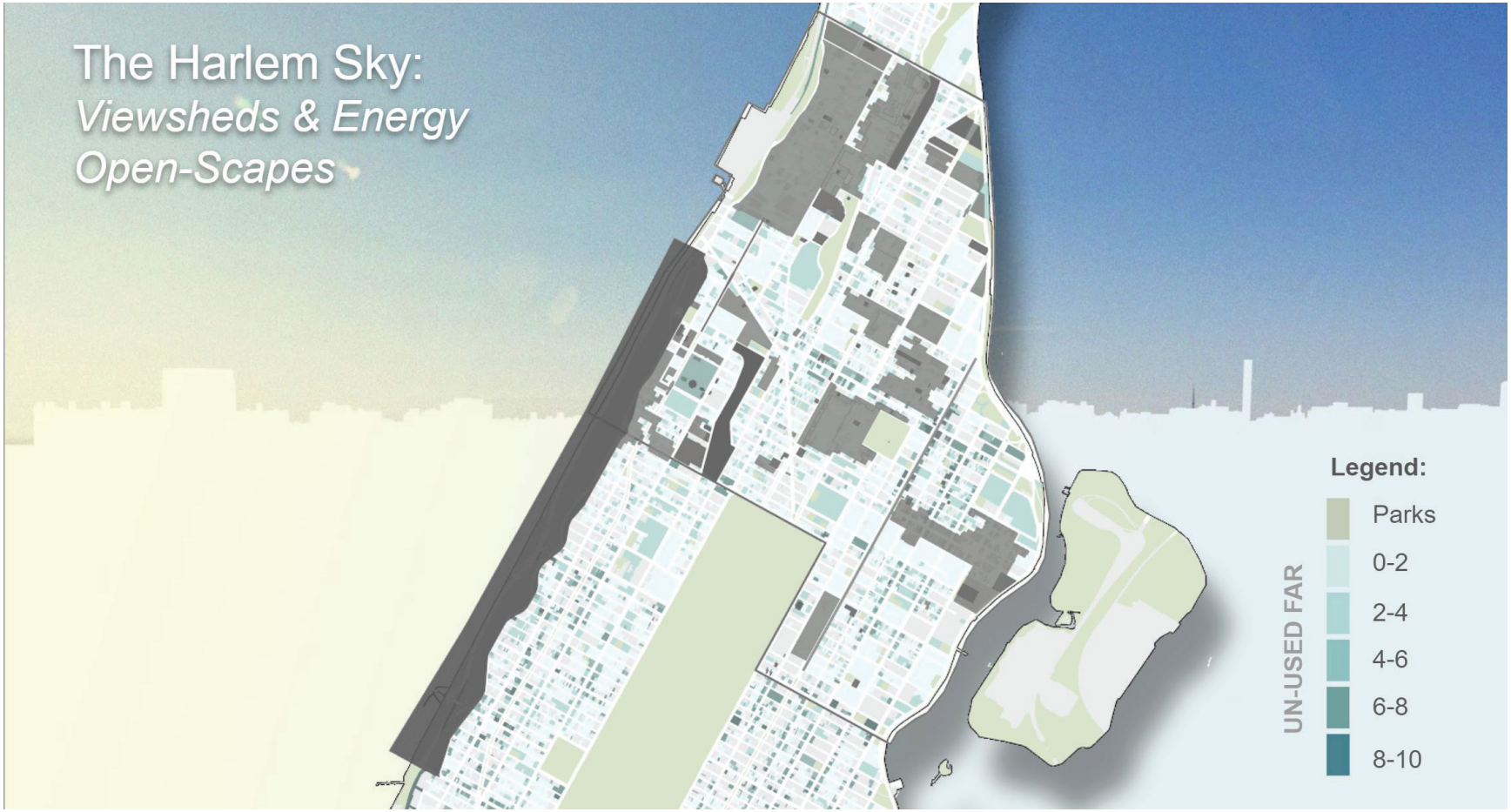
- > HARLEM SKY TENSIONS

BACKGROUND, SIGNIFICANCE, AND RATIONALE

The illustration shows available FAR (floor area ratio) additions in shades of blue and historic sites and districts in shades of black. Those properties shown in the darkest shades of blue are assumed to be at the highest risk of redevelopment due to the value of their unused FAR allowances. This map would be used to inform a pilot solar district.

This proposal utilizes Transferable Development Rights, or TDRs, as a mechanism to offer economic agency to individual building owners in the preservation of the existing low-rise building stock of Harlem. In essence, TDRs allow the owner of a building with existing air rights the opportunity to sell their air rights to be allocated elsewhere. Thus, the unrealized allowed height of a building could be sold by the owner and added to another project's air rights (NYC Dept. of City Planning, "Transferable Development Rights," n.d.). In this proposed scheme, as building owners choose to sell their air rights to developers outside of a designated district, a percent of the sale would go into a fund accessible to other owners within the low-rise district for the purchase and energy retrofit of solar panels for buildings within a designated receiving district.



Map showing unused residential FAR in shades of blue and historic districts imported from the Landmarks Preservation Commission Landmarks Map.

In essence, this system benefits three parties: "The owner of a designated landmark building can realize an economic gain by selling their unbuilt, but allowable, development rights; the buyer of these rights, in return, can acquire additional floor area they would otherwise not have; the neighborhood, meanwhile, can retain an the amenity of a revitalized landmark" (NYC Dept. of City Planning, "Transferable Development Rights," n.d.). This proposal also aligns with WE ACT's initiative called "Community Power," launched in 2016 to identify "the need for energy independence as a priority in Northern Manhattan, and specifically for alternatives to the fossil fuel power being offered by existing utilities" (Callaway, n.d.).

In 2015, the New York City Department of City Planning released a survey of existing TDR regulations and cases. This report discussed two instances of preservation and planning through the use of TDRs, including the High Line and Theater Subdistrict. At the Theater Subdistrict, the goal was to preserve the Broadway theater industry "in the face of office and residential development encroaching from adjacent neighborhoods," while the High Line sought to preserve the sense of open space at the rail's 30-foot elevation. The two schemes vary in how they specify receiving sites, size restrictions on transfer amounts, and how review processes take place. The Theater Subdistrict, especially, is considered to be a success for its widening of TDR-receiving areas to anywhere within the subdistrict and the creation of a fund to promote theater use and preservation at an initial rate of $10 per square foot of transferred area (NYC Department of City Planning, "Transferable Development Rights," n.d.).

Mount Morris Historic District and Extension, the proposed pilot Solar District. Receiving areas proposed to be adjacent avenues outside of the district or Second Avenue in East Harlem, where there is an existing high ratio of unused Residential FAR.

Case study block in Central Harlem used to assess solar energy viability within the context of existing energy and floor area demands.

DESCRIPTION AND IMPLEMENTATION

This proposal suggests the implementation of a pilot Solar District within the area of the Mount Morris Park Historic District and Extension. Landmarked buildings and districts have a standing history of using TDRs as a mechanism of preservation, where landmark "owners would sell unused development rights to 'adjacent' properties, which include 'contiguous' properties plus those directly across the street or that share an intersection" (NYC Department of City Planning, "Transferable Development Rights," n.d.). Transfer could also happen at potentially greater distances. This location capitalizes on existing landmark regulation and seeks to promote energy transition in landmarked areas. While a receiving district or zone is not specified by this proposal, potential sites should be further investigated and could include properties adjacent to the Historic District along corridors such as Adam Clayton Powell Boulevard or across greater distances to Second or Third Avenues.would go into a fund accessible to other owners within the low-rise district for the purchase and energy retrofit of solar panels for buildings within a designated receiving district.

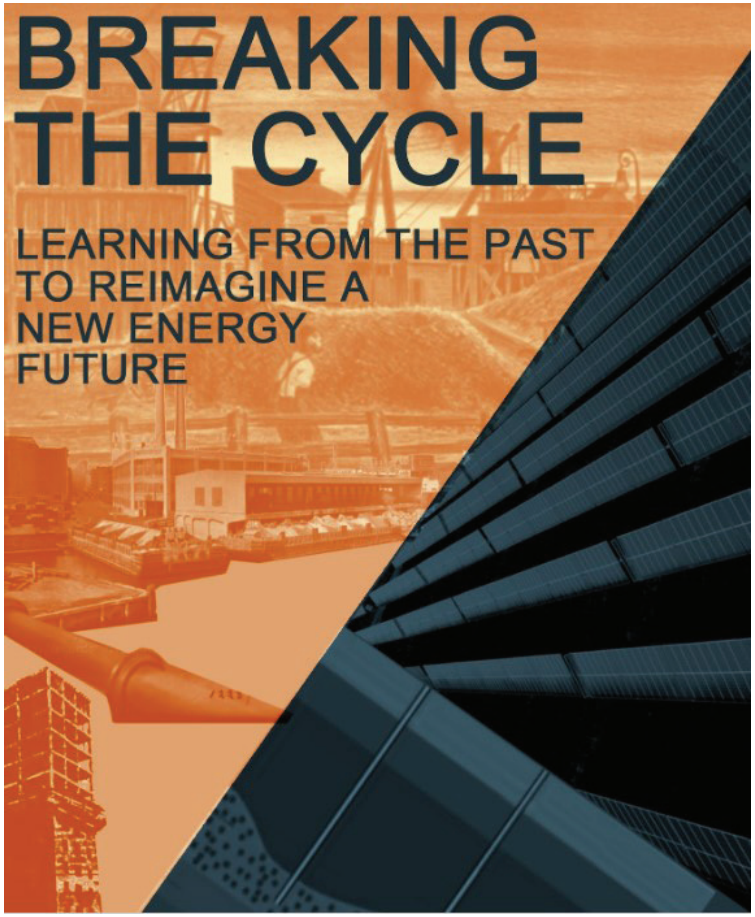
Analysis of existing conditions and energy demands support the viability of solar. The block between 119th and 120th Streets to the east of Adam Clayton Powell Boulevard serves as a test case. If assumed averages throughout the block for floor area and average energy are 4,900 square feet and 7 watts per square foot per hour, respectively, then the average building in this block is using 34.3 kilowatts per hour (Sherpa, n.d.). Currently, standardized residential solar panels generate up to 400 watts per hour (Lumen Now, n.d.). Using these panels, the average building would need eighty-six solar panels to supply 100 percent of its electricity demands. Looking at roof area availability, if the average roof area is about 2,000 square feet, this is enough area to accommodate around 110 panels, exceeding the average amount necessary.

This solar district acts in simultaneous support of the preservation of Harlem's historic assets, such as the open sky and characteristically shorter building stock, while harnessing the unobstructed sunlight reaching the tops of buildings. While many historic structures and districts qualify for exemption from updated energy codes, this proposal recognizes preservation's responsibility to respond to New York's 2019 Climate Mobilization Act, specifically requiring all new construction to have either green roofs or solar panels. Ultimately, the solar district open-scape has three goals: distribution of economic agency through TDRs, improving access to renewable energy, and historic preservation both on the ground and in the sky.

Long-term vision for Harlem's low-rise roof-scape.

BREAKING THE CYCLE: LEARNING FROM THE PAST TO REIMAGINE A NEW ENERGY FUTURE

Michelle Leach and Hongye Wang



Poster of Breaking the Cycle exhibition project.

KEY ISSUES ADDRESSED

- > NARRATIVES OF ENVIRONMENTAL JUSTICE ACTIVISM
- > LACK OF SPATIAL ENCOUNTERS WITH ENVIRONMENTAL JUSTICE HISTORIES
- > LANSCAPE VULNERABILITY
- > VULNERABLE POPULATIONS
- > HOUSING INEQUITIES
- > DISPLACEMENT RISKS
- > REDEVELOPMENT CONFLICTS
- > OPEN SPACE DISPARITIES
- > HARLEM SKY TENSIONS

This proposal aims to create an interactive experience for the community to connect with the history of Harlem's energy sources, while also providing resources for a new sustainable future. To accomplish this, the project includes two pieces. The first is an exhibition that would be adaptable to both indoor and outdoor community spaces. The second is a website to connect those who have agency in the built environment with resources to transition to renewable energy.

BACKGROUND, SIGNIFICANCE, AND RATIONALE

From the historical context research, we found that initial inequities in energy resources took root in Harlem at the beginning of the twentieth century. Slow expansion of electricity and the absence of a district heating system disadvantaged Harlem. These disparities were repeated over time, leading to slow fuel changes. As Harlem enters a new phase of energy transition to renewable resources, some of the mistakes of former energy transitions are being repeated.

Due to the progression of fuel types over time, the spatial elements of previous fuels have been adapted or demolished. While the exhibit is intended to be moveable and adaptable to most spaces, there are many locations in Harlem that relate to its energy history that could give added significance to the exhibit. Our exhibition would take place in public spaces that could be accessible to the community to emphasize transparency in new energy forms. One example of such a space would be the Percy Sutton Educational Complex. This school was one of the last remaining coal-heated schools in Manhattan. It did not switch fuels until 1997 (Hernandez 1997). Harlem River Park would be an ideal outdoor space because it sits on the site of a former coal yard. WE ACT also plans to create a new Urban Environmental Education Center (WE ACT, n.d.). This location could give further weight to the exhibit because of WE ACT's long history in environmental justice, and the content of the exhibit supports their efforts to expand solar in Harlem. All of these spaces are, or will be, integrated spaces in the community and would engage residents in places they already inhabit. The examples given here show that the exhibition could take place in community and educational centers, as well as in spaces with hidden energy histories.

This proposal aims to address issues of past energy transitions identified in the historic context analysis (see Appendix A). These include the way past transitions integrated with redevelopment and displacement, a need for trust building within the community for equitable changes in the built environment, and a lack of engagement from landlords during energy transitions. All of these issues must be resolved for a successful and equitable transition to renewables. The importance of renewable energy and resources related to renewable options must reach all actors in the built environment.

Percy E. Sutton Educational Campus as a possible exhibition space due to its history with energy transitions.

Harlem River Park was the location of a coal yard in the late nineteenth and early twentieth centuries.

The future WE ACT educational space could act as a community and educational space for the exhibit.

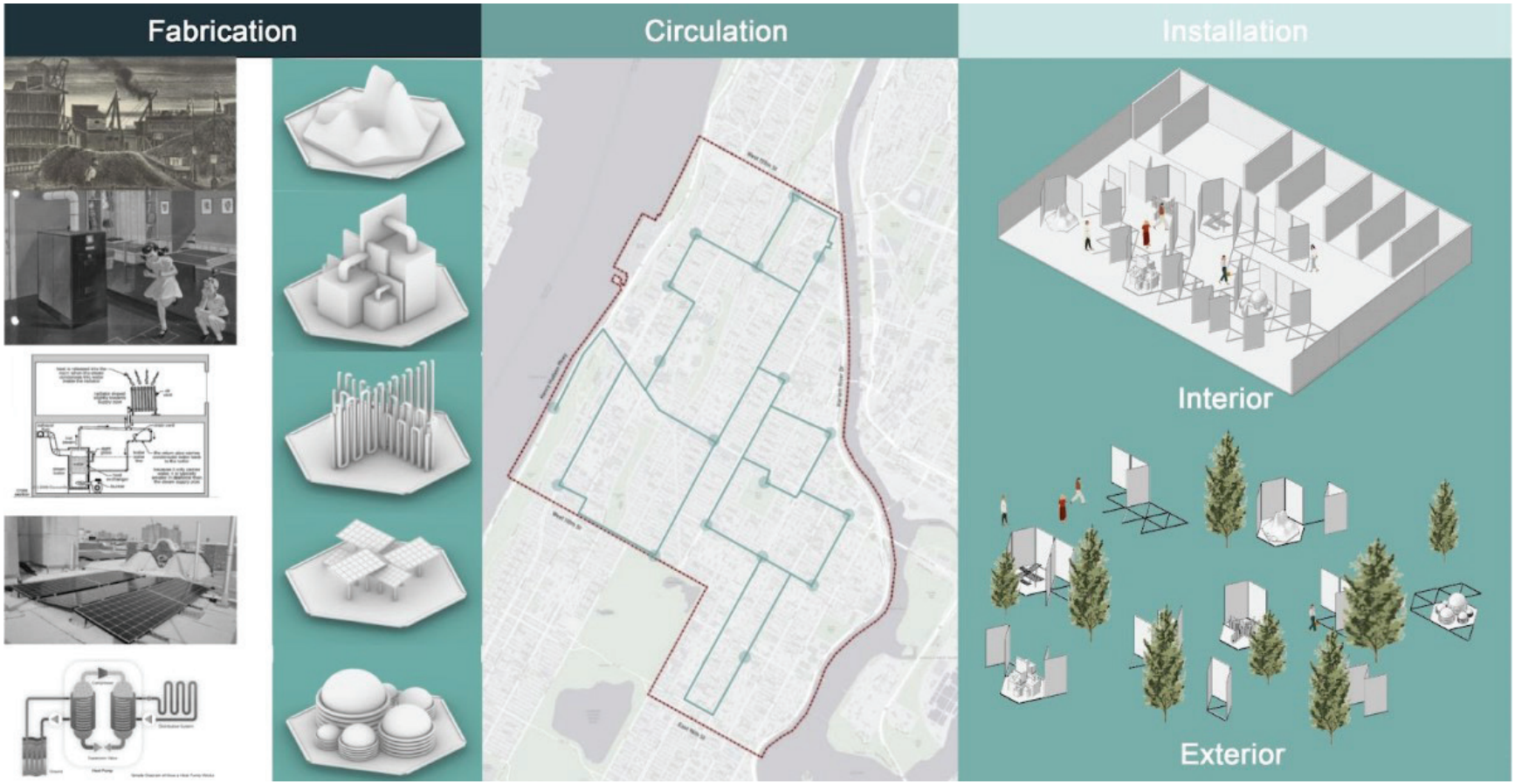


Diagram showing the inspiration from energy technologies to form models to represent different energy eras and the installation in both indoor and outdoor settings.

DESCRIPTION AND IMPLEMENTATION

The exhibition follows a timeline of energy transitions. The eras of focus include coal, heating oil, natural gas, and emerging energy technologies viable in Harlem. These eras allow the exhibit to spotlight the complexities of renter and landlord relationships, past efforts to rehabilitate housing stock for energy, and the modern implications of slow energy transitions.

The section on contemporary renewable energy opportunities is divided into two sections: solar and geothermal. Both options bring the opportunity for community control in energy generation. There is an increasing number of solar resources and initiatives. While geothermal is a less-researched possibility, if it emerges as a viable, sustainable, and equitable option, it too would be included in the exhibit.

The three-dimensional portion of the exhibition is inspired by creating a modern interpretation of the Harlem energy transitions. Five historic energy equipment types—the coal yard, oil boiler, steam system, solar panel, and geothermal system—are the prototypes for the installation. They could be produced in uniform modules, which makes them easier to assemble, transport, install, and disassemble as the exhibit circulates around venues. As a temporary exhibition, it has a higher flexibility both in space and time while using limited resources.

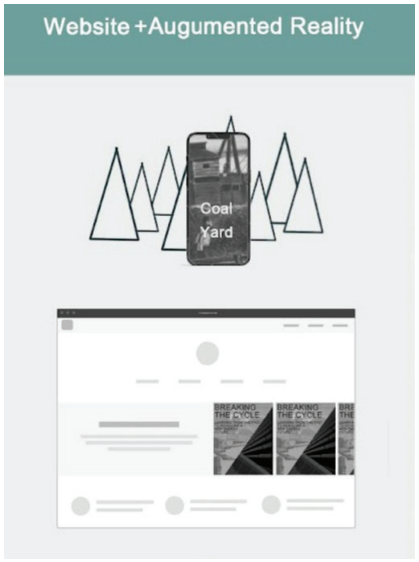
The renderings demonstrate how the installation can fit in both an interior environment of different room shapes and sizes, or an exterior environment and its landscape. The models and textual information could be moved and assembled in various orientations depending on the space they need to occupy. The modules provide a more tactile experience to supplement historic images and exhibition

The exhibition in an indoor space with moveable panels and models.

The exhibition in an outdoor space, highlighting the opportunity to uncover hidden energy histories.

text. The units display the obsolete or unseen infrastructure associated with energy, bringing visitors much closer to their energy sources. Because many former energy sites were converted to public spaces, it is important for the exhibit to be adaptable to the outdoors. This also creates further opportunity for the public to participate. It brings invisible energy histories back into public space, where anyone could stumble upon the information while going about their daily life.

Because the exhibition would be mobile and temporary, a website would act as a more permanent reference. This website can provide an easily updatable resource to reach a wider range of people who have agency in the built environment. This takes inspiration from the community actors the studio interviewed who have established connections within the community to guide landlords, tenants, and homeowners to necessary resources (Curtis Archer, unpublished interview, March 31, 2022). A resource such as this one could be integrated into this existing framework as an additional reference to be recommended to those interested in renewables in Harlem, providing information on incentives, funding, and initiatives. This network also encompasses some of the community actors that would be instrumental in making such an exhibition possible. WE ACT and its affiliates in its solar initiative would be great partners for the exhibit, because their goals for implementing solar uptown align with this proposal (Callaway, n.d.). To place the exhibit in parks, a partnership with NYC Department of Parks and Recreation would also benefit the project.



The website and app would provide information about historical energy sources and resources relating to renewable energy.

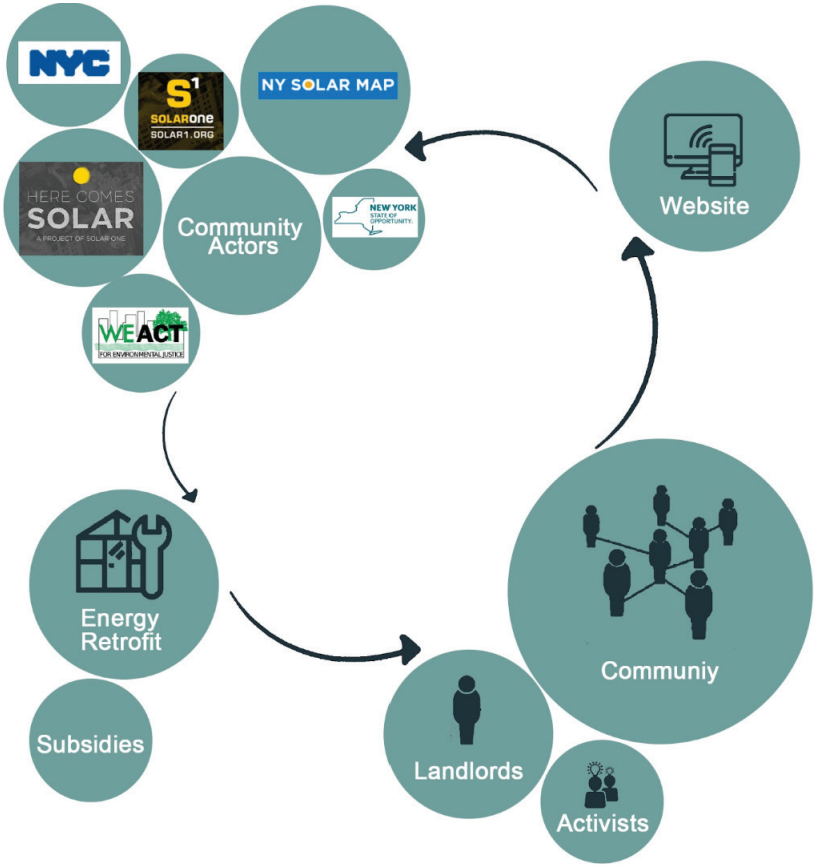


Diagram displaying the connection between funds and information, the website, community members, and community actors.

The website would provide a range of information. This includes information about the in-person exhibit such as schedule, location, and contact information if a community actor were interested in hosting the exhibit. The historical and modern information about energy transitions presented in the exhibit would have a more permanent form here, and most importantly, it would guide visitors to community initiatives, information, and financial resources for solar and geothermal energy.

Between the exhibit and the long-lasting website, this proposal could create a wider conversation about renewable options in Harlem. Solar and geothermal pose new opportunities for Harlem to take control of their energy production for a more sustainable and equitable future. Prioritizing equity in the transition to renewables is vital to ensuring that past injustices in energy access are not repeated once again.

Image of the proposed website.

EXHIBITION INFORMATION HARLEM ENERGY HISORY RENEWABLE POSSIBILITIES CLEAN ENERGY RESOURCES

EXTERNAL RESOURCES

NY SOLAR MAP

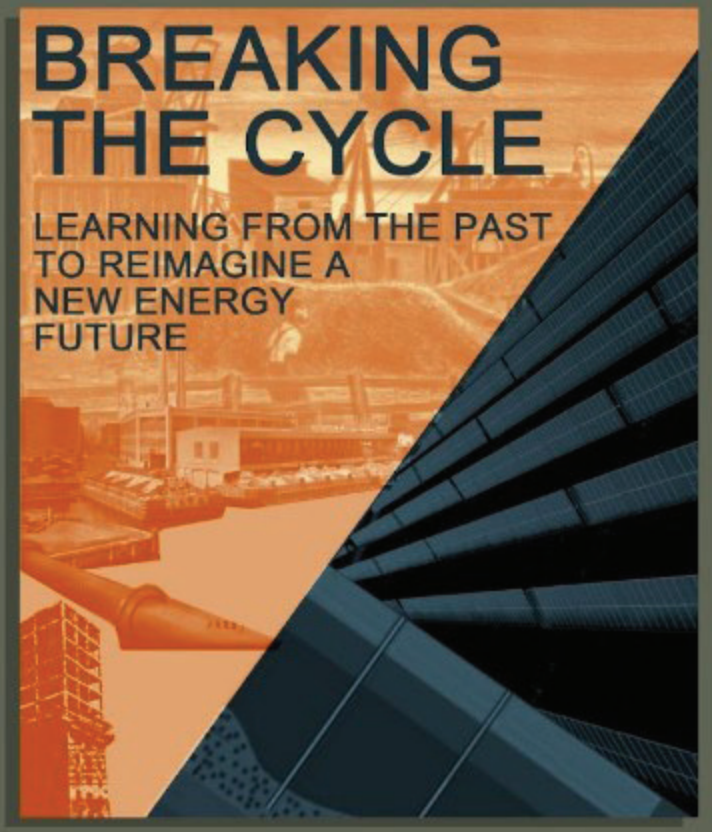
SOLAR

SOLARone

WE ACT

Where Could My Energy Come From in the Future?

New York city is attempting to increase the part renewable energy sources play in the electric grid, but Harlem residents no longer have to wait for the city to take action to make energy changes in the community. In the past, energy sources have been determined by players outside the boundaries of the neighborhood, but with solar and geothermal possibilities, Harlem has the exciting opportunity to generate its own energy. There are an increasing number of resources to make solar more financially viable in New York city, and institutions like We Act have committed to expanding solar uptown. Whether you are a tenant, property owner, or landlord, there are initiatives and incentives to help you take steps toward a more sustainable future. While there are fewer existing incentives and far less information on geothermal energy, the city of New York has identified it as a feasible option for uptown residences. As more data and resources become available, these resources will also be found under the Clean Energy Resource to give property owners the tools to evaluate the best, sustainable option for their property.



REDESIGNING PLEASANT VILLAGE COMMUNITY GARDEN FOR RESILIENCY

Winnie Michi Trujillo, Clara Yip, Damiana Yousef, and Zihao Zhang

PVCG photo of children playing in the garden, c. 1990s.

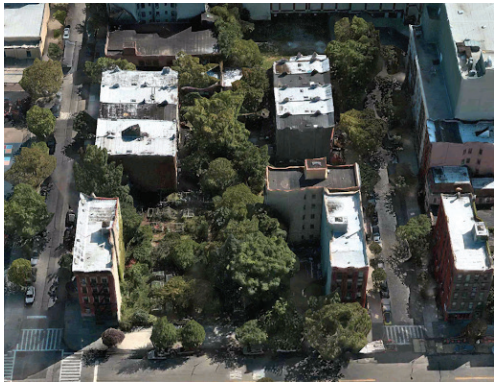
KEY ISSUES ADDRESSED

- > NARRATIVES OF ENVIRONMENTAL JUSTICE ACTIVISM
- > LACK OF SPATIAL ENCOUNTERS WITH ENVIRONMENTAL JUSTICE HISTORIES
- > LANSCAPE VULNERABILITY
- > VULNERABLE POPULATIONS
- > HOUSING INEQUITIES
- > DISPLACEMENT RISKS
- > REDEVELOPMENT CONFLICTS
- > OPEN SPACE DISPARITIES
- > HARLEM SKY TENSIONS

BACKGROUND AND SIGNIFICANCE

Community gardens are host to meaningful community interaction, and have enormous social benefits, such as place attachment (Petrovic et al. 2019). They also hold the potential for restorative justice and climate benefits, such as stormwater collection and staying cool in the shade (Ramaswami 2012). Moreover, they tend to serve vulnerable populations. However, community gardens such as Pleasant Village Community Garden (PVCG) often run the unfortunate risk of being demolished or reduced in size to make room for development. New affordable housing has been slated for a portion of the PVCG site.

Rendering of new development on 118th Street.



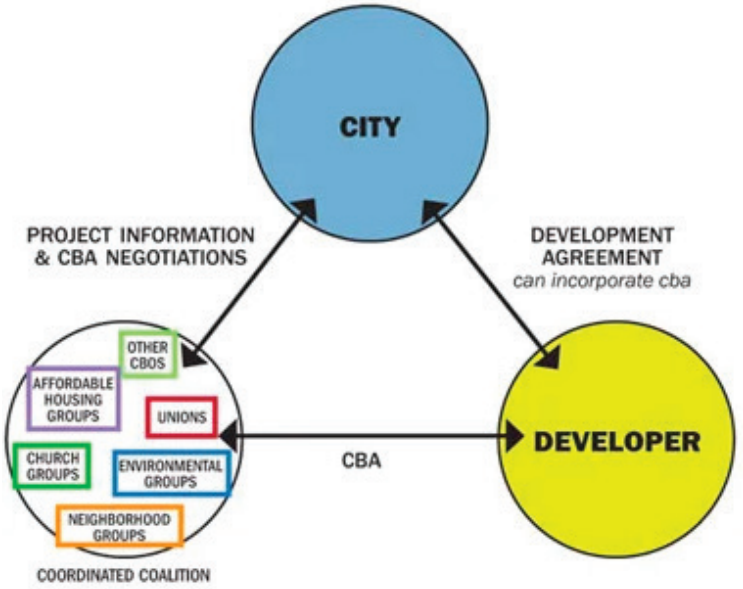
Aerial view of Pleasant Village Community Garden.

This proposal presents a preservation design for the site at PVCG that seeks to mitigate the effects of the new development. Established in 1974, PVCG is one of the oldest gardens in all of East Harlem. It has provided the community in East Harlem with an opportunity to participate in gardening, composting, and other outdoor activities for almost fifty years (Johnson 2017). Located on the easternmost avenue in East Harlem, Pleasant Avenue has a rich history of multiculturalism as immigrants from Italy and Puerto Rico have settled here since the early twentieth century. The garden is also situated between 118th and 119th Streets. This proposal aims to memorialize the cultural heritage of the neighborhood and the restorative justice activism of the garden's founders, the Green Guerillas. The design aims to assist the community gardeners at PVCG in the redesign of their garden, which must undergo remediation due to the recent discovery of contamination in its soils.

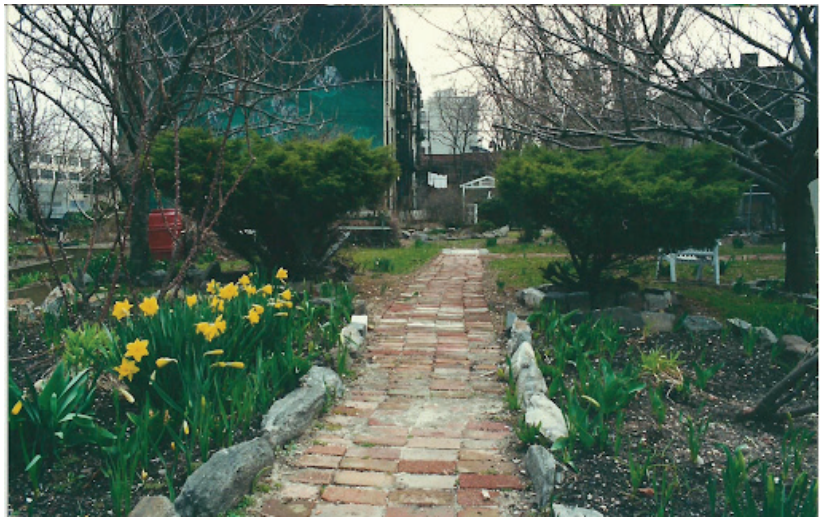
COMMUNITY BENEFITS AGREEMENT

The main purpose of the Community Benefits Agreement (CBA) is to protect the garden as a place of heritage. The stories of PVCG and its members as activists for the environment have power to educate the public on many topics of environmental and climate justice, including 1) narratives of environmental justice activism, 2) lack of spatial encounters with environmental justice histories, 3) landscape vulnerability, 4) vulnerable populations, 5) redevelopment conflicts, and 6) open space disparities. The new affordable housing development can valorize this portion of *occupied* green space.

The developers, Ascendant and MDG, along with the Department of Housing and Preservation, have published their proposal plans for the new development project



How development works with a CBA.



Pleasant Village Community Garden.

of 100-percent affordable housing. The project, called "Las Raices" (Ascendant Neighborhood Development 2021), will also impact another of East Harlem's gardens, Jackie Robinson Community Garden at 103 East 122nd Street. There are many environmental groups that have specialized in the support and sustainability of gardens. These groups can assist with the preservation aspect of the project,

but also in the consultation of creating the CBA model. Some of these actors include Green Guerillas, Trust for Public Land, The Climate Reality Project, More Gardens!, NYC CGC, and Project Harmony, one of the first community garden groups in Harlem to lose one of its gardens. With the help of these collaborators, a CBA could serve as a guide for policymakers, community professionals, and developers, and establish a model for future at-risk gardeners who might like to create their own compensation proposals. New developments like Las Raices can recognize the cultural heritage values and potential environmental benefits that may be lost when green space operating as community gardens is dispossessed. Examples of restored compensation might look like open access hours to a community green roof garden, and financial assistance in the remediation of the site.

Gardener Jake Cuellare-Doran with Andres Cuellar.

Carlos Melendez, Vice President.

Members hard at work tending to their garden beds.

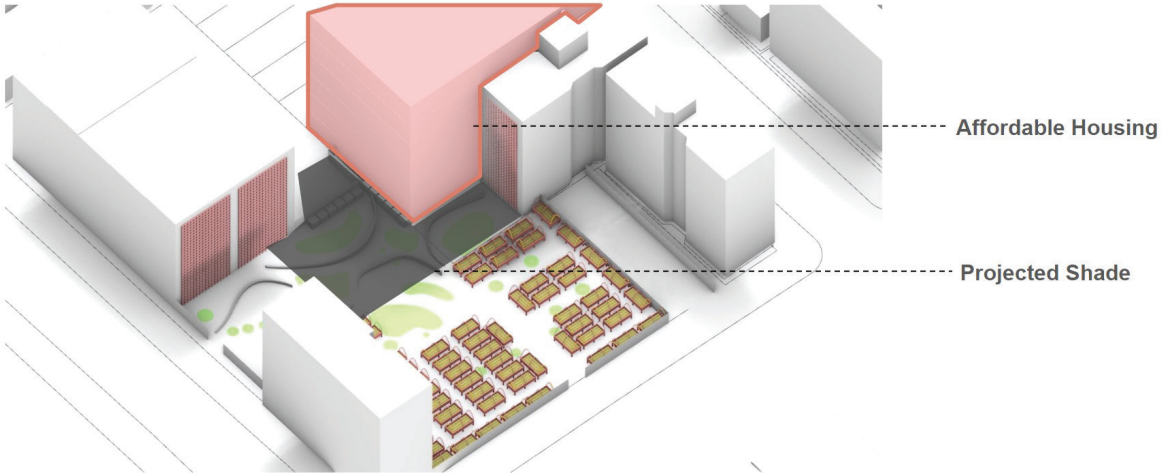
East Harlem would suffer from another garden lost. Previously outlined research from this studio shows that per capita green space in both Central and East Harlem is lacking. If development must occur, a CBA should address cultural values at risk of loss and disruption in PVCG and should minimize impacts onthe current activities tied to restorative justice, such as: a) the composting program, b) raising bee pollinator plants with native species of the land, c) the maintenance of a chicken coop for food equity and education, and d) green infrastructure that collects stormwater in a FEMA-designated flood zone. Additional CBA-negotiated activities might include:

- Rebuilding PVCG's chicken coop and compost garden.
- Financing soil testing, soil remediation, and the addition of remediating plants like mustard plants and hemp.
- Creating a new community area-cum-open space (rooftop or elsewhere) for Pleasant Avenue folks to enjoy the shade on a hot day, with open access hours.
- Maintaining a compost facility that supports the neighborhood.
- Sponsoring the design of a memorial to honor the garden's 1970s Green Guerilla and "seed bombing" origins (Jejune Magazine 2017).
- Using fences at PVCG to exhibit posters and images that act as spatial encounters with related histories of environmental justice, including redevelopment conflicts and landscape vulnerabilities.

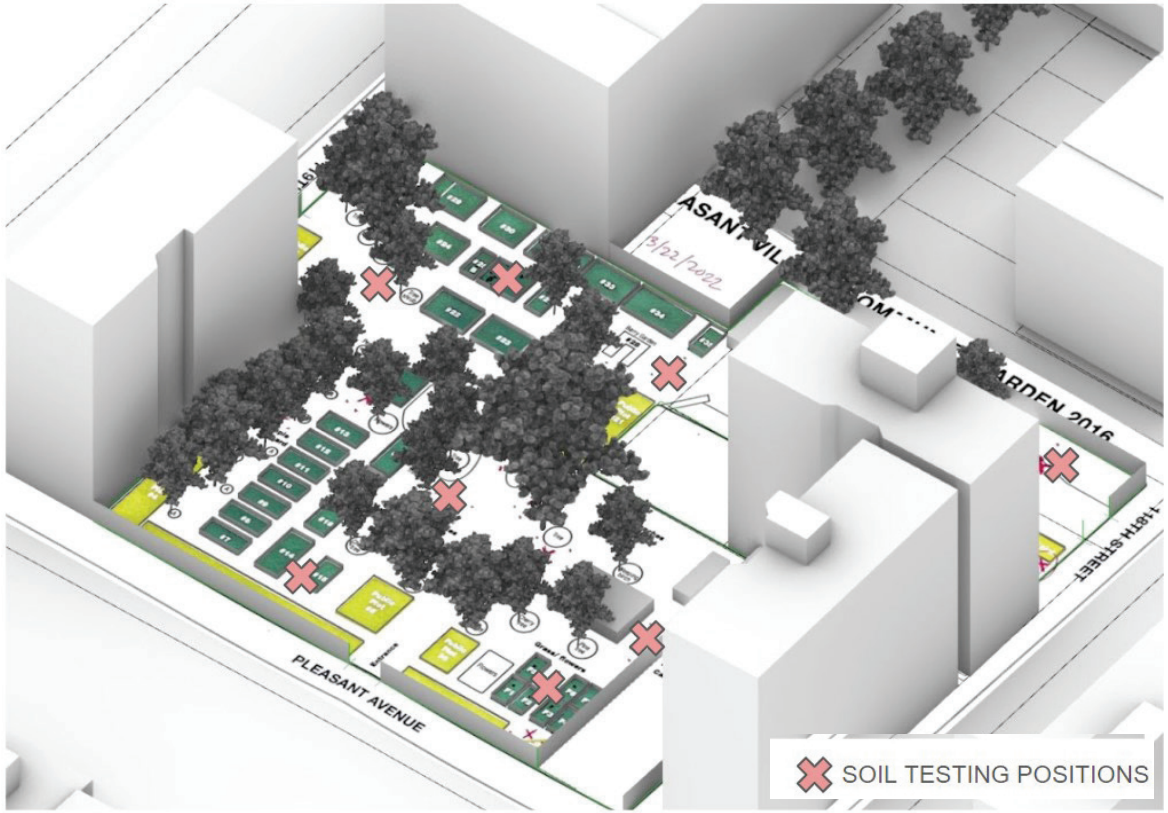
Spatial transformations should allow community members to retain their agency as rightful members of the neighborhood. This proposal can use the tools of preservation to memorialize this space and keep it as a place where its members can engage with each other in shared values. In forming a cultural significance statement, this proposal would engage the neighborhood in determining who this space has and will serve. Through the preservation of Pleasant Village Community Garden, the stories of the people who have fought so hard to address environmental injustice disparities could be commemorated and new precedents set. This proposal of a CBA centers on ensuring that the new space continues to serve the community as a place where its EJ histories and many EJ-related activities can be encountered. .

REDESIGNING PLEASANT VILLAGE COMMUNITY

To complement the approach of the CBA, this dimension of the proposal provides a more detailed design for a reimagined community garden, to assist in community-engaged visioning efforts. Due to its current size and location, the project could give PVCG the potential to be a part of the East Harlem River's climate resilient green infrastructure projects.



3D rendering of the garden with affordable housing and added shade.



Northeast rendering of the current garden state with soil testing locations.

In the accompanying diagram, the red area indicates where the affordable housing will be placed. The garden will be downsized, and more shade will be added. Acknowledging the loss of community space, this proposal advocates to redesign space and maintain the critical factors that the community garden members want to keep in mind: containing the contaminated soil, improving the overall garden condition, and remembering the Lenape people who once occupied the land, while adapting to the newly added shade.

The pink symbols in the accompanying diagram indicate the soil testing sample locations. Recent testing indicates high traces of lead, arsenic, chromium, and cadmium. A primary goal of redesign is to address contaminated soils.

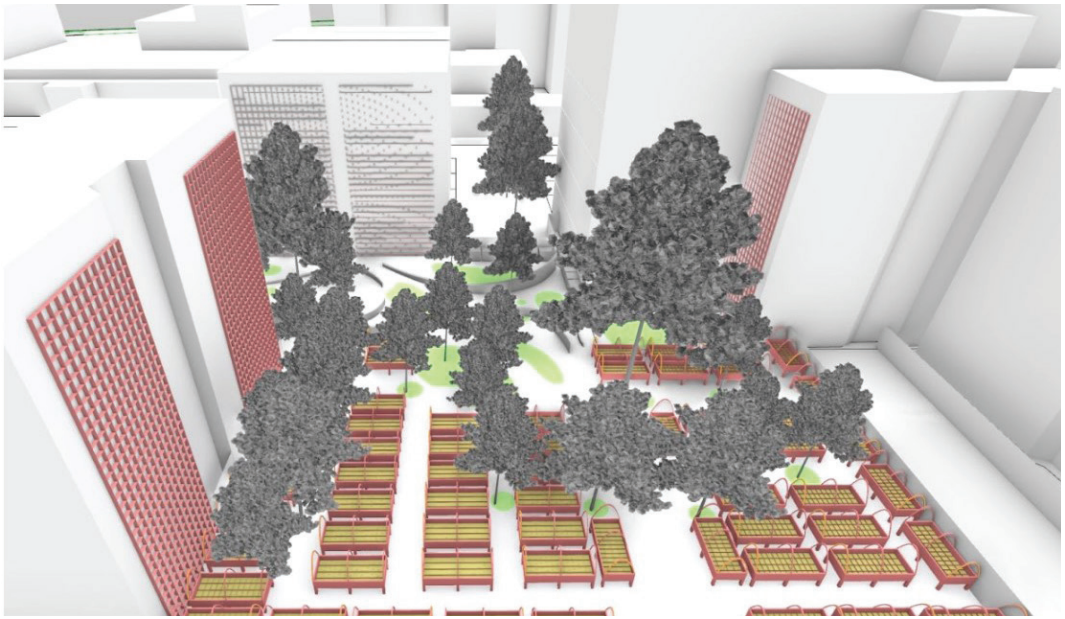
Soil testing process.

Northeast elevation of the current garden state with concentration of planting lots.

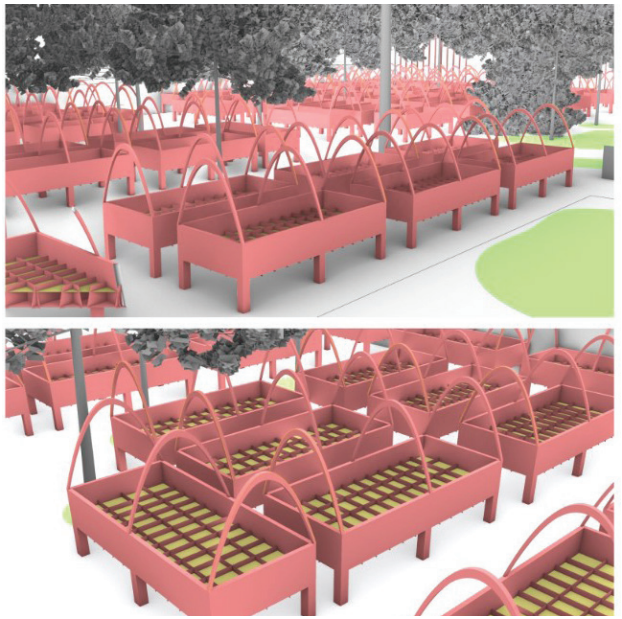
A second goal is to accommodate community garden membership. The green area of the map shows the main concentration of planting lots, which are thirty in total. However, as the community garden manager explained, there are currently fifty-six members, which means many are still on the waiting list to get their plots. This project proposes reorganizing the plots to make them more efficient and to respond to the shade caused by the construction of the new affordable housing buildings.

The third goal of this proposal is to provide more composting boxes and storage space for the garden. The star shows the position of compost boxes.

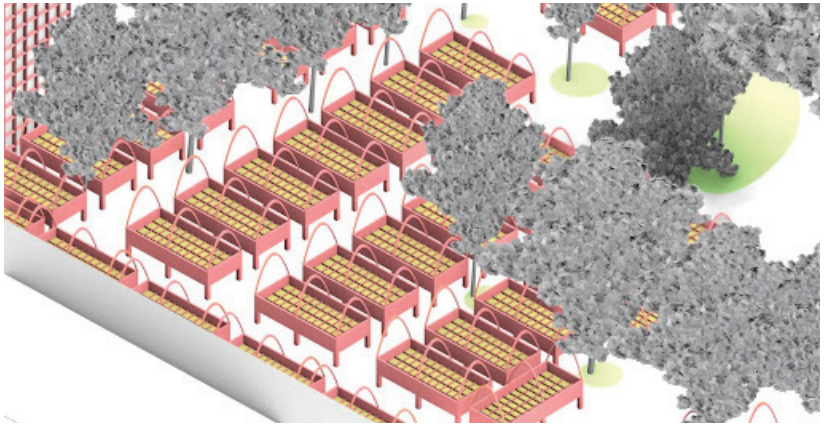
Higher gardening beds would help separate the contaminated soil from the new earth and provide space for storage. The proposed gardening beds also act as a sculptural element resembling the ancestral homes of the Lenape people. Vertical gardening beds would increase space for use, and add more composting bins.



East elevation of 3D garden rendering with raised garden bed detailing.



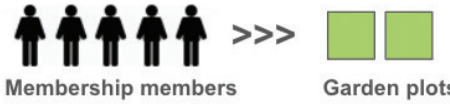
Lenape housing.



3D rendering of raised garden beds.

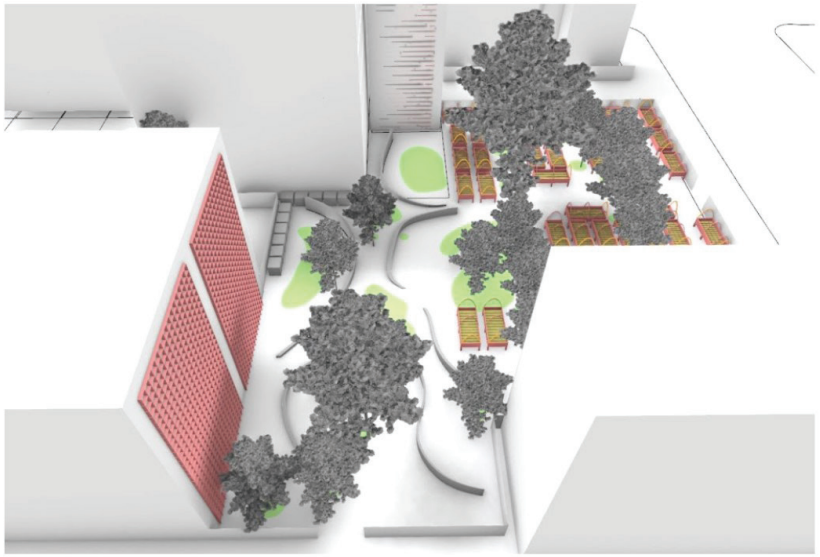
Workers composting in the Pleasant Village Community Garden.

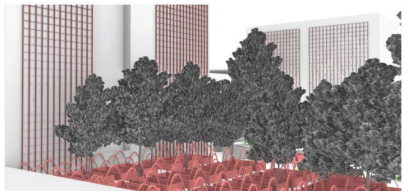
PVCG has provided East Harlem with a range of social and environmental benefits over the years. Although a piece of their land will be taken and used for affordable housing, we believe that these plans will help preserve its value and maximize space, as it continues to be a joyful place for the community.

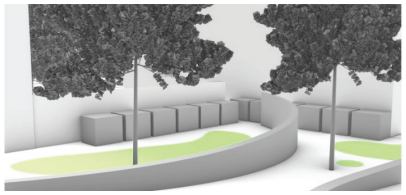


Member-to-plot ratio.

Composting bins of Pleasant Village Community Garden.



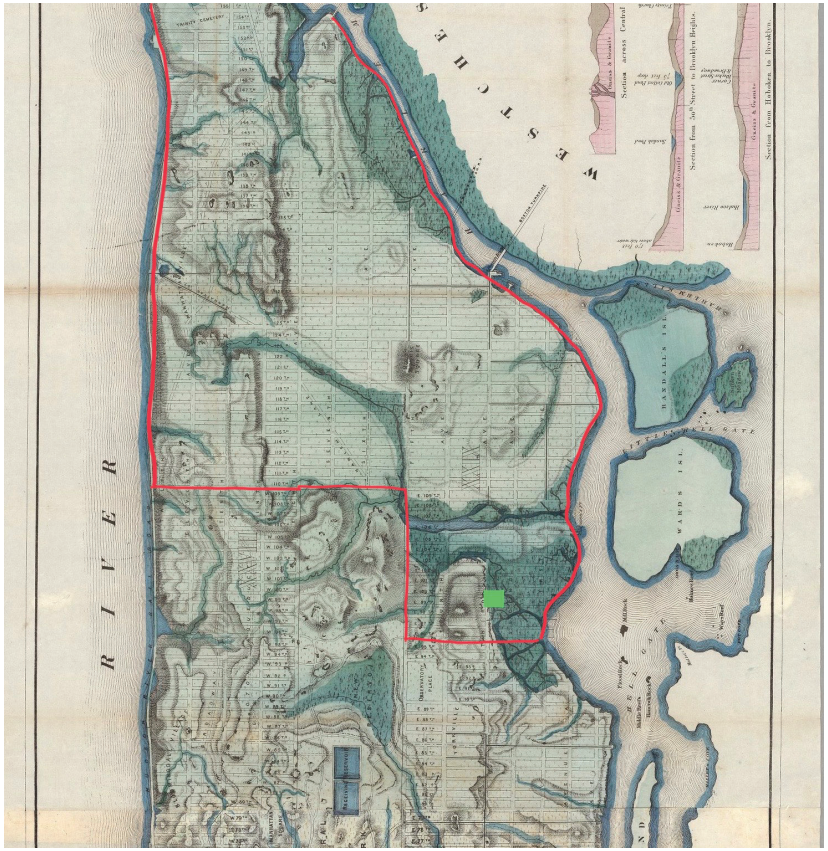




North elevation of 3D garden rendering with garden detailing.

CREEK CORNER

Adam Brodheim, Mimi Vaughan, and Emily Conklin



Cherry Tree Park (site of Creek Corner) is located at the green square on this 1865 map of Manhattan.

KEY ISSUES ADDRESSED

> NARRATIVES OF ENVIRONMENTAL JUSTICE ACTIVISM

> LACK OF SPATIAL ENCOUNTERS WITH ENVIRONMENTAL JUSTICE HISTORIES

> LANSCAPE VULNERABILITY

> VULNERABLE POPULATIONS

> HOUSING INEQUITIES

> DISPLACEMENT RISKS

> REDEVELOPMENT CONFLICTS

> OPEN SPACE DISPARITIES

> HARLEM SKY TENSIONS

Throughout our studies of the history of environmental justice in Harlem, we began to understand the correlation between the lack of physical space held by environmental justice histories, the inherent vulnerability of the landscape (both natural and man-made), and the inequity of distributed green space. For the three of us, these issues collided and crystallized around the central importance of East Harlem's past as a marshland with Harlem Creek running through it. We sought a space in this critical location where we could physically ground this history of Harlem. Our proposal is to do this by bringing a brand new interactive children's sprinkler to the playground in Cherry Tree Park, a playground sited on what was once Harlem's marshland on Third Avenue and East 99th Street. This new water feature would consist not only of a new and improved spray head, but would create a flow of water that gushes through a model of the historic waterways of Harlem. Further, the project would combine Harlem's past with its present by overlaying New York City's street grid on top of the waterways model. We call this "Creek Corner," as it would inhabit a previously underutilized corner of Cherry Tree Park. It would enable community engagement with Harlem's histories and "daylight" areas in Harlem that once were marshland or riverbeds.

Cherry Tree Park (site of Creek Corner) is located at the green square.

SIGNIFICANCE AND RATIONALE

Harlem currently has minimal opportunities for interaction with histories of environmental justice. As noted earlier in this report, only three statements of significance for designated sites in Harlem explicitly mention environmental justice. This proposal for Creek Corner's physical space engages with concepts of landscape vulnerability and open space injustices, bringing these issues to the forefront by allowing for playful interaction around these challenging issues.

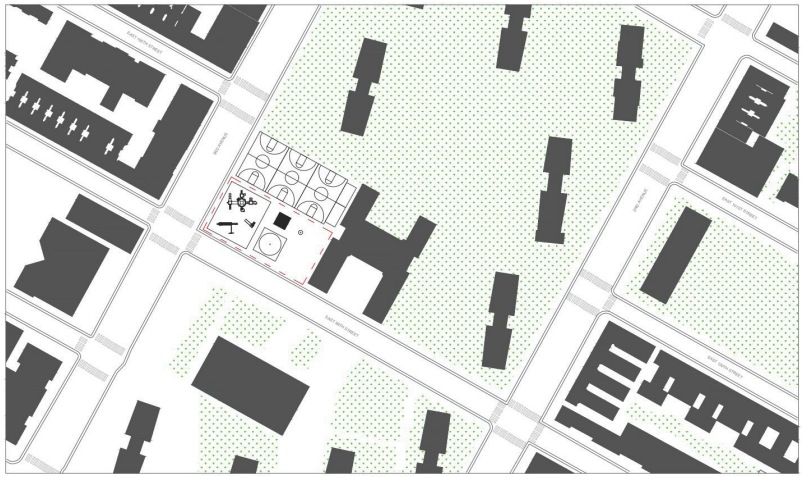
Cherry Tree Park is located on top of the former marshland known as The Harlem Flats. As such, Creek Corner would be located on top of the very historic story of vulnerability to which this proposal hopes to bring attention. This area of Harlem is particularly susceptible to flooding from both large storms and consequent storm surges, as well as flooding from heavy rainfall events. Sited here, Creek Corner would be well-positioned to tell powerful stories of environmental injustice and its lasting consequences for young and old audiences alike.

Harlem, and particularly East Harlem, suffers disproportionately during summer heat waves. Staying cool during the hot Harlem summer has historically been a priority for area residents, and is the center of a NYC Parks initiative, "Cool It" (NYC Dept. of Parks and Recreation, "'Cool It' Program," n.d.). This proposal's sprinkler revitalization offers a new, engaging, local solution to bring investment into Harlem's parks and would work to keep Harlem residents cool.

While bringing attention to these challenges does not solve them, Creek Corner posits that providing educational moments, particularly in a playground that caters to younger residents, is a meaningful first step in moving towards a more just and equitable Harlem.

BACKGROUND

Cherry Tree Park, Creek Corner's planned site, is a New York City Parks Department park located in the southwest corner of the George Washington Houses superblock. Originally named the George Washington Houses Playground of East Harlem, it was renamed Cherry Tree Playground in 1997 as an homage both to the cherry trees in the park as well as the apocryphal tale of President Washington and the cherry tree. The park opened in 1957 around the same time as the neighboring Washington Houses. It last received a major upgrade in 1996, which included new play equipment and refurbished courts (NYC Dept. of Parks and Recreation, "Cherry Tree Park," n.d.).



Current conditions at Cherry Tree Park (99th Street and Third Avenue), depicting play structure, basketball and handball courts, and the sprinkler system, which has been in place since the 1950s.

Today, Cherry Tree Park has a variety of recreational facilities, including basketball courts, handball courts, a children's play area with jungle gym and swings, as well as a spray shower. Additionally, located behind the sprinkler is a small building that houses restroom facilities and maintenance equipment for the Parks Department.

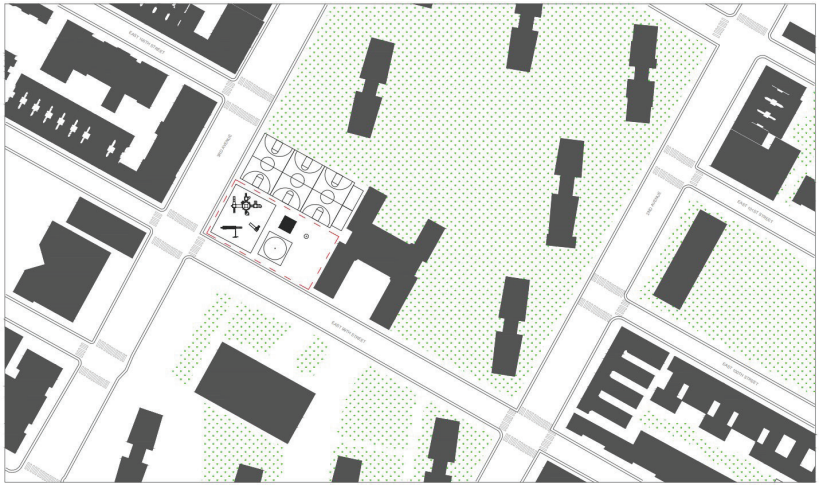
Existing Cherry Tree Park sprinkler.

Cherry Tree Park is a strong site for Creek Corner because it lies within the historic pathway of Harlem Creek, connecting this proposal intrinsically to the physical site of intervention more concretely. Further, Creek Corner would be located next to PS 109, a National Register and LPC-designated school building that is now the El Barrio Artspace). Despite being built on East Harlem's marsh, the designation reports make no mention of PS 109's sitting as an important element of its history. Instead, the report focuses more on PS 109's survival in the midst of urban renewal (Herman 2018). As such, Cherry Tree Park is an appropriate site for a proposal that would elevate this untold history.

DESCRIPTION

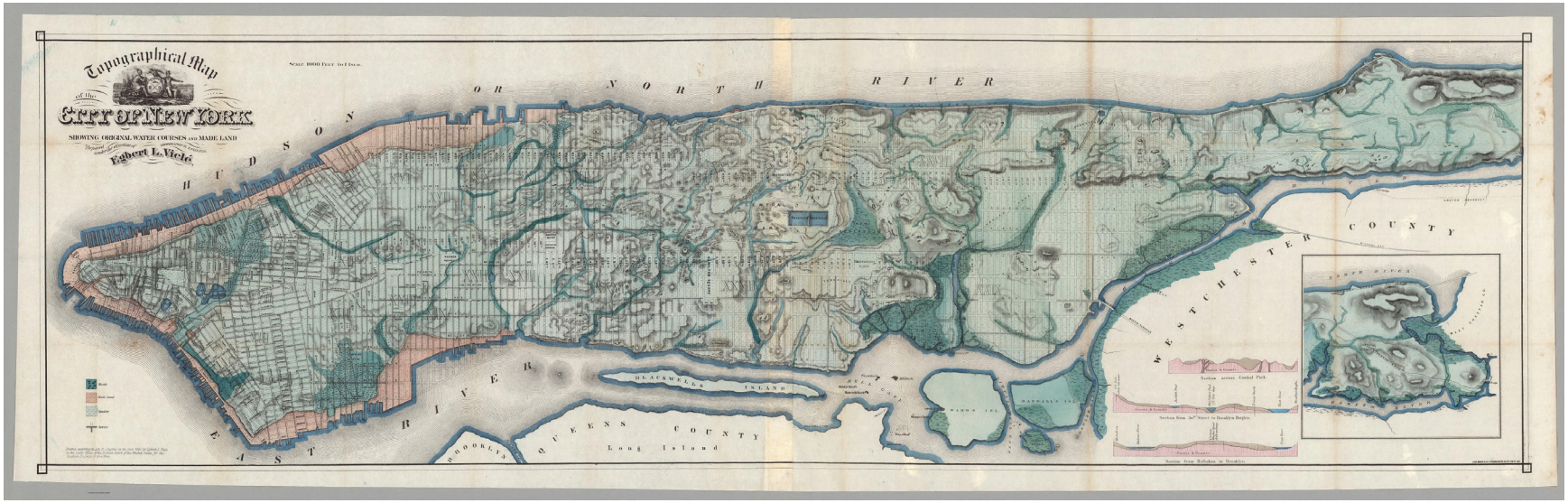
Our proposal focuses on the portion of the park located along the western edge, where the children's sprinkler is currently situated. According to the Parks Department, the water feature has not had any renovations or improvements since the park's initial opening in March 1957.

Creek Corner proposes utilizing a renovation to this dated element of the park to create an opportunity for learning, by illuminating the connection between Harlem's historic marshland landscape and the superimposed modern-day grid, and allowing children to identify themselves, their homes, and other locations of significance in this historic landscape.



Creek Corner's proposed site plan, featuring a new sprinkler and wading pool system at the eastern edge of the park, implementing the historic path of the Harlem Creek and the modern-day grid plan.

Open Source Data grid of Harlem used as a stencil for Creek Corner's interactive map overlay.



Historical map showing the Harlem Creek as it was in 1865.

Creek Corner first initiates the relocation of the washroom facilities from the center of the children's play area to the northeast corner of the site, allowing for the installation to be opened up to the rest of the children's space.

Using historic maps of the Harlem Creek, Creek Corner integrates a three-dimensional set of waterpaths, to be carved out of the ground to create the bathymetry of the Harlem Creek. Atop the gently sloping creekbed, inlaid in metal is the current grid plan of Harlem, at the same scale as the Harlem Creek interpretation, to show where the Harlem Creek would flow through Harlem, had it not been drained, filled, and built on. By placing a water sprinkler at the northwesternmost corner of the daylighted mini-creek, its water flows through the sprinkler and rushes into the paths of the waterbeds. This aquatic activation of Creek Corner enables the waters of Harlem Creek to flow through the neighborhood once again.

By allowing these two histoires to intersect, we hope to illuminate the environmental injustice of Harlem, allowing children and their parents to explore the new mini landscape, and physically find their location, their home, their school—and see where it would have fit into an earlier Harlem. By embedding this historical context back into the neighborhood, we hope to shed light on a since-buried history of infill locations, areas of land reclamation, and changed landscapes over time.

Materially, Creek Corner implements tactile, pervious materials to draw attention to the native soils and marshes of pre-urbaned Harlem, allowing children to explore this topography in hopes that they would be able to interact with history, and gain an understanding of the true threat of climate change through material, history, and site.

Creek Corner raises awareness about climate and memorializes the past histories of Harlem. By taking these issues—which are difficult to visualize due to scale and time—and giving them physical space to inhabit and be interacted with through play, it can support community-led movements towards addressing them.

We believe that by "daylighting" the historic waterways of East Harlem and its inherent vulnerability to climate change, while overlaying the grid of the streets—as water from the sprinkler flows—children will begin to connect material, land mass, and vulnerability in a educational, interactive, and tactile way to highlight broader vulnerability challenges. While creating an educational playground for children, this project would also help improve a critical necessity for Harlem residents in the summer, helping to keep them cool on hot summer days. Used outside of the summertime, when the sprinkler system is off, the gentle dips in elevation of the waterbeds could be used as general park space, continuing the thread of childsplay year round.

Rendered image collage illustrating children at play in the rethought Creek Corner.

IMPLEMENTATION

In order to make Creek Corner a reality, a variety of New York City organizations and individuals would be consulted. There are two primary groups that Creek Corner would solicit input from: organizations that act as local stakeholders for Cherry Tree Park and individual collaborators who would help refine specific design and curricular elements of Creek Corner.

The primary organizational collaborator for Creek Corner would be the NYC Parks Department. They not only have jurisdiction over Cherry Tree Park, but are also a part of the aforementioned "Cool It!" program, which seeks to make cooling features more accessible to residents. As such, Creek Corner would be realized through their capital construction projects and ongoing maintenance and program management. Creek Corner would also connect with local community-based organizations, including Community Board 11 and the Washington Community Improvement Council, a resident-led coalition between George Washington and Washington Carver House residents.

Creek Corner would also seek out individual collaborators to help realize this proposal. Since Creek Corner borders the El Barrio artspace, artists who live and work there would be prioritized to help with this project. Additionally, Creek Corner would look for local educators and teachers who may want to integrate climate change and histories thereof into their curriculums. The ultimate goal is to bring a variety of voices together in a resident-led, grassroots design workshop process that can help make Creek Corner a reality.

PUBLIC OUTDOOR SWIMMING POOLS RE-IMAGINED

Xiyu Li, Yinjie Tian, and Wenjing Xue

This proposal recommends turning current public outdoor swimming pools into seasonal adaptive open spaces to provide more recreational spaces and enhance community engagement in Harlem. The New York City Department of Parks and Recreation regulates all public pools, and two in the study area have been recognized as historic: Thomas Jefferson Pool, which was landmarked by the LPC, and Marcus Garvey Pool, part of Marcus Garvey Park, which includes the designated Watch Tower. These two cases serve as demonstration projects for this proposal.

The proposal focuses on design, but also considers the possibility of using renewable energy (especially geothermal energy) in the adaptation project, thereby serving as a Harlem-based demonstration of renewable energy.

KEY ISSUES ADDRESSED

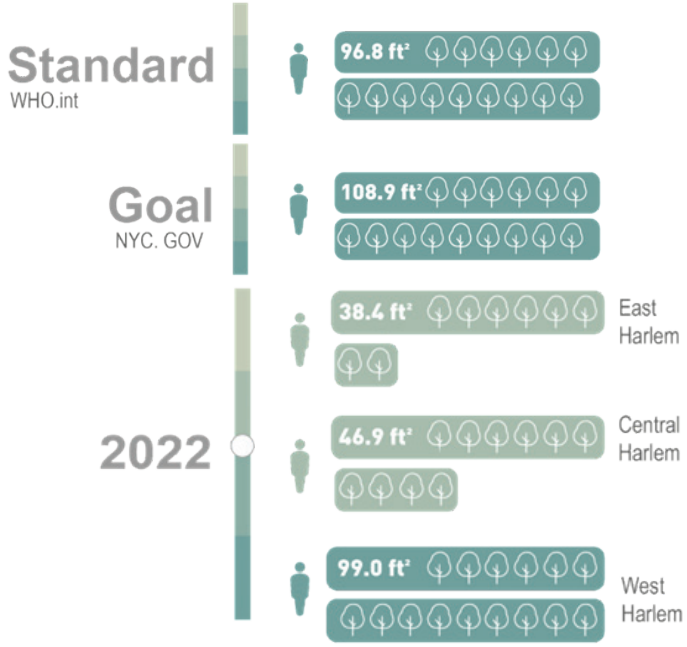
- > NARRATIVES OF ENVIRONMENTAL JUSTICE ACTIVISM
- > LACK OF SPATIAL ENCOUNTERS WITH ENVIRONMENTAL JUSTICE HISTORIES
- > LANSCAPE VULNERABILITY
- > VULNERABLE POPULATIONS
- > HOUSING INEQUITIES
- > DISPLACEMENT RISKS
- > REDEVELOPMENT CONFLICTS
- > OPEN SPACE DISPARITIES
- > HARLEM SKY TENSIONS

Thomas Jefferson Pool.

Marcus Garvey Pool.

BACKGROUND, SIGNIFICANCE, AND RATIONALE

COVID-19 has already shifted people's perception of open spaces, making such spaces unprecedentedly important, but also highlighting the inadequate and unequal access to them. In the studio context, open space is highlighted as one of the most critical aspects related to environmental justice. Per the studio's research, per capita open space in Central and East Harlem are far below the World Health Organization's suggested standard and the city's goal. It is also less than the average area in other parts of Manhattan.



Standard for open space per capita and the open space per capita in Harlem.

Open space access within the study area is even less than such statistics imply due to the seasonality of some open spaces, such as public outdoor swimming pools. There are six public outdoor swimming pools in Harlem, with an accumulated area of around 280,000 square feet. Those pools are open for less than three months during a year, exacerbating open space inadequacies in Central and East Harlem.

In determining what sorts of activities could be supported during the off-season, we looked to activities that would not significantly alter the nature of the public outdoor swimming pools in summer, and that addressed the lack of winter-accessible, water-dependent activities. There is a significant disparity in ice rink and public indoor swimming pool distribution across Manhattan, with only one ice rink and one public indoor swimming pool located in the studio study area.

Public outdoor swimming pools in Harlem.

Public outdoor swimming pools in Harlem.
Distribution of ice rinks in 2022.

Distribution of public indoor swimming pools in 2022.

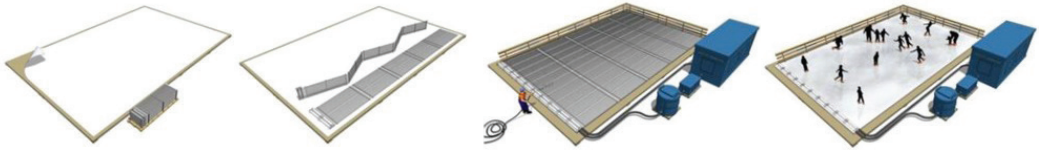
THOMAS JEFFERSON POOL

Located in the recently designated East Harlem Historic District, the Thomas Jefferson Pool was the first public outdoor swimming pool in East Harlem. It opened to the public in the blazing summer of 1936. Financed by the federal Works Progress Administration (WPA), the pool was part of a massive effort to alleviate adverse health conditions and provide safe recreation in predominantly working-class communities at that time (NYC Dept. of Parks and Recreation, "Thomas Jefferson Pool," n.d.). It is worth noting the injustices that occurred here: to discourage minority use at this facility, the water heating system was turned off, as at the time it was believed that the cold water would not bother Caucasian swimmers, but would somehow deter non-Whites (NYC Landmarks Preservation Commission 2007, 6). In 2007, the pool and play center were designated as an official New York City landmark.In stark contrast to the lively scene in summer, the outdoor pool is deserted in winter.

Thomas Jefferson Pool during summer season.

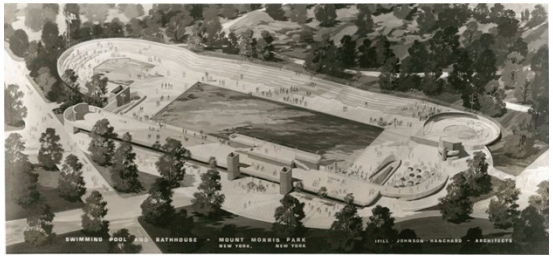
Thomas Jefferson Pool during off-season.

Adaptation of the Thomas Jefferson outdoor pool during the winter.



Ice rink construction diagram during the winter.

Since the Thomas Jefferson pool is landmarked, the adaptive redesign minimizes alterations to the existing structure. The ice rink would be installed on a flat wooden deck that covers the pool. The temporary structure could be removed in summer. As the construction process diagrams show, the rink's ice could be fabricated on site and kept cold with a network of chillers and pipes beneath it. Based on the "minimally visible" requirement explicitly mentioned in the Rules of New York City Landmarks Preservation Commission (NYC Landmarks Preservation Commission 2019, 65), the cooling machines would be hidden and not distract from any significant features of the site and the building.



Marcus Garvey Pool and Bathhouse, original render, c. 1967.

Mt. Morris Park bird's-eye view in 1937, without the pool building, c. 1937.

Mt. Morris Pool's opening dedication, c. 1971.

Marcus Garvey Pool during summer.

Marcus Garvey Pool during winter.

Portable pool in Vaughan, Ontario.

The image shows the significance of the pool to the community; in summer the space is packed with swimmers (and people who are just having a really good time). However, the building is closed entirely during its off-season.

Beyond the study area, Manhattan has five public indoor swimming pools, but Harlem only has one public indoor pool. This proposal seeks to address that disparity by allowing for the Marcus Garvey Pool to be converted for indoor use in the off-season.

The accompanying image shows an example of a portable pool cover in winter. In this case, a retractable pool enclosure shelters a mid-sized pool in the extremely cold climate of Ontario, Canada.

As the use of ETFE membranes gains popularity, the material's lightweight and excellent insulating properties can further elevate the potential of creating an all-season pool for the people of Harlem.

Geothermal heating is largely underutilized in New York City, and the city government has proposed that most areas of Manhattan are feasible for two kinds of geothermal heating systems: standing column well and closed loop (U.S Dept. of Energy, "Geothermal Heat Pumps," n.d.). The New York City geothermal webtool indicates that Marcus Garvey Pool is a viable site for either of these two systems. This could be a great opportunity for Harlem to become the first neighborhood in Manhattan to have a geothermal heated pool with a hybrid energy system.

MARCUS GARVEY POOL

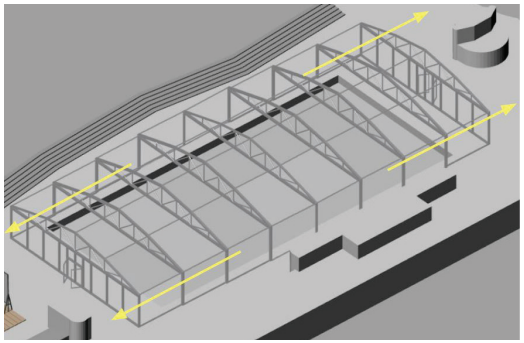
Marcus Garvey Pool, formerly known as Mt. Morris Pool, was built in 1967 as the first public outdoor pool in Central Harlem. The pool and adjacent bathhouse were designed by Percy Ifill, co-founder of Ifill Johnson Hanchard Architects and the first African American architect to work on a city-commissioned project in New York City (Wilson 2004). The pool and bathhouse are located on the north edge of Marcus Garvey Park.

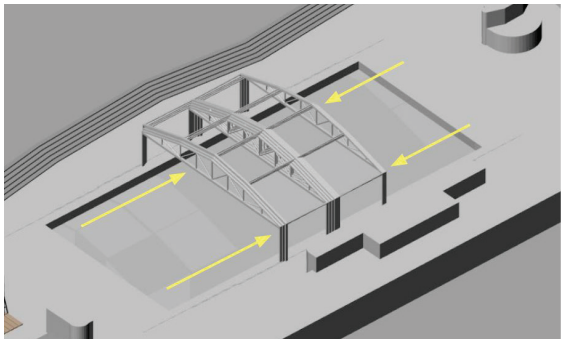
NYC Geothermal Webtool selection

This document contains the geothermal feasibility estimation, retrieved at:
Sun Apr 24 2022 23:13:32 GMT-0400 ([redacted])

Selection			
Address	18 MT MORRIS PARK WEST		
Borough	Manhattan		
Block	1719		
Lot(s)	1		
BBL(s)	1017190001		
Building			***Overrides**
Lot Area (SqFt)	856,609		
Building Area (SqFt)	22,800		
Building Footprint (SqFt)	74,179		
Building Type	Other: IN2		
Calculation			
Depth To Bedrock (Ft +-25 Ft)	17		
Depth To Water (Ft +-25 Ft)	Data Not Available		
Lloyd Aquifer (Present/Not Present)	Not Present		
Geothermal System	**Standing Column Well**	**Closed Loop**	**Open Loop****
Geological and Technical Suitability (Yes/No)	Yes	Yes	No
Potential Capacity (Tons)	12,845	5,999	
Full System Feasible (Yes/No)	Yes	Yes	No
Hybrid System Feasible (Yes/No)			No
Carbon Footprint Reduction (Tons CO2e)	47	47	
Annual Cost of Carbon ($)	6,363	6,363	0
Annual Potential Savings with Geothermal System ($)	14,321	14,321	0
Projected Incremental Payback with Carbon Credit (Years)	29	9	
Projected Incremental Payback without Carbon Credit (Years)	42	13	

Above: NYC geothermal summary for Marcus Garvey Park.
Upper Right: Retracted and extended pool cover diagram.
Middle Right: Covered pool exterior render.
Lower Right: Covered pool interior render.





Two diagrams show the envisioned retractable pool cover for all-season climates. In the summer or warm weather, the cover can shrink to one-fourth of its full extended size or be completely removed from the track system. In the winter, the cover can be extended across the entire pool space to insulate swimmers from the cold.

The accompanying images show both exterior and interior experiential renderings for a fully extended pool cover. The pre-fabricated structure resembles the form of a greenhouse.

Public outdoor pools map in Harlem.

There are four other public outdoor pools in Harlem beyond the two discussed above. More seasonal adaptive recreational spaces have the potential to be implemented in other public outdoor pools in Harlem to enhance access to recreational space during off-season.

To implement these proposals, Harlem residents, community organizations, and the community board would be considered key stakeholders in the project. Through community organizations and the community board, residents in the adjacent areas should be consulted and their voices heard. In the New York City Government Open Space Goals report issued in March 2014, the city explicitly indicated the need to increase city open space to above 2.5 acres per 1,000 residents, or 108.9 square feet per capita (NYC Mayor's Office of Environmental Coordination 2014, 3). Although the LPC strictly regulates all designated sites, the proposal would neither pose a great threat to the historic value of these pools nor violate the existing regulations. Expanding the service period of public outdoor swimming pools would increase the managerial burden of the Parks Department, but only by extending activities that it already oversees elsewhere. The project has a great potential to be implemented, as it is likely to be socially, financially, regulatorily, and managerially viable.

ENERGY RETROFITS IN HISTORIC PUBLIC HOUSING

Shuya Zhao

This proposal promotes energy retrofits in historic public housing. NYCHA plans to take a series of measures to improve heating and cooling in public housing, including those on the National Register, while decreasing greenhouse gas emissions. Those measures may require alterations to the buildings' exteriors, which may affect the material integrity of those properties that have been recognized as historic. This proposal seeks to consider heritage concerns in decarbonizing public housing.

As has been outlined previously, obsolete heating types have historically persisted longer in Harlem than other areas in Manhattan, which contributes to repeated injustices over time. The 1960s and 1970s saw the delayed transition away from coal. Now, Harlem is just finishing the transition from heating oil to natural gas, while the next shift toward renewable energy has already begun. This proposal outlines a more detailed study of the decarbonization methods for historic public housing in the study area, applying retrofit technologies with minimum damage on historical buildings.

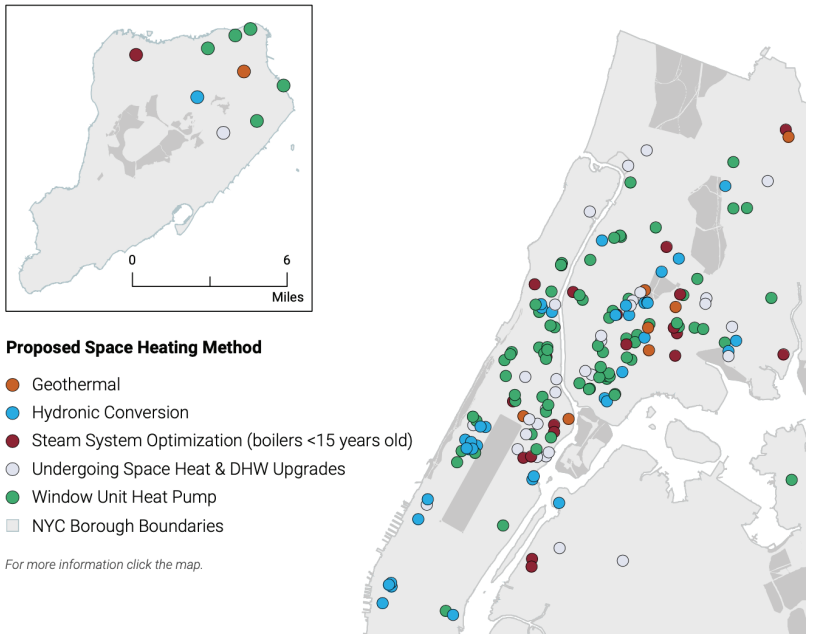
BACKGROUND, SIGNIFICANCE, AND RATIONALE

According to Local Law 97 of 2019, NYCHA must reduce greenhouse gas emissions by 40 percent by the year 2030 and 80 percent by the year 2050, relative to such emissions for calendar year 2005. Historically, NYCHA has been criticized for failing to provide adequate heating and cooling for residents. Two years ago, after a federal investigation into mismanagement and general dysfunction at the agency, NYCHA signed an agreement with the U.S. Department of Housing and Urban Development establishing deadlines for the agency to remediate certain hazards, including unreliable heat (Pontecorvo 2022).

KEY ISSUES ADDRESSED

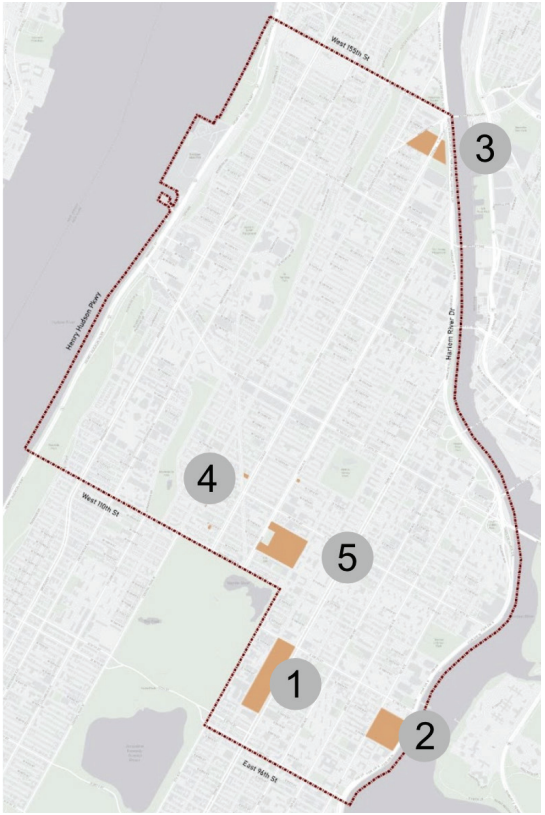
- > NARRATIVES OF ENVIRONMENTAL JUSTICE ACTIVISM
- > LACK OF SPATIAL ENCOUNTERS WITH ENVIRONMENTAL JUSTICE HISTORIES
- > LANSCAPE VULNERABILITY
- > VULNERABLE POPULATIONS
- > HOUSING INEQUITIES
- > DISPLACEMENT RISKS
- > REDEVELOPMENT CONFLICTS
- > OPEN SPACE DISPARITIES
- > HARLEM SKY TENSIONS

NYCHA developments by proposed decarbonization method
Displayed by space heating measures



Decarbonizing and improving heat transitions in public housing.

Public housing has difficulty with heating in winter and cooling in summer.



Maps of National Register public housing in the study area.

1. Carver House

2. East Rover House

3. Harlem River House

4. Taft Rehabs

5. King Towers

DESCRIPTION

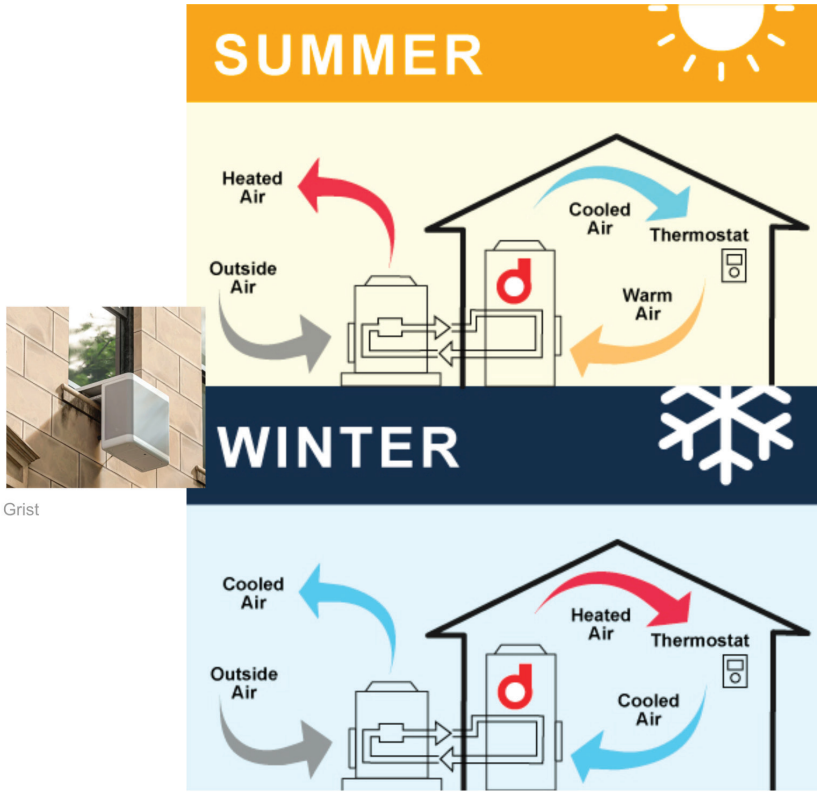
To deal with the problems, NYCHA examined the properties in its jurisdiction, including those in the National Register. In the studio study area, there are five National Register NYCHA complexes, including: Carver Houses, East River Houses, Harlem River Houses, Taft Houses, and King Towers.

NYCHA has proposed different decarbonization strategies for different complexes, involving recommendations on space heating, window replacement, and wall insulation. Among these recommendations, installing window unit heat pumps and exterior insulation finishing systems will largely affect the buildings' exteriors. If windows are carefully replicated, impact to architectural integrity may be minimized (NYCHA 2021b).

	Space Heating Recommendation	Window	Wall
Carver Houses	Undergoing Space Heat & DHW Upgrades	Windows Replaced with Energy Efficient Models	Exterior Insulation Finishing System (EIFS) wall cladding installed
East River Houses			
Harlem River Houses			
Taft Houses			
King Towers	Geothermal		

Decarbonization Strategies for Public Houses in National Register by NYCHA.

Why does NYCHA want to replace the existing steam system with heat pumps? The accompanying image shows how a heat pump works in summer and in winter. Heat pumps use electricity and are more efficient. They can provide both warm and cold air, while the steam system can only provide heat. They allow for temperature to be adjusted, reduce harmful emissions, and require less maintenance.

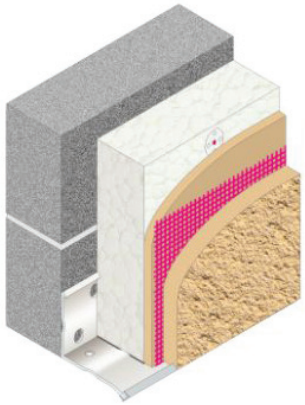


Grist

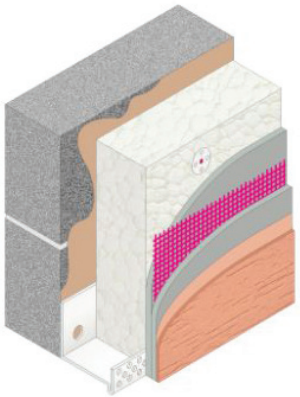
How heat pumps work in summer and winter.

Why does NYCHA recommend window unit heat pumps, as an alternative to installing equipment on roofs? The accompanying image shows workers installing the heat pump indoor unit and outdoor roof unit for the Fort Independence Houses in the Bronx. For a 21-story building with more than 300 residences, the agency had to hire engineers to do a structural analysis of the rooftop to ensure it could support the outdoor components. NYCHA also had to coordinate plumbers, carpenters, and electricians. The installation required taking down parts of the ceiling and navigating residents' furniture. It took about ten days per apartment, which was disruptive to residents. The approach is complicated, costly, and time-consuming, while window unit heat pumps provide a more cost-efficient and less disruptive option (Pontecorvo 2022).

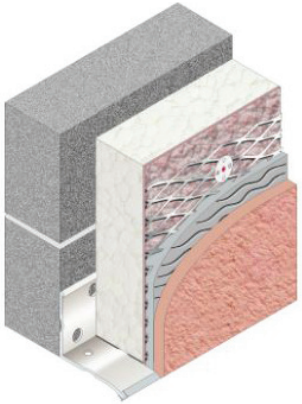
Workers install heat pump units on the roof of and inside the Fort Independence Houses.



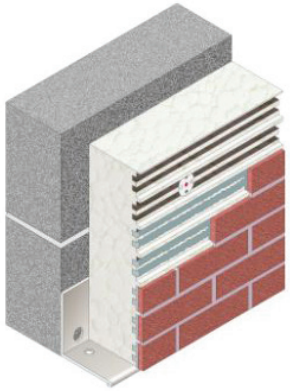
One-Coat System with Lath or Mesh



Polymer Render Systems

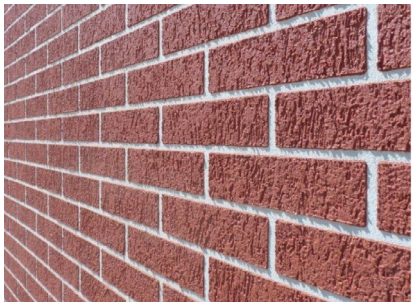


Traditional Render



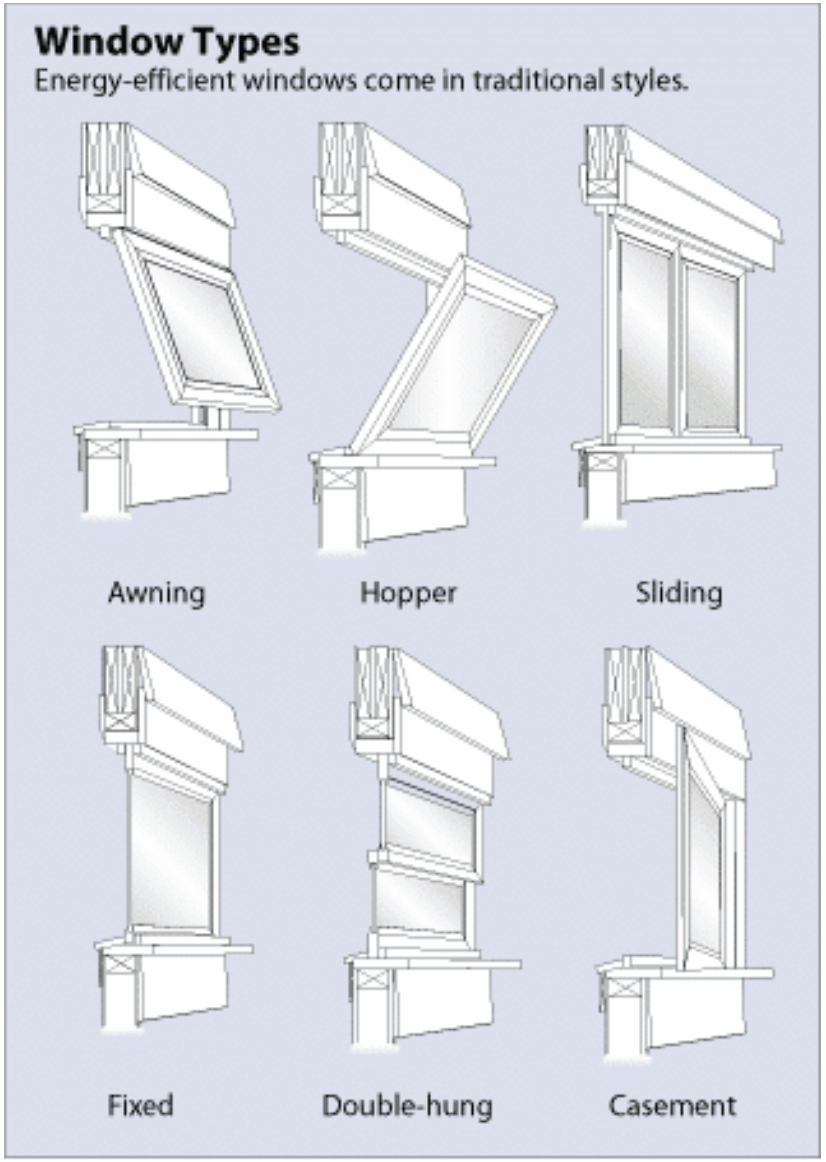
Brick Slip Faced Systems

Types of external wall insulation systems.



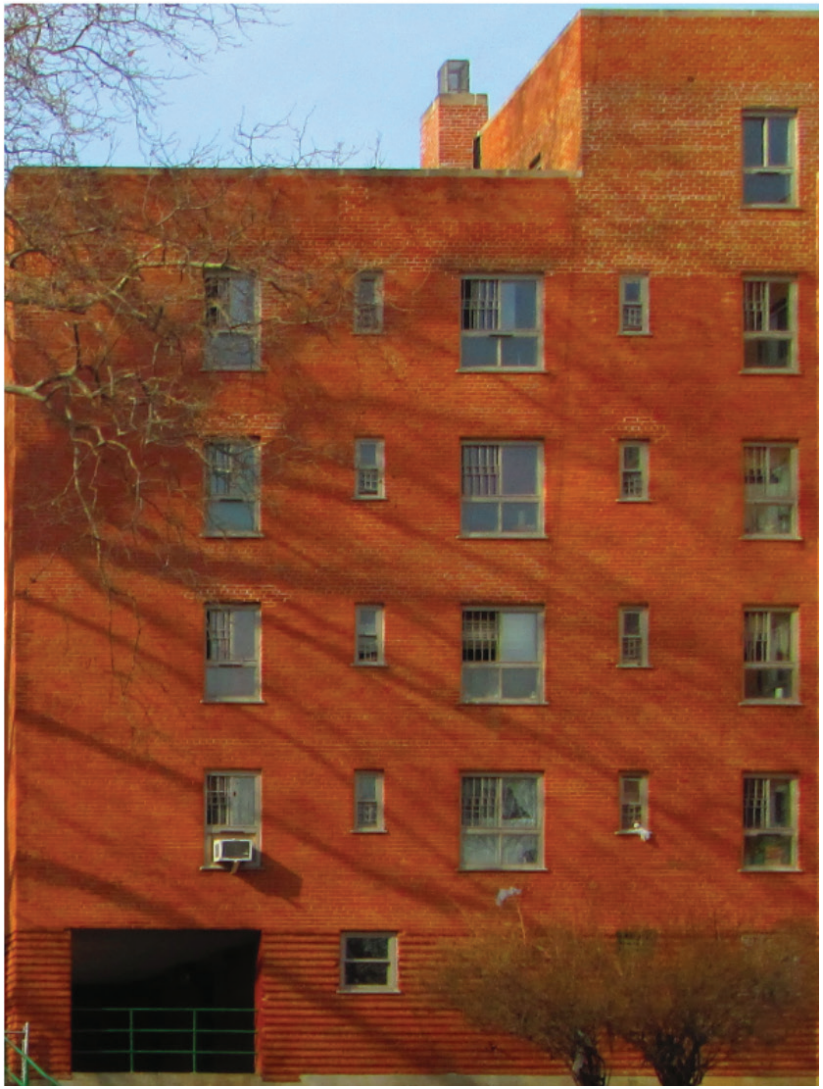
A brick veneer exterior insulation finishing system at the Homewood Suites in Nashville.

There are several types of exterior insulation finishing systems. Since many NYCHA complexes are all brick, brick veneer can be used. However, this will also largely change the external appearance. The accompanying image shows the appearance of a building using brick veneer (DeLaura 2013).

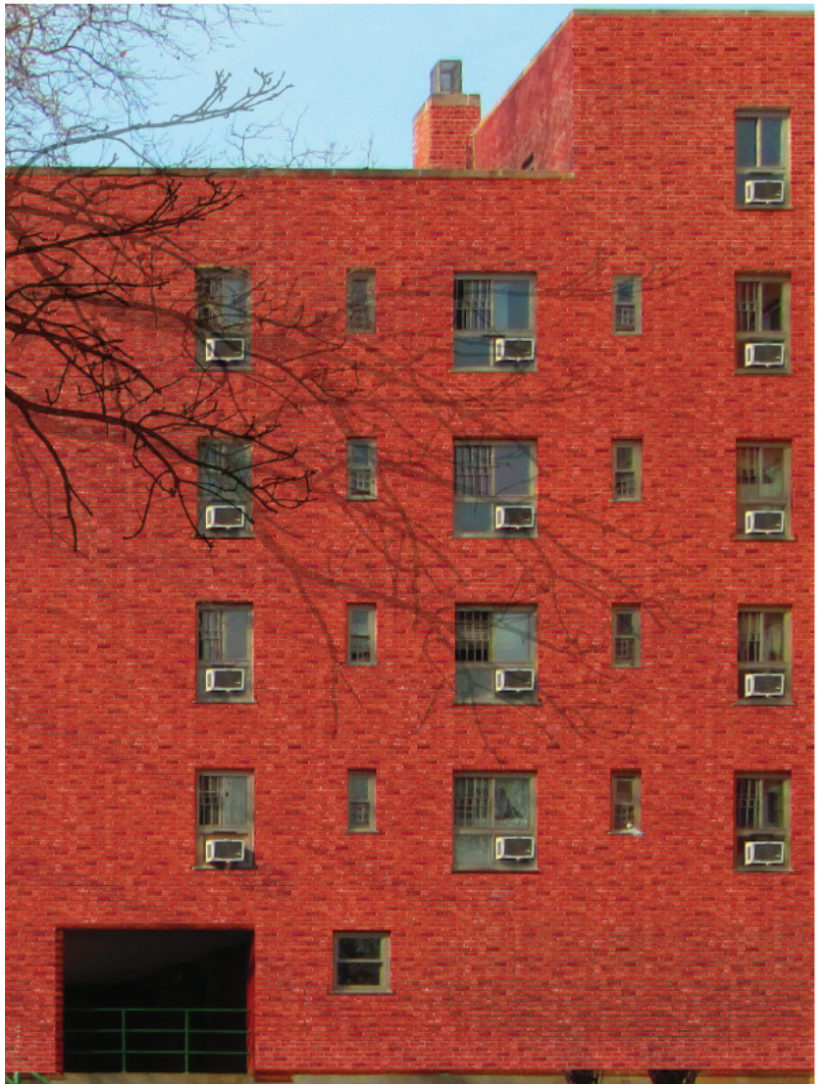


Energy-efficient window types.

Window types can be identified to conform with the original frames and sash, glazing and glass, gas fills and spacers, and operating types (U.S. Dept. of Energy, "Window Types," n.d.). It should be noted that NYCHA has already been replacing many of the original steel windows with new aluminum ones that look very different.



A facade of Harlem River House now.



A proposed visualization of the facade.

The potential impacts of cladding and other facade interventions to architectural integrity are visualized in the accompanying image. The left side is a current facade at the Harlem River Houses. On the right side, many heat pumps are installed outside the window. If veneer brick is added, the windows will be recessed quite a bit, changing the amount of light. The exterior of the building would be altered, potentially affecting architectural significance and National Register status.

Therefore, this proposal focuses on processes of alternative design. There would be a charrette or committee meeting in which all stakeholders could participate, including NYCHA, energy efficiency experts, community board members, the LPC, preservationists, and NYCHA residents.

In addition, windows could be customized for different historic public housing complexes to minimize the impact of the exterior. Wall cladding systems should be explored carefully, and should consider other insulation methods to reduce carbon.

VISUALIZING HEALTH AND HOUSING INEQUITIES IN HARLEM: A MOBILE EXHIBITION ON ENVIRONMENTAL INJUSTICE

Shannon Trono and Nina Nahitchevansky

KEY ISSUES ADDRESSED

- > NARRATIVES OF ENVIRONMENTAL JUSTICE ACTIVISM
- > LACK OF SPATIAL ENCOUNTERS WITH ENVIRONMENTAL JUSTICE HISTORIES
- > LANSCAPE VULNERABILITY
- > VULNERABLE POPULATIONS
- > HOUSING INEQUITIES
- > DISPLACEMENT RISKS
- > REDEVELOPMENT CONFLICTS
- > OPEN SPACE DISPARITIES
- > HARLEM SKY TENSIONS

BACKGROUND AND SIGNIFICANCE

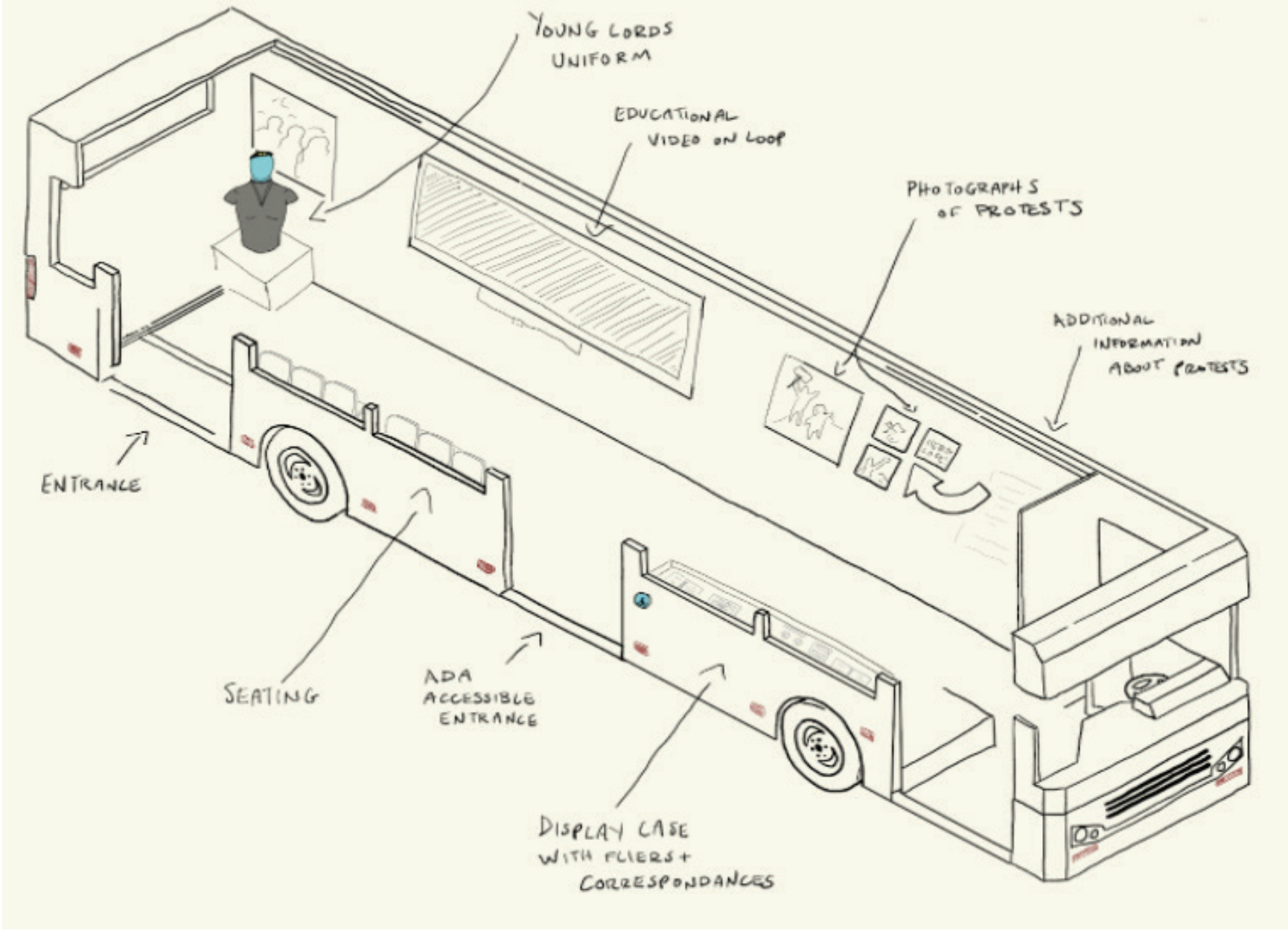
"Take me into the museum and show me myself, show me my people, show me soul America." - June Jordan

Museum spaces have historically served as settings where local communities can engage with educational, cultural, and nonprofit instwitutions. Although this model is sound in theory, it is often the case that the histories being represented and discussed by these institutions exclude the narratives of vulnerable populations, leaving many publics ignorant of their own histories.

June Jordan, an African American poet, made the statement above at a museum conference in November of 1969, which sought to discuss the way in which traditional museums could remain relevant in the context of recent social and political upheavals of the time (Burns 2013). Jordan's remarks hit on the notion that spaces needed to be created to reclaim and teach Black history. African-American activists, organizers, and artists across America took to creating spaces for these histories, often using former stores or apartment buildings as their venues, in stark juxtaposition to the imposing structures of traditional museums (Burns 2013). Within these new museum typologies was the mobile museum—buses that functioned as museums—which aimed to make Black histories and activism mobile by bringing the museum to those who were unable, or unwilling, to travel.

As the words of June Jordan still ring true, we created a proposal inspired by the sentiment of representation that is far reaching. Looking to history, we arrived at the conclusion that this could best be achieved with a mobile museum, as the issues of accessibility and willingness to travel were still as relevant now as they were in 1970 (Burns 2013).

The aim of our proposal is to educate Harlem's vast community on its history of activism as it relates to health and housing disparities, specifically as seen through the lens of Harlem's Black and Latinx population. We believe that many of these histories are under-represented and that it is important for Black and Latinx residents of Harlem to see these stories, to be proud of them, to be a part of the dialogue of their community's history, and to struggle with environmental injustice issues within a welcoming, museum environment. Our hope is to achieve our goal of educational narration and representation through the recovery and interpretation of artifacts, documents, and stories drawn from preceding activists and their associated movements.



Sketch for the proposed mobile museum, interior layout.

DESCRIPTION

Mobile Museum Design and Interior

The mobile museums would be in the form of buses, which would be outfitted on the inside to comfortably accommodate visitors. In order to draw attention to these buses and prompt community engagement, we propose wrapping the exterior of the bus in vinyl that replicates the decals on the exterior of the x-ray bus seized by the Young Lords activism group in the summer of 1969. The hope is that the unusual look of the bus will draw the attention of people on the street, leading them to ask questions about the bus. Once at the bus, docents can answer any questions that they may have and invite them to view the exhibit, creating an organic engagement with the material.

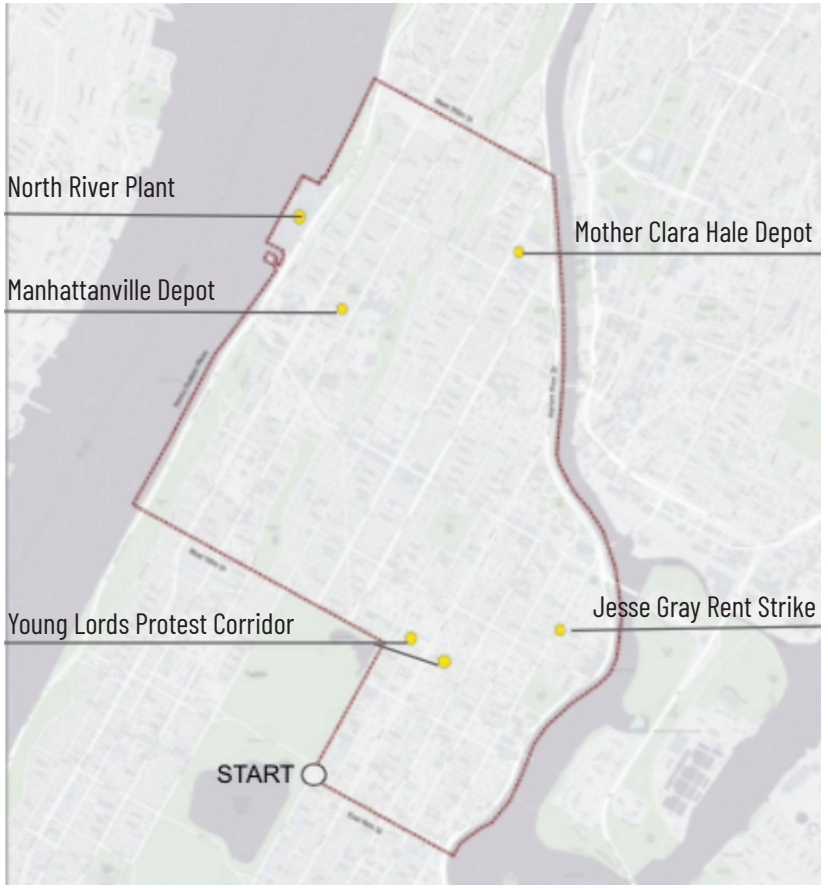
The interior of the buses would contain a blend of mediums in order to thoroughly communicate the narrative being displayed. The mediums used would include printed materials, such as original fliers or relevant correspondances; archival photographs; an educational video that explains the movement or person and their historic significance; and relevant artifacts (e.g., protest banners, party pins, uniforms). We believe that providing a variety of materials with which to engage will create a more interesting learning experience for the general public. All mobile museums will be ADA-accessible and offer an audio program for the visually impared.

Young Lords activists stand in front of a commandeered x-ray bus in Harlem, c. 1969-1970.

Mobile Museum Routes and Stops

In order to compensate for the vastness of Harlem's geography, two to three mobile museums would be in circulation between East and West Harlem. The buses would follow predetermined routes with stops at different sites of past activism. Although it is not the goal of the buses to function as tour buses, making stops at these specific sites forces the location to interact with its history while also creating an awareness of any lingering similarities or differences.

The sites chosen for theses buses to stop are as follows: the site of the Young Lords protest (East 111th Street between Lexington and Madison Avenues), the site of Jesse Gray's Harlem rent strike (East 117th Street), and the WE ACT bus depot protest sites (the North River Plant, the Mother Clara Hale Bus Depot, and the Manhattanville Depot).



Map of mobile museum bus route.

IMPLEMENTATION

Community Activism Organizations and Non-Profit Cultural Institutions as Connectors and Facilitators

In order to implement the project, it would be crucial to involve existing social justice organizations, such as WE ACT and PA'LANTE Harlem, as well as other relevant community connectors, such as El Museo del Barrio, The Studio Museum in Harlem, and the Shabazz Center. Moreover, collaboration with governmental organizations would be necessary to facilitate funding and a framework for operations, such as the New York City Mayor's Office of Climate and Environmental Justice, the New York City Civic Engagement Commision, and the New York State Office of Parks, Recreation, and Historic Preservation. In particular, the New York City Civic Engagement Commission has created and funded the People's Bus Project—a bus formerly used to transport people detained on Rikers Island, now transformed with input from New Yorkers into "a community center on wheels, with the purpose of engaging people in NYC's civic life through beauty and joy" (NYC Civic Engagement Commission, n.d.). The People's Bus Project created an educational mobile experience that tackled topics such as climate justice and environmental injustice, food security, economic empowerment, and even wellbeing and mental health. This mobile, environmental injustice museum builds on that precedent by seeking to illuminate, spatialize, and visualize health and housing inequities within Harlem.

P.A.'L.A.N.T.E - Peoples Against Landlord Abuse and Tenant Exploitation, a community activism organization.

CONSIDERATIONS AND LIMITATIONS OF MOBILE MUSEUMS AS A SPATIAL ENCOUNTER

PROS

- Community-specific reach: Harlem area stops
- Incidental engagement: Curious passersby have the opportunity to engage casually and authentically
- Low barrier to entry: No museum ticket paywall. Free, non-traditional museum experience.
- Unique and interesting experience

CONS

- Limited capacity: With a smaller space, there comes limitations in the number of people the site can accommodate at any given time.
- Limited exhibition size: With a smaller space, exhibition size is smaller too.

FUTURE CONSIDERATIONS

- Adding additional stops or locations to the mobile museum travel itinerary.

Conceptual art from the People's Bus project flier.

APPENDICES

APPENDIX A: HISTORIC CONTEXT ANALYSES

This appendix comprises the full historic context analyses for the studio's eleven faculty-identified themes representing the concerns and histories associated with environmental justice and land use in Harlem:

> Climate Risk and Response

> Energy

> Fresh Food and Nutrition Access

> Hazardous Materials Exposure

> Indoor Air Light and Ventilation

> Open Spaces and Green Resources

> Outdoor Air

> Redevelopment and Displacement

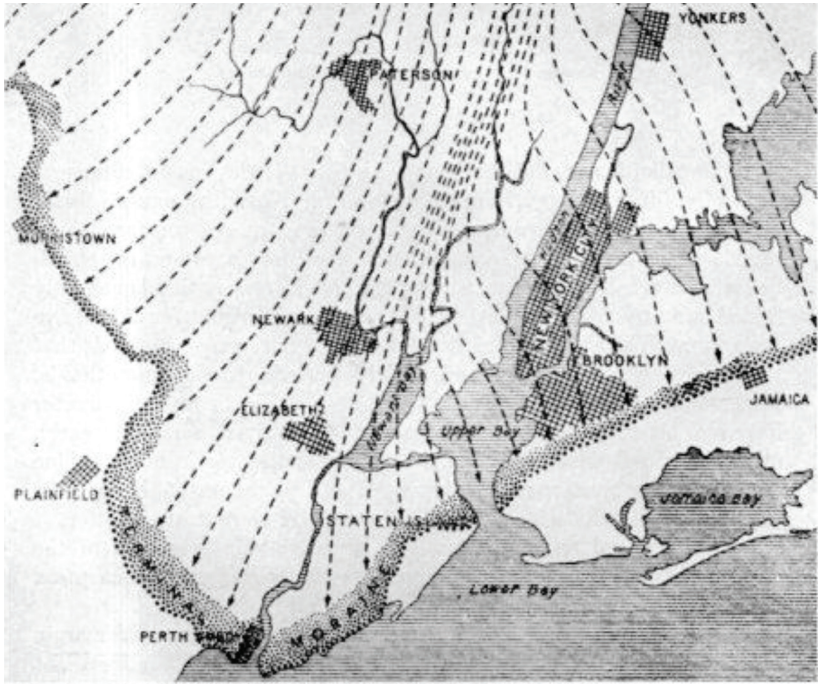
> Solid Waste Management

> Transportation

> Water Quality & Management

CLIMATE RISK AND RESPONSE

Emily Conklin and Kemuning Adiputri



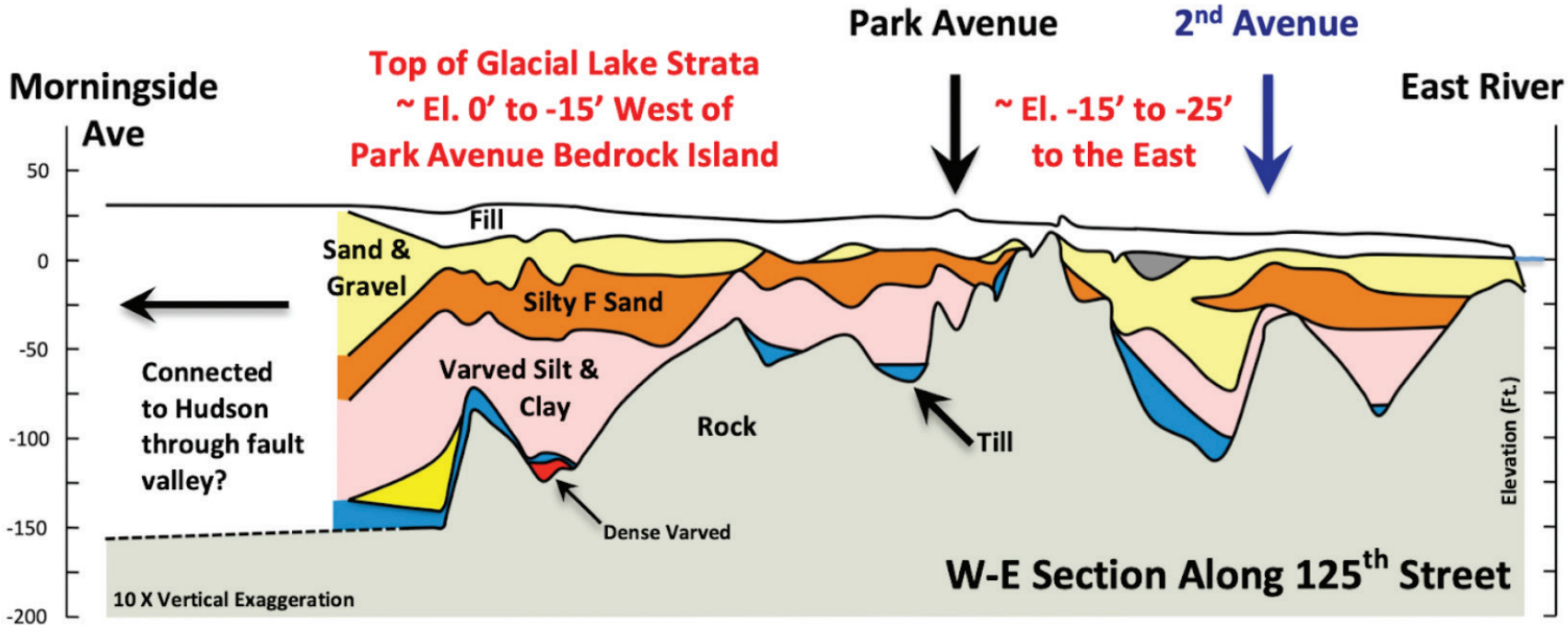
New York City and vicinity, showing position of the terminal moraine and directions of the ice movement (indicated by the arrows) during the last or Wisconsin glaciation. United States Geological Survey.

GEOLOGIC HISTORY AS PRECONDITION: LAND-BASED INEQUITIES

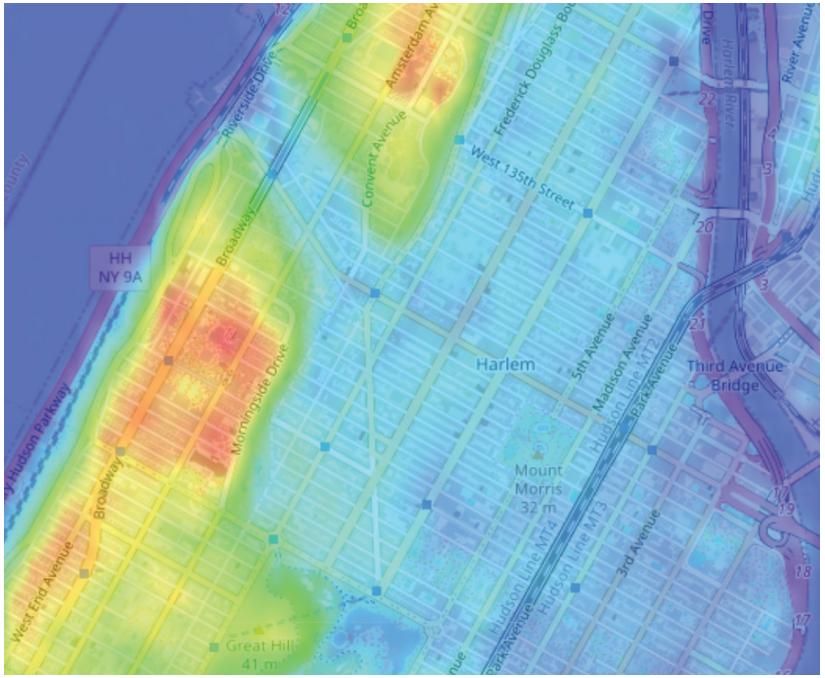
New York City's rivers, ridges, and valleys were created during the last ice age, approximately 22,000 years ago, by the Wisconsin Glacier. The area was the southernmost point of the glacier's reach, and evidence of its movements and debris dispersal are evident in the terminal moraine stretching throughout the boroughs, as well as rock formations throughout, which are particularly visible in Central Park. Harlem's landscape shows evidence of this glacial history through steep cliffs of schist to the west, sloping down towards the Hudson River, and a low valley leading to marshland to the east, meeting the Harlem River.

Detail of the Viele Map showing original waterways and systems, c. 1865.

There is a notable elevation difference between the "heights" to the west and the "valley," or Harlem Marsh, to the east, from as high as 200 feet to just 15 feet above sea level, respectively. This creates a condition where the west side's rock elevations protect land, property, and people from flooding, while the waterways, lowlands, and valley conditions to the east are more vulnerable in the event of a heavy storm or natural disaster. These distinct landscapes establish unequal climate risk conditions that underlie urban development and infrastructural design.



Section along 125th Street, showing elevation change and soil makeup.



Heat map overlay of Harlem with green to red tones delineating higher elevations.

Harlem is also filled with myriad hidden waterways, well documented on historic maps and visible in many nineteenth and early twentieth century fire insurance atlases. These small creeks, streams, and ponds indicate places in the landscape where waters naturally flowed, gathered, and drained into the adjacent rivers, and also irrigated farmland and soils. However, as development persisted in the area, and in Manhattan more generally, these streams and creeks were ill-used and became a nuisance rather than a natural asset. Waste dumping and animal feces polluted many of the streams, and flooding damaged crops and properties. Downtown, City Hall itself was built on the site of the former (infamous) Collect Pond, a cesspool of human and animal wastes, trash, and soot that became so offensive to public health that the city had it drained and infilled in 1811. This trend continued as the city expanded northwards following the layout of the grid and was also often accompanied by leveling topographies that challenged an even plane of development.

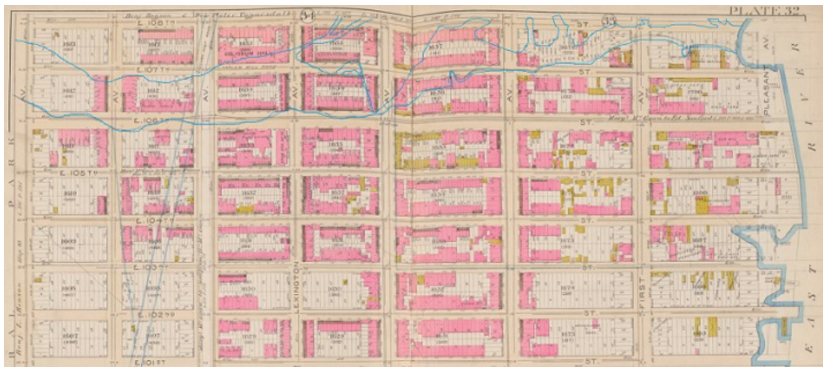
Despite infill and dynamite, Harlem shows many signs of its natural landscape, from its previously mentioned dynamic elevation changes to the rocky outcrops at the mountain of Mount Morris (also known as Marcus Garvey Park). These landscapes also remind us that nature triumphs over the most carefully planned manmade interventions. Old streams and creeks will reappear in subway tunnels

despite hydraulic pumps meant to keep water out. Low-elevation streets or roads located over river infill, like East 106th Street, will flood in heavy rain, becoming veritable rivers themselves. The Harlem Marsh encompasses most of East Harlem, as indicated by the blue streams and green areas on the accompanying map, and these marshy conditions persevere despite the addition of asphalt overlay and apartment buildings. The geological character of Harlem provides a necessary basis for analyzing and understanding the environmental conditions of the studio study area.

Details of the Viele Map, showing large stream systems in East Harlem marsh, c. 1865.

FLOOD RISK AND RESPONSE

While Harlem has been a marshland and therefore a natural floodplain for centuries, intensive development in the last 200 years has meant that natural flood events have come with a cost to human existence in the neighborhood. The East Harlem neighborhoods between Fifth Avenue and the Harlem River, stretching from East 96th Street to East 155th Street, have been most heavily impacted. According to our geological research, this area was once the Harlem Marsh, a lowland area that was moist, close to sea level, and characterized by a system of streams and rivulets, draining rainfall and other streams from the heights on the west side of Manhattan Island. Even early in Harlem's post-settler colonial history as farmland, the marshiest areas on the riverfront were left undeveloped, with farms starting to sprout around what we now know as Second and Third Avenues. However, as several consecutive fire insurance atlases show, the steady development from the south meant that even these marshes surrendered to the grid, and decade by decade, new streams were taken off the atlas maps as avenues were laid over their drained beds. East 107th Street is constructed almost entirely over a preexisting large stream, depicted on the Viele map of Manhattan. Subsequent areas between First and Third avenues from 96th to 104th Streets on the south of the study area, as well as further north between East 114 and East 122nd Streets, are also buried streams whose outlets fall into the Harlem River.



Detail of fire insurance map showing the expansion of the grid northward and construction over existing waterways, c. 1891.

These two maps illustrate the most prominent areas of land lying on the Harlem Marsh, which is occupied today by many NYCHA housing complexes, multi-family apartment buildings, and multi-use storefronts. The area is serviced by the 6 train, whose infrastructure chronically floods. This marsh was infilled with solid waste to "reclaim" land for Manhattan's development, and this ongoing flood vulnerability impacts the populations who live there.

Another prominent historic waterway is the Harlem Creek, visible on almost every fire insurance atlas and depicted in bold on the Viele map. This creek ran from West 116th Street down to the Harlem Meer, and was also fed by Montagne's Rivulet. This creekbed explains the depression in land grade in Central Harlem, and is buried beneath the major subway express lines of the 2, 3, A, C, B, and D trains that traverse tunnels from Central Park West to the central vein of Harlem up to the 125th Street depot.

However, flood vulnerability is not solely based on the presence of historical waterways, as the west side of Harlem is littered with streams feeding into the Hudson. The area's topography is also a factor in East Harlem's frequent sewer overflows: water flows down from the heights through the plains of East Harlem, overworking the water maintenance systems on that side of the island. Together, these two geological realities have combined to create a perfect storm for East Harlem residents for decades.

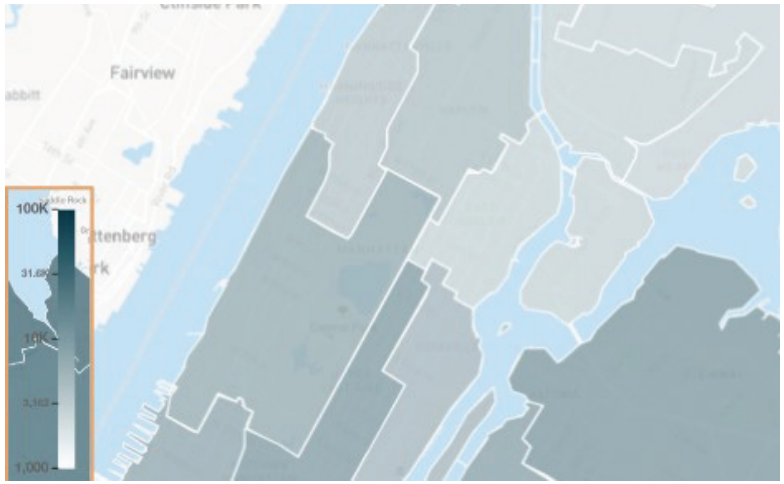
The Federal Emergency Management Agency (FEMA) has outlined data for the 100- and 500-year floodplain locations for many cities that are at risk for flooding and increasing negative effects from climate change and sea level rise. In New York City, a large percentage of the floodplain danger is in East Harlem. FEMA, as well as the open data nonprofit First Street, have collected data and run simulations on the Harlem floodplain's performance during several historic flood events. Their findings show that Harlem has likely always flooded, and will continue to flood with increased severity (Risk Factor, n.d.).

Harlem's geography and topography establishes conditions of environmental inequality, with different areas of the neighborhood being more prone to flooding. The area has not received funding or infrastructural support to mitigate these environmental stressors when compared with other, wealthier at-risk areas of New York City, underscoring further injustice. One example of this inequity can be seen in the city's major investment into the coastal resiliency program for the Lower East Side, a neighborhood that has changed dramatically and is now an expensive enclave. The East River Park that services this neighborhood is set to have millions of dollars invested in soft landscape upgrades, new park facilities and amenities, and above all, flood protection for that neighborhood (NYC Dept. of City Planning, "East River Waterfront Study," n.d.). None of these plans extend upwards to Harlem, which was hit as hard as or harder than the Lower East Side by Hurricane Sandy.

EXTREME HEAT HISTORY AND HEAT PROSTRATION REPORTS

Harlem has been documented to have high vulnerability to extreme heat conditions and is one of the warmest neighborhoods in New York City (Vant-Hull et al. 2014; Rosenzweig et al. 2006). As wind moves from south to north during a heatwave, the air is heated by the buildings on the southern end of the island, causing the wind to become warmer before it reaches Harlem. The high ridge on the west side reduces the prevailing surface wind, further increasing the temperature in Harlem (Ramamurthy et al. 2017).

Historically, Harlem also has had fewer street trees, and the 1995 tree census of Manhattan still portrayed the Harlem area to have less tree density than the rest of the island (NYC Dept. of Parks and Recreation 2015). The lack of shade on the street allows more sunlight penetration, which causes a warmer urban fabric, leading to extreme heat danger.



1995 Street Tree Census. Data Source: New York City Open Data.

There are also fewer hours of shade produced by buildings in Harlem due to their average lower height. Structures in Harlem mainly consist of residential buildings built between 1900 and 1940, which are generally lower in height (4.6 floors tall on average) compared to the business area around lower Manhattan (the average height for all of Manhattan is 6.3 floors) (Vant-Hull et al. 2018). Within Harlem itself, Central Harlem and South Harlem are documented to have lower buildings than West Harlem (based on the PLUTO dataset; see NYC Dept. of City Planning 2022), indicating even greater heat risk.

In addition to building heights, the interior living condition among residential buildings in Harlem is another characteristic of the built environment in Harlem that affects heat vulnerability. As discussed in the Indoor Light, Air, and Ventilation historic context, 48 percent of housing in Harlem documented in 1969 was built during the era of Old-Law Tenements. This type of residence utilized 90 percent of the lot area for built space, with very minimal interior air shafts and narrow courts between buildings for ventilation. This resulted in minimal air circulation, which trapped stagnant warm air inside, increasing Harlem residents' vulnerability during extreme heatwaves.

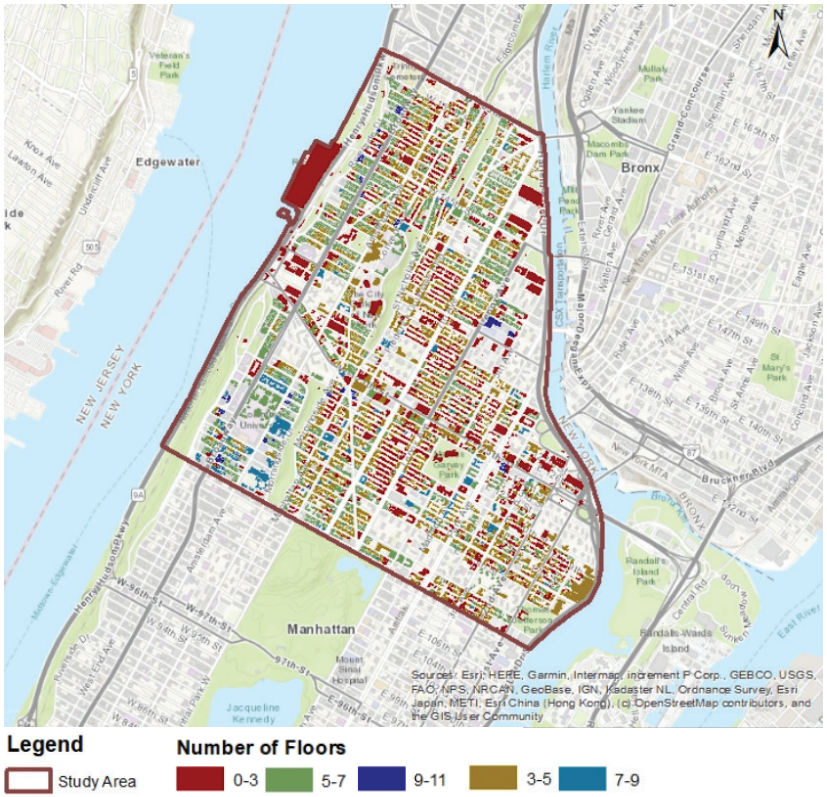
The availability of open space in Harlem indirectly affects the increasing heat vulnerability of this area as well. Before 1900, Harlem residents often utilized undeveloped land and streetscapes as public spaces in response to the lack of parks in this neighborhood (Gill 2012, 256).

Narrow courts between Old-Law Tenement buildings.

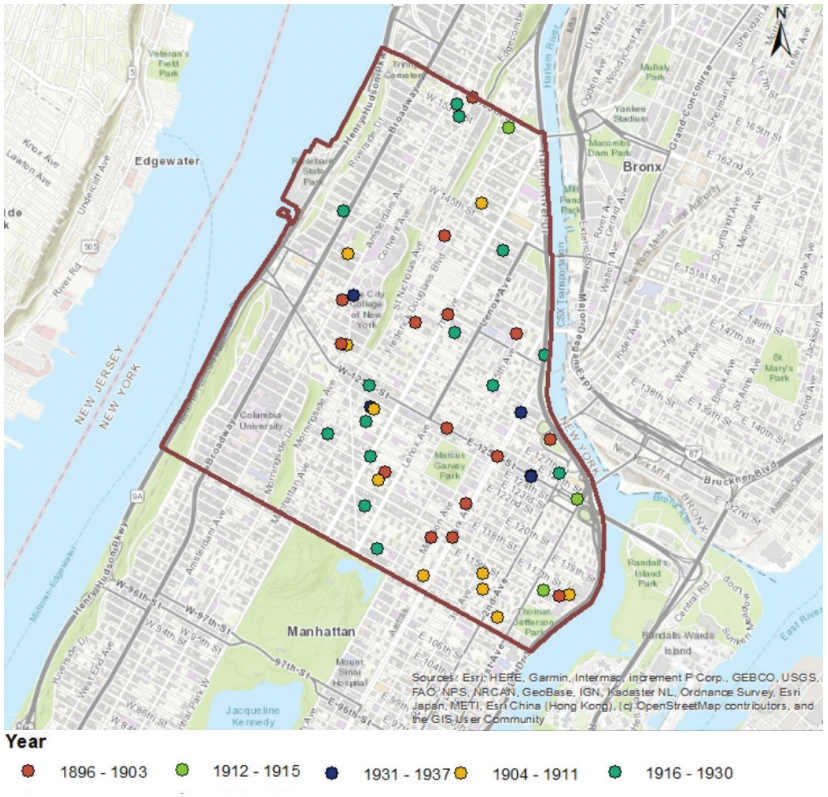
Street gathering in Harlem.

While it is apparent that the Harlem area is a vulnerable neighborhood during heat waves, what is the effect of this danger to the residents of Harlem? For hundreds of years, newspapers have reported heat prostration victims and heat casualties in Harlem. The accompanying map illustrates areas of concentration where heat victims were reported in the media between the 1880s and the 1940s. While this data is neither a comprehensive accounting of heat prostration cases in Harlem nor relative to the city as a whole, it provides a perspective on the prevalence of the problem in Harlem.

The first map shows whether the victims survived or not after prostration, while the second map shows the year when the case was reported. The maps indicate that Central Harlem and South Harlem have denser recorded cases than West Harlem, with particular patterns of concentration, such as a linear arrangement of dots along 125th Street.



Harlem mostly consists of low-rise buildings.



Heat prostration map based on reported year.

HEAT RISK MITIGATION: DEVELOPMENT OF COOLING FACILITIES

The establishment of cooling facilities suggests a response to mitigate extreme heat risk. One newspaper article from 1936 reported heat prostration casualties and the lack of public cooling facilities in Harlem. The caption says, "Cooling Spots for Grownups Hard to Find." It notes the in-progress development of Colonial Park (now Jackie Robinson Park) and mentions the facilities it will provide after its completion: pool, benches, and greenswards (*New York Amsterdam News* 1936). The Jackie Robinson Pool was the first public pool for adults in Harlem. Considering that the first pool built in Manhattan was the West 60th Pool, developed in 1906, it shows how late the development of cooling facilities and public spaces was in Harlem compared to other neighborhoods.

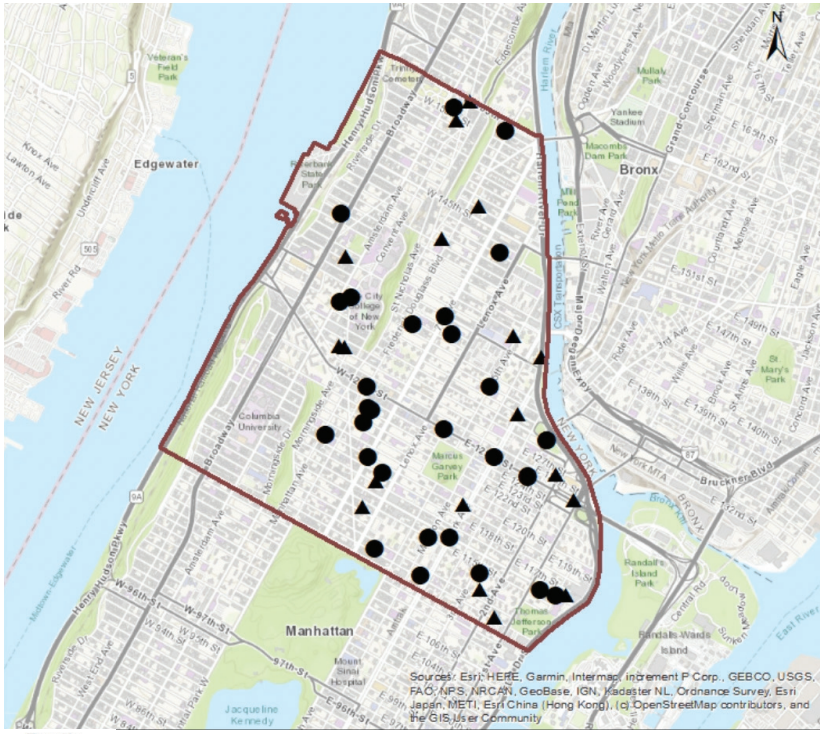
The establishment of drinking fountains in Manhattan has a similar pattern. Some existing drinking fountains in Manhattan were documented back in 1899 (NYC Dept. of Parks and Recreation 2019). All of those earlier drinking fountains were established in Lower Manhattan and Midtown, indicating a pattern of progression from the southern parts of the island to the north. Harlem residents' minimal access to cooling facilities increased the risk of extreme heat in the neighborhood, as relief from the heat was hard to find in the past.

COOLING SPOTS FOR GROWNUPS HARD TO FIND

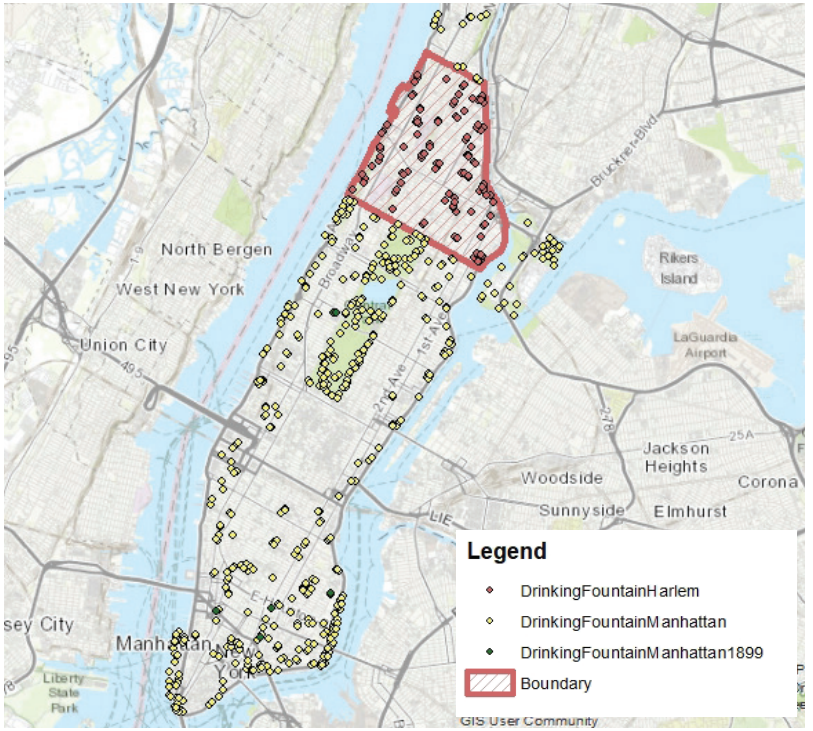
Swimming Project in Colonial Park Not Finished

Harlem Swelters...

New York Times *headline about the lack of cooling facilities.*



Heat prostration map based on victim condition.



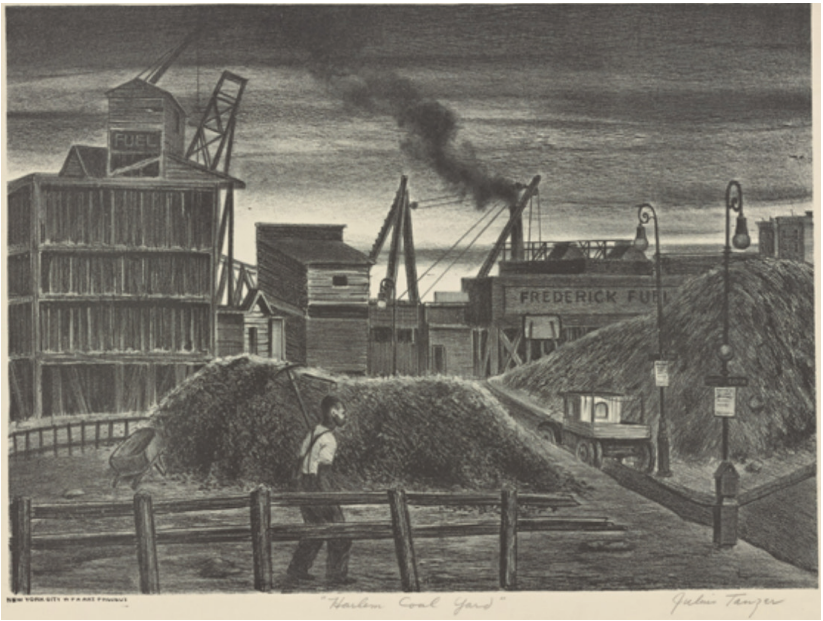
Existing drinking fountains in Manhattan.

ENERGY

Michelle Leach and Jerry Schmit

HISTORY OF HARLEM HEATING AND THE MANHATTAN STEAM HEAT DISTRICT

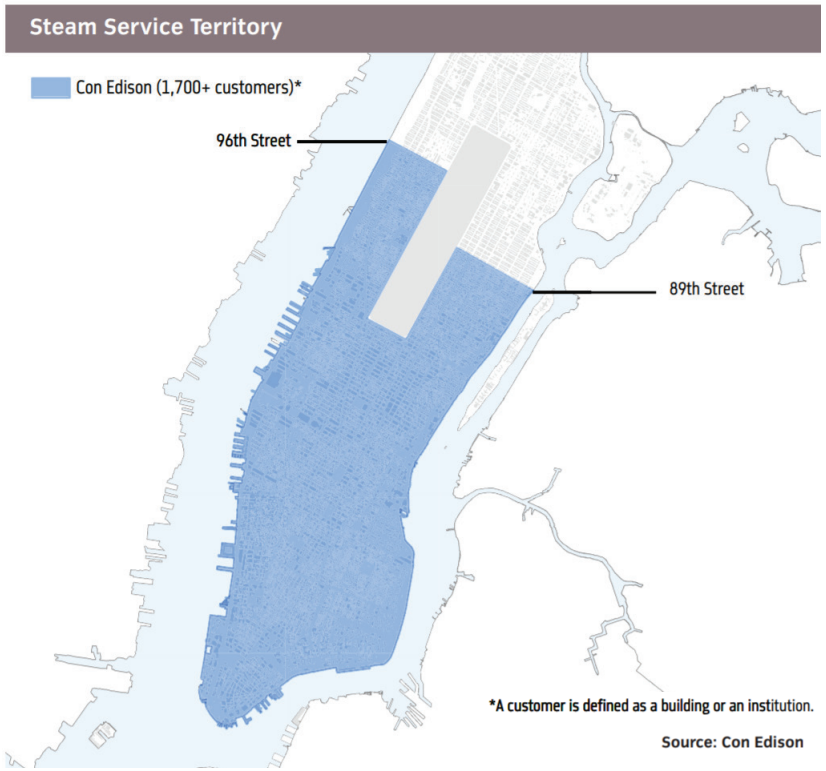
The evolution of energy technology in Harlem has unique contrasts from that of southern Manhattan. Early progression of heating in Harlem followed that of other locations in New York City until the late nineteenth century. Previous to European settler colonialism, the Lenape used wood for heat and cooking (Sanderson 2009, 227). European settlers would do the same, using wood fireplaces to heat small early buildings, followed by burning coal instead of wood in the 1800s. This introduced coal baskets into already constructed fireplaces and coal burning stoves to heat individual homes, rooms, and apartments.



Coal yards were fairly commonplace in Harlem in the late nineteenth and early twentieth centuries, c. 1935-1943.

Steam heating was invented at the end of the eighteenth century, and New York City would be revolutionized by its use. At first, this meant that buildings would have their own coal-fired boilers heating water to feed steam into radiator pipes that would travel up buildings. For many buildings in upper Manhattan, this is still the system used today, except that coal has been traded out for more modern fuels.

As the buildings in southern Manhattan increased in size, individual boilers became impractical, leading to the use of a district steam system in the 1880s. Steam is produced on a large scale and is then provided to buildings across the city (Young 2020). Today, the city's steam system services buildings up to 96th Street on the Upper West Side (UWS) and 89th Street on the Upper East Side (UES).



Consolidated Edison Steam Service in Manhattan.

District steam heat is advertised as decreasing pollution, increasing efficiency, and creating a safe and easy heating option (ConEd, "Steam Benefits," n.d.). By the 1930s, the New York Steam Company was advertising its steam heat as a luxury for Lower Manhattan and Midtown as they extended the service toward the Upper West and Upper East Sides. District steam continued to be unavailable to the ever-

growing communities uptown (Young 2020). The stated reason for not continuing the district uptown was that the smaller scale buildings could be adequately serviced by individual boilers, but this decision has compounded heating problems in Harlem over time.

The expansion of steam and electricity was intertwined, often sharing the same underground tunnels used to lay pipes and lines (New York Steam Corporation 1932). Edison began expanding electricity through downtown from the Pearl Street Power Station with the help of wealthy investors such as J.P. Morgan and political advantages bought with bribes (Institute for Energy Research, n.d.). The New York Steam Company would be incorporated into Consolidated Edison in 1936 to provide electricity and steam, but electricity was slow to progress uptown, while the steam district never made it to Harlem. Gas lights were common and, at first, many uptown residents were hesitant to switch to electric when they had outfitted their homes with gas lighting so recently. Into the 1930s, it remained a luxury in Harlem to have heating, hot water, and electricity within a rental unit (White 2017).

With a high proportion of the population in Harlem being renters starting in the nineteenth century, the complaints about heating reflected those of other low-income rental neighborhoods in New York. Common complaints documented in newspaper articles included landlords decreasing the heat in apartment buildings to save on fuel, or even shutting off heat to drive tenants out of buildings (Wright 2022). These practices have recently been dubbed "thermal discrimination," but the practice has plagued low-income communities through New York City's history. This led to the addition of Section 225 to the Sanitary Code of the city in 1918. The code specifies that landlords must keep buildings above 68 degrees Fahrenheit during the day when the outdoor temperature is below 55 degrees (NYC Dept. of Housing Preservation and Development, n.d.). This policy is still in effect today, but since its inception, landlords in low-income areas have tended to flout the policy more often, leading to poor living conditions in areas like Harlem (Wright 2022). With the city's efficient steam system serving downtown, midtown, the Upper West Side, and the Upper East Side, there were fewer incentives for landlords to take advantage of tenants by decreasing the heat to save money. The district steam heat system allowed for individual buildings to oversee the upkeep of steam traps and valves, which was much simpler than the upkeep of a whole boiler system (New York Steam Corporation 1932). Meanwhile, many heating complaints in Harlem were caused by absentee landlords ignoring maintenance to heating systems.

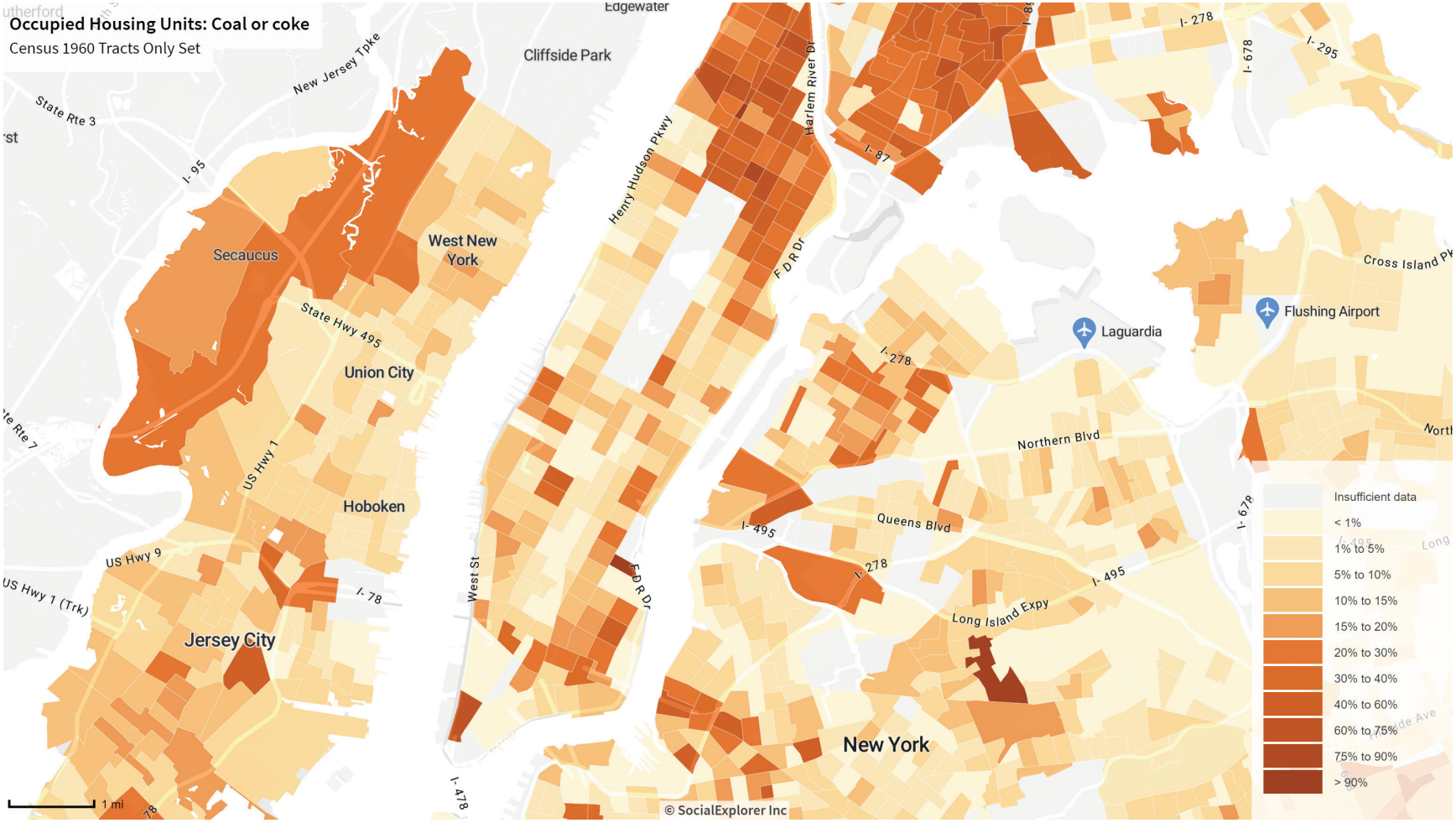
Over time, the district steam system transitioned from coal to heating oil, and is now mostly powered by natural gas (ConEd, "How We Source Our Steam," n.d.). This general transition happened with individual heating as well, but often lagged behind the district system, with individual landlords being slow to transition to new fuel types. As individual systems were upgraded across the city, they were often replaced with larger boilers than necessary, making systems less efficient with new fuels (Pontecorvo 2019). Many changes to fuel were driven by price and stability of resources, but these shifts also tended to decrease pollution and combat adverse health effects. Without policy to mandate changes in fuel, landlords had little incentive to make changes toward cleaner fuels. This caused outdated heating sources to be used in Harlem, such as coal and heating oil, longer than in other parts of the city.

Paying for fuel and heating changes often added another layer of tension between renters and landlords. It was common for heating costs in New York City to be included in rent prices for apartments, including those with rent control. When fuel prices increased or heating systems needed to be replaced, landlords would increase rent if possible, and if not, they would often put off changes. Landlords in the twentieth century have tried to change this process, attempting to pass fuel and heat costs on to their tenants. During the oil crisis in 1974, New York City landlords protested at the offices of the Saudi Arabian mission at the United Nations. At the same time as this protest, a group of rent-controlled tenants refused to pay rent increases that were put in place by the City, and another group of landlords cut off heat and hot water during a single day as a counterprotest (Fried 1974). This is just one historical example illustrating the frustration between landlords and tenants, but these dynamics have been heightened in low-income and minority areas where tenants pay a greater amount of their household income for energy, and bear greater energy, climate, and pollution burdens than wealthier areas of New York City (WE ACT, "Gas Fress," n.d.).

EFFECTS OF VARIOUS FUELS

Changes in fuel sources in Manhattan were generally led by cost, health, and pollution. The steam heat system has been advertised to be better in all of these regards due to the efficiency of a district system and its ability to eliminate burning fuel in buildings. Areas without the district steam system continued burning solid fuels much closer to their living spaces.

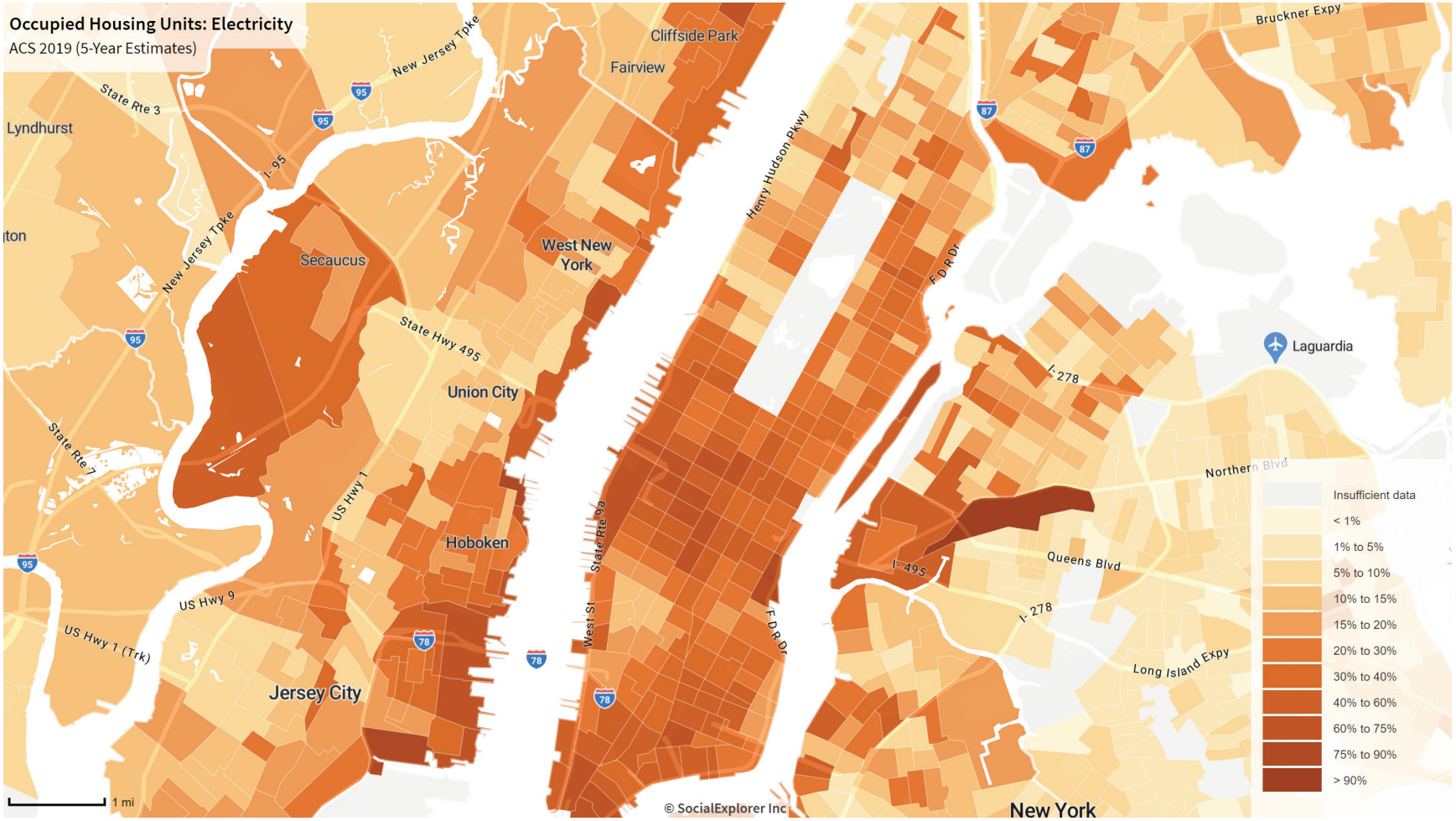
Solid fuels such as wood and coal create adverse effects through both indoor and outdoor ambient air pollution. Health effects that have been linked to these fuel sources include cardiovascular harm, the release of carcinogenic compounds into the air, and other respiratory problems (Chafe et al. 2015, 15). Outdoor ambient air pollution also causes greater health burdens on communities, resulting in higher rates of premature death and healthy life years lost (18). As coal was phased out



Coal's prevalence in 1960. Data Source: The United States Census.

due to cost and replaced by heating oil, areas such as Harlem and the Bronx lagged, with a higher density of buildings still using coal for heating fuel in 1960. Areas further south had already made the transition to cleaner fuels.

Between the 1940s and 1970s, the United States shifted from coal to hydrocarbons for heating. In New York City, this led to widespread use of heating oil #6 in buildings. Heating oil was the prevalent heating type until the late twentieth century, when natural gas and cleaner heating oils became cheaper and more popular (Pontecorvo 2019). Heating oil #6 has since proven to be a major pollutant in New York City and to cause health conditions such as heart disease (Gregory 2014a). Yet, transitioning away from heating oil #6 has been complicated for the city. Its use was to be phased out by 2015, but due to a lack of education on the topic and cost associated with transitioning systems to cleaner fuels, uptown Manhattan once again has been slower to make the transition (Mailman School of Public Health 2018). WE ACT has claimed that the slow transition is due to a lack of education and enforcement of the policy. Residents seeking financing for converting oil heating systems were mostly homeowners, but the majority of Harlem's residents are renters. The landlords that they depend on are either uninformed about financing options, unable to make the switch, or refuse, choosing to be fined by the city instead of transitioning (Mailman School of Public Health 2018). Landlords uptown are also more likely to transition from heating oil #6 to #4, rather than spend more money to transition to #2 or natural gas, the cleaner options (Gregory 2014a). This is only a short-term solution, because the city is also phasing out heating oil #4 by 2030.



Harlem's delay in receiving electric heating upgrades. Data Source: The United States Census.

Aside from policy changes to ensure buildings are properly heated, regulating fuel types has only recently emerged in New York City policy. The City has mandated a carbon-neutral New York by 2050, including goals to transition to electric heating systems. This has started with phasing out fossil fuels in all new buildings by 2027 (Newburger 2021). While New York heads toward a more sustainable future, policymakers must acknowledge the fuel disparities that have continuously disadvantaged low-income communities uptown throughout history. Even now, data from the American Community Survey (ACS) reports show that the switch to electric heating already favors southern Manhattan, setting up areas like Harlem to be dependent on fossil fuels for longer.

While electric heat pumps are growing in popularity as a replacement for fossil fuel-based heating, they are not yet widely used in multifamily dwellings and have not gained popularity within affordable housing complexes. This is due to cost, a lack of information, unclear regulations, and slow technological advancements (Urban Green Council 2020). New York City is attempting to face these problems and has started initiatives, such as the NYCHA Clean Heat Challenge, which aims to produce an affordable heat pump mechanism that can be implemented in City-owned housing as well as make this technology more accessible to other landlords in the city (Pontecorvo 2022). WE ACT also has initiatives to transition away from cooking gas to electric stoves in affordable housing through its "Out of Gas, In with Justice" initiative. WE ACT is attempting to decrease carbon emissions uptown due to concerns that the City's regulation in the building sector will not be enough to meet carbon goals. The City is still expanding the natural gas grid in attempts to remove heating oils, but this only leaves communities like Harlem behind in electrification (Mailman School of Public Health 2018).

ACCESS TO ENERGY THROUGH HOUSING PROJECTS

Historically, access to energy in Harlem was a function of the affordability of utility costs and the degree to which infrastructure supporting said utilities had advanced. Affordability was twofold: exorbitant rents deterred disadvantaged families from units that were otherwise equipped with adequate heating and lighting infrastructure; and families who did have the means for these units could not always bear the expense for operating these systems. These challenges, along with concerns for sanitation, ventilation, and affordability gave rise to philanthropic and, eventually, government-subsidized housing efforts in Harlem and the greater New York metropolitan area (Bloom, Lasner, and Dolkart 2016). Regarding new tenement construction and urban renewal, the series of housing developments that Harlem witnessed during the twentieth century reveals increasingly prevalent amenities, including petroleum heat sources and electric lighting. To examine the community's access to the infrastructural amenities of energy, early policies governing tenements will be explored, followed by a glance at a series of twentieth-century housing improvement efforts in Harlem.

Since Harlem's inception, early dwellings, most of which were speculative projects, were relatively unregulated and often fostered poor living conditions (Bloom, Lasner, and Dolkart 2016). The use of energy in these buildings bore no exception. The New York State Tenement House Act of 1901 only mentions that "In every tenement house there shall be adequate chimneys running through every floor with an open fireplace or grate, or place for a stove, properly connected with one of said chimneys for every apartment" (Fryer 1901). A glimpse of the housing conditions in Harlem can be obtained by perusing the National Urban League's 1915 report.

The report notes that merely 41 percent of tenements that were built under the 1879 "old law" had operating central steam heat systems, while 80 percent of those built under the 1901 "new law" buildings had central steam (National Urban League 1915). While this difference marks a definite advancement in the conventions of speculative tenement buildings in Harlem, it still indicates that nearly half of the tenants in the study did not have access to reliable central heat at home. Overall, the report projected that 53.6 percent of all tenements in the district of the study had operating central steam heating systems. It also noted landlords' increasing tendency to shut off these steam "apparatuses" as they wore out or even prematurely due to "poor service" and mounting coal costs (National Urban League 1915). Toward the end of World War I, preference for alternatives to coal as an energy source began to settle into New York City. A slew of coal strikes in 1919 began to shake the stability of the coal market and led to sporadic price

Older heating fuels limited upgrades to newer appliances, c. 1949.

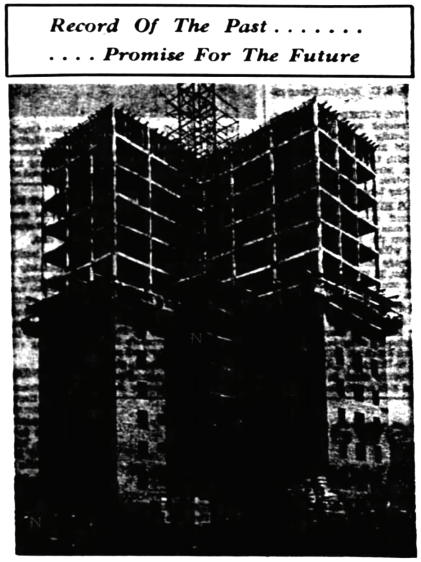
hikes, creating another reason for consumers to opt for electric and petroleum alternatives (Nye 1998). Relatively lower operating costs and cleaner air were among the advantages of coal alternatives, but to obtain the infrastructure to support said alternatives was another matter. Access to these required either retrofits, which burdened tenants with higher rent costs, or the task of applying for new housing.

Worsening issues in housing inspired a wave of new projects that would supply residents with affordable alternatives to traditional tenement housing. One of the early projects in Harlem was John D. Rockefeller's Paul Laurence Dunbar Apartments complex of 1926. It featured gas and electric amenities and offered a comparatively low rent at $230.42 (adjusted for inflation) with utility costs already included (Bloom, Lasner, and Dolkart 2016). Subsequently, the government-funded Harlem River Houses appeared in 1937 between 151st and 153rd Streets. These were rented at seven dollars per room with an additional $1.42 charge for gas and electric use (a total of $167.68 today) (*New York Age* 1937). While these initial projects provided improved housing options to which residents could apply to move, they

were not as proactive in improving the existing building stock because they did not involve renovations. Rather, historic fire insurance maps reveal that these projects were erected on undeveloped portions of the island.

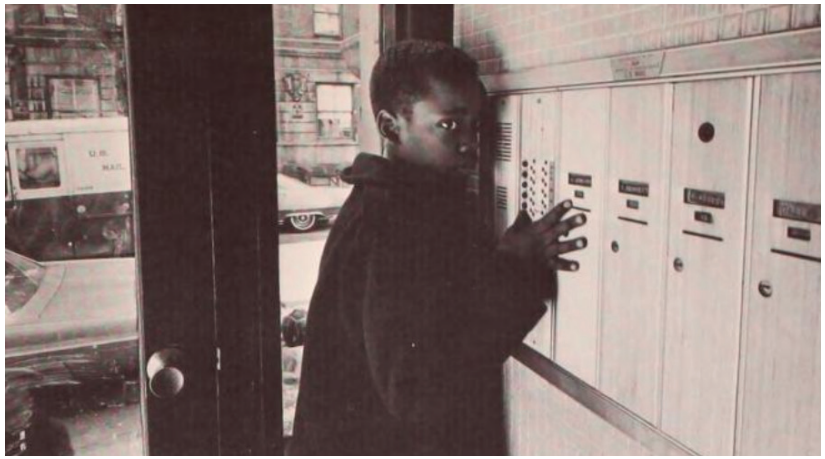
By contrast, insurance maps also reveal that the subsequent construction of the East River Houses (1940) and the James Weldon Johnson Housing Complex (1948) involved the multi-lot acquisition of already-occupied properties to clear massive plots of land for new developments. The James Weldon Johnson project was particularly extensive in its mission to better what was otherwise considered a blighted area, demolishing over 1,000 tenement apartments (Bloom, Lasner, and Dolkart 2016). While these government-subsidized efforts provided Harlem residents with better access to energy resources, they only encompassed a small portion of the greater Harlem population. The 1960 census records show the distribution of energy types in New York City, and reveals that a great majority of Harlem residents still relied on coal as an energy source for heating.

As an alternative to these "clearance-based" strategies, Harlem also witnessed improved energy systems through then-experimental methods like renovations. A random selection of respondents for a 1966 survey of Harlem residents revealed that over half were dissatisfied, particularly with "insufficient heat" (Goldstein 2019). A renovation project at West 114th Street during the late 1960s sought to address this and other concerns in thirty-six tenement buildings.


Record Of The Past . . . . . .
. . . . Promise For The Future

1949 newspaper article describing the new James Weldon Johnson housing complex in Harlem.

This project oversaw the elimination of the original coal-fired steam boilers for replacement with oil-fired ones (Goldstein 2019). Beyond improving energy measures for heat and comfort, these housing reclamation projects also utilized new energy systems to improve other aspects of home life, such as security. The project at West 114th Street involved the installation of new, high-capacity electrical systems to allow for more advanced electronic aids, such as electronic door locks and PA systems (U.S. Dept. of Housing and Urban Development 1968). While the project at West 114th Street marked great strides in housing infrastructure in Harlem and employed energy in unprecedented ways, it is important to reiterate that this only involved thirty-six housing units. Greater Harlem still lacked access to such amenities.



New electrical systems brought added security to housing.

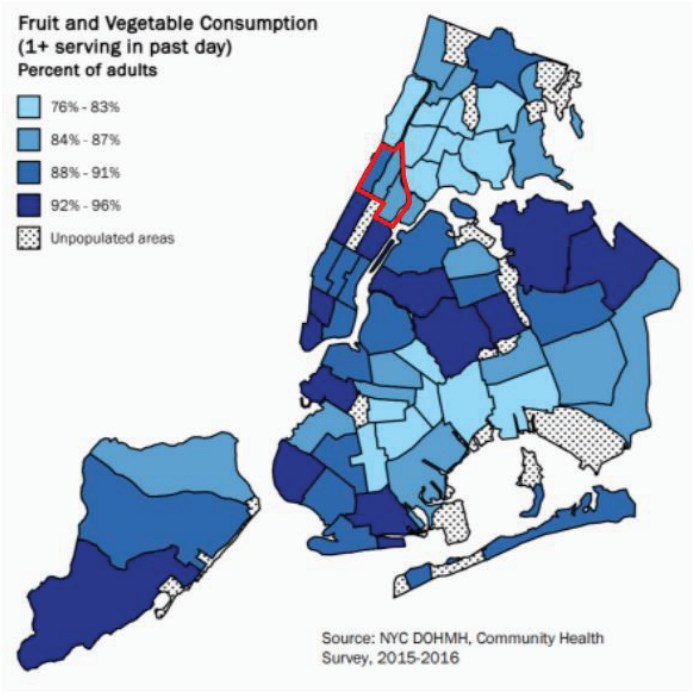
Programs seeking to combat the disproportionately unlivable conditions of Harlem's residential energy infrastructure arose on the heels of the nation's energy crisis in the early 1980s. These efforts sought to address every component of residential heating, beyond just the heating source. They were concerned with all parts of the thermal envelope of these homes to address issues more holistically. The Harlem Urban Development Corporation Weatherization Program was advertised in a 1988 *New York Daily News* article to potential contractors and vendors for bidding. The article discussed the many potential upgrades to both the furnaces and components of the residential envelope, such as weather stripping on doors and windows. The bulletin also described the Weatherization Program as one that was provided to tenants free of charge through grants disbursed by the United State Department of Energy, Health, and Human Services (*New York Daily News* 1988). Today, the Harlem Community Development Corporation, operating as a subsidiary of a New York State program, conducts a Weatherization Assistance Program that continues to funnel funding from the United States Department of Energy to eligible Harlem residents. Eligibility is based upon the relative incomes of tenants (New York State, Empire State Development, n.d.). The emergence of these programs marks a noteworthy turn in the attitudes toward equitable access to home essentials such as energy and all of the infrastructure it requires.

FRESH FOOD AND NUTRITION ACCESS

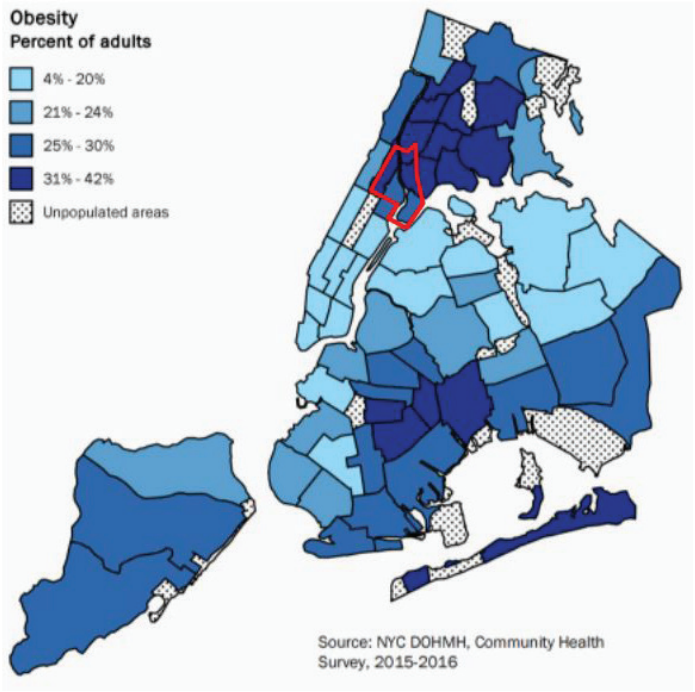
Clara Wayee Yip and Daoxin Chen

CONTEMPORARY FOOD ACCESS AND NUTRITION ISSUES

Harlem was widely regarded as a food desert in which the options for affordable and healthy choices were scarce (Nikoa Evans, unpublished interview, April 7, 2022). The City's Food Retail Expansion to Support Health Program (FRESH), launched in 2006, has helped encourage the development of healthy products at food retailers such as bodegas by offering zoning and tax incentives (Naidoo et al. 2018). Still, the percentage of adults who report eating one or more servings of fruits and vegetables per day in Harlem is lower than that in other regions (Naidoo et al. 2018). The lack of healthy food options is often met with the constraint of availability and proximity (Naidoo et al. 2018). One article reported that students at a school on 129th Street had food options from fifty fast-food restaurants and twenty-nine pharmacies but not a single affordable healthy food restaurant within a three-block radius (Roy 2019). For every supermarket, there were seventeen bodegas (Naidoo et al. 2018). Therefore, the number of people in Harlem who suffer from nutrition-related diseases like obesity, diabetes, and hypertension is approximately twenty percent higher than in other areas (Naidoo et al. 2018). In East Harlem, food insecurity disproportionately affects people of color, including Black, Latinx, and Asian-Americans (Nieves et al. 2022). Lower-income populations experience higher levels of food insecurity and stress during certain parts of the month; 48 percent of people in East Harlem spend more than 30 percent of their income on rent, putting pressure on their ability to afford nutritious foods.



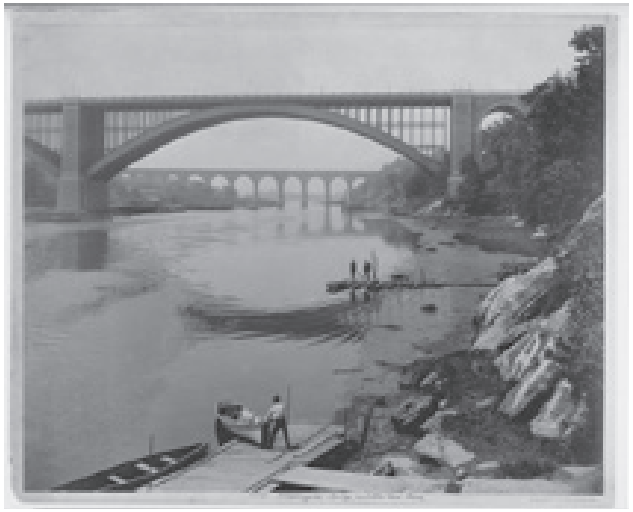
Lower fruit and vegetable consumption in Harlem.



Higher percentage of obesity in Harlem.

HISTORICAL DECLINE OF FISHING AND ACCESS TO FOOD SOURCES

The lands before Dutch and French settlers arrived in the seventeenth century were rich for hunting and gathering, and the Lenape peoples grew corn, which flourished in the wet and marshy lands of the area now known as Harlem (Sanderson 2008). The Hudson and Harlem Rivers once provided the area with fresh fish. The Lenape caught herring, mackerel, and cod from the Atlantic Ocean or the Harlem River in the areas like the banks near 120th Street and Willis Avenue (Wildlife Conservation Society, n.d.). As the urban landscape developed in the nineteenth century, waterways were still enjoyed for fishing and boating. As the population increased, human activities from industry, shipping, and waste disposal on Harlem's banks left a damaging effect on the overall water quality.



View from Harlem River, c. 1890.

By 1910, the Harlem River was so ecologically impaired from the pollution caused by dumping into the rivers that a panel of scientists and engineers sought to define ways to improve the conditions of the city's rivers and sewage system (Metropolitan Sewerage Commission of New York 1910). During the study, the panelists found that the Harlem River was more polluted than the East River and Hudson River, such that it was incapable of supporting fish life. The experts could not find proof that dumping sewage into the Harlem River had negative effects on human health, despite the common knowledge that eating shellfish from the harbor would cause illnesses (Metropolitan Sewerage Commission of New York 1910). The shellfish industry that profited off of the oysters and clams in Harlem's riverbanks was largely unregulated at the turn of the twentieth century, so consumers faced risks of contracting illnesses like typhoid fever and gastro-enteristis.

As the sewage system advanced, water pollution control plants (WPCPs) were established at Wards Island and North River to divert wastewater and to collect rainwater. In times of heavy rainfall, however, the treatment plants were unable to keep up with the storm water overflow and wastewater was diverted to outfalls in the Harlem River (Fisher 2016). Policies such as the Clean Water Act in the 1970s aimed to revitalize the waters for fishing privileges (Sanderson 2009). However, fishing and crabbing in Harlem remain recreational activities and any caught fish or crab are not fit for consumption (Wang 2014).

Before the land was colonized, the aboriginal Leni Lenape would freely hunt duck, turtle, raccoon, hen, turkey, and deer in the area. The development of south Harlem following the plan of 1811 systematically reduced once-prevalent farming and hunting activities, as farmers began selling their land to eager real estate speculators. The conversion of Harlem "from field to subdivision" would continue through the nineteenth century as the loss of control for ownership and inheritances fell through "pitfalls of litigation" (Tremante 2000). While farms were still found in Harlem until the 1910s, urban development would eventually lead to the erasure of all farmlands (Sanderson 2009).

Print showing a woman and a child walking along a dirt road through a wooded area that borders the Harlem River near the "High Bridge," otherwise known as the Croton Aqueduct, which is not visible from this vantage point. Also shows a cow walking along the river and a man fishing from shore, c. 1854.

ICE AND REFRIGERATION

The ability to properly refrigerate and store food for freshness is another important environmental justice implication of food access and nutrition. A study into Native American practices reveals that diets were often related to the landscapes and were impacted by the ability to preserve food through refrigeration (Sanderson 2009). In New York's four season climate, agricultural productivity is lower during the winter. The Leni Lenape stored their dried corn and beans in grass-lined pits in the ground, and also ate preserved squash, smoked fish, and oysters or clams found in the coasts of the Harlem and Hudson Rivers (Sanderson 2009). It was the Indigenous peoples who taught the settlers how to store their food in similar below-ground storage mechanisms and root cellars (Kraft 1984).

The people of a more modern Harlem, especially those who resided in overcrowded apartments, faced an entirely different challenge with fresh food storage. For tenants, refrigeration was often unreliable, if made available. During July of 1944, the Seventh District Municipal Court at 455 West 155th Street saw a total of 619 cases between landlords and tenants in disputes over unpaid rent, many of which were related to protests against adequate housing conditions and needs (*New York Herald Tribune* 1944). The case of one landlord-tenant dispute over a working electric refrigerator sparked an uproar in the Harlem community after a Magistrate dismissed the complaint "remarking that the same point was raised in another litigation" (*New York Herald Tribune* 1944).

Because the refrigerator system before this time period was dependent on transported ice blocks, if the ice supply was inadequate, it impacted the ability for Harlem residents to store fresh or frozen food. An example of this is the Knickerbocker Ice Company, which dominated the supply of ice in the Harlem region during the nineteenth century. In 1880, an accident occurred in the ice supply chain at the ice depot on 128th Street and the Harlem River. Saloon-keepers, butchers, and grocery men in Harlem were deeply distressed as this adversely affected their business operations, while housewives lamented that their food had been spoiled from the lack of adequate ice in their ice-boxes (*New York Times* 1880).

MILK

The relationship between food accessibility and social injustice is also reflected in milk insecurity in Harlem. A general phenomenon in New York City was that many babies would not survive because of milk-borne diseases (O'Connor 2016). This condition was improved when pasteurized milk appeared. However, residents in Harlem seemed to benefit less from the new invention, as the supply of pasteurized

Horse-drawn ice harvesting on the Hudson River, c. 1912.

Sheffield Farms milk delivery wagon, c. 1936.

milk was far from enough in Harlem. Sheffield Farms opened a state-of-the-art bottling plant in West 125th Street in 1909 to provide healthy and clean milk. The company also built Sheffield Farms Stable to house the horses that pulled the door-to-door milk wagons. When New York Central Railway, the railway monopolizing the delivery of milk, reached West 125th Street in Harlem, another major milk company, Borden's Farm Products Division of the Borden Company, purchased a six-story garage and converted it into a milk pasteurizing and distribution plant in 1937 (*New York Times* 1937). However, in 1940, the two companies both declared that the Harlem delivery routes were discontinued and the delivery wagons were limited, due to the losses from robberies of their drivers (*New York Amsterdam News* 1940b). This action increased the cost of milk to local consumers, the retail purchase at local stores being one penny greater (*New York Amsterdam News* 1940b).

Borden's milk, 125th Street and Eighth Avenue, c. 1939.

An alternative place to get milk was the milk depot, where milk was distributed to residents freely. But the milk depot in Harlem could not provide sufficient milk for Harlem families. The daily amount of milk supplied by the depot was only 120 quarts, and thus the first 120 mothers each could get one quart of milk and others were turned away *(New York Herald Tribune* 1930b).

MARKETPLACE

The evolution and disappearance of public markets reflect how racist governmental policies neglected to consider food accessibility challenges to underserved populations in Harlem. When a large percentage of the Black population migrated from the South to Harlem, most found they had to work long hours to support themselves to afford the inflated cost of rent. Many did not have the time to cook the recipes they had brought with them, which often required slow-cooking methods (Racism and Culture Blog 2016).

In the early to mid-twentieth century, the extra fee that Harlem renters were required to pay for use of kitchens, referred to as kitchen privileges, and the high price of cooking fuel also deterred the preparation of in-home meals (Miller 2013). As a result, from 1900 to 1919, street markets began to provide residents with prepared meals such as yams and brown sugar to save time and money. Portable stoves were also available at many vendors. There were three major street markets, on the east side of Lenox Avenue between 138th and 142nd Streets in 1913, on the east side of Eighth Avenue between 139th and 145th Streets, and on the west side of Fifth Avenue between 132nd and 135th Streets in 1915. The markets became an important food resource for Harlem residents (Miller 2013). However, the street vendors were considered a nuisance by public officials. Food vendors were forced to be contained within buildings, as a result of a citywide ban against pushcarts under the LaGuardia administration in 1934. The former street markets were forced to close and thereby limited food access in Harlem (Wasserman 1998).

Eighth Avenue street markets, c. 2011.

Even though some public markets were established in Harlem, they were not well maintained. One of these LaGuardia-era public markets is the Park Avenue Retail Market, which after World War II became known as "La Marqueta," specializing in Latin American and Caribbean goods for the residents of East Harlem and Central Harlem and gained popularity in the 1950s and 1960s (Gustafson 2019). However, from the 1970s, the public buildings that replaced the surrounding tenements reduced the foot traffic and led to reduced public support. The market started to decline, and was heavily damaged by fire in 1977 (Gustafson 2019). Supermarkets did not necessarily provide a viable alternative. Certain supermarket chains discriminated against the poor by selling food at higher prices in Harlem (Carmody 1967).

At the end of the twentieth century, rezoning was another factor that contributed to the inaccessibility of fresh food for Harlem residents. A nonprofit corporation developed the Pathmark supermarket at the intersection of 125th Street and Lexington Avenue in 1997, a much needed local resource (Cohen 2018). However, after rezoning in 2008, 125th Street became a higher-density residential and commercial region. With the value of parcels increased, the scale of Pathmark was significantly smaller than the FAR (floor area ratio) allowed under the new zoning (Cohen 2018). As a result, a developer purchased the Pathmark site and is replacing it with a multi-story office building (Warerkar 2016).

La Marqueta: an East Harlem marketplace that once featured over 500 vendors, c. 1986.

Pathmark Supermarket in East Harlem, c. 2012.

HAZARDOUS MATERIALS EXPOSURE

Winnie Michi Trujillo and Damiana Yousef

CONTAMINATED SITES

Hazardous material exposures can occur when people come into contact with toxic substances, such as the chemicals in some paint, soil, or gas. Common encounters that the public is faced with are older lead paint in building interiors and contaminated soils from previous industrial sites. These toxic materials can be harmful to individuals and lead to serious medical complications such as anemia, weakness, and kidney and brain damage (Centers for Disease Control and Prevention 2021).

New York City has over 7,000 properties currently subject to environmental study and management, 40 percent of which are contaminated sites known as brownfields (NYC Mayor's Office of Climate and Environmental Justice, "Brownfields," n.d.). In the 1980s, the environmental risks of abandoned industrial sites became a significant public concern (Gorman 2003, 21). In response, brownfield clean-up programs emerged to incentivize redevelopment and became crucial resources for areas such as Harlem. In 2003, the Brownfield Cleanup Program (BCP) was enacted by the New York State Legislature to encourage private-sector cleanups of brownfield sites and promote redevelopment to grow communities economically through tax incentives for these designated areas (New York State Department of Environmental Conservation, n.d.).

Hazardous materials introduce risk to land development due to the high cost of cleanup or remediation, often causing developers to pass over these properties, especially within lower-income communities. Over time, brownfield sites can accumulate and start to present heightened health risks while reducing opportunities for small businesses, jobs, and affordable housing (NYC Dept. of City Planning 2016).

Brownfield in New York City being cleaned up for remediation.

Remediation of a contaminated site in Hell's Kitchen.

There are more than 200 contaminated sites in Harlem alone, many in East Harlem. Most sites previously had industrial uses, versus commercial or residential.

By the 1880s, the United States had started to produce inexpensive goods that were shipped all around the world (Gorman 2003, 21). The location of industrial facilities in East Harlem was based heavily upon access to transportation to obtain raw materials, favoring sites near water or a railroad. Companies also wanted the location to be convenient to their workers so building near a trolley line or residential area was ideal (Gorman 2003, 21).

As new technology and product development started to become more accessible, industrial sites proliferated in New York. These industries used large amounts of hazardous materials and produced large amounts of contaminated waste, which would never be properly disposed of, leading these toxins to contaminate the soil (Gorman 2003, 23).

Industrial site located on 110th Street and Lenox Avenue, c. 1901.

LEAD-BASED PAINT

Although the use of lead is currently banned in some industries and regulated in others, the historic damages continue families with fewer resources who usually do not have access to information on how to make their homes safer for themselves and their children.

The use of lead in paint dates far back in history. Several Greek and Latin writers like Theophrastus, Pliny, and Vitruvius left comprehensive details regarding the manufacture of these old paints and pigments. In the United States around the 1920s, virtually every item a toddler touched had some amount of lead in it. Leaded toy soldiers, dolls, toys, porcelain, pipes, and joints in the sparkling new kitchens and bathrooms of the expanding housing stock were made of or contained large amounts of lead. The vast expansion of cities in the United States fueled the growing use of lead paint as a convenience of modern American life;

One of the earliest international regulations in the use of lead in the painting was made by the League of Nations in the International Labor Office in Geneva 1921. The organization decided to adopt specific proposals concerning lead poisoning that turned into the prohibition of white lead, lead sulfate, and all products containing these pigments in the internal painting of buildings. However, the United States declined to adopt it.

In the United States, the efforts to raise awareness about the effects of lead paint started over the 1930s. Baltimore's health commissioner identified lead paint as a significant source of injury to children. Since the 1950s, Johns Hopkins University had numbered among its faculty the foremost lead researchers in the nation. In 1950, Baltimore became the first city in the country to ban lead-based paint from home construction.

In 1960, New York City banned the use of lead paint for residential use. In 1969, the Young Lords Organization (YLO) joined community groups, nurses' aides, technicians, and hospital medical and administrative staff in a battle over cuts to East Harlem's major municipal hospital. The YLO contributed a document called the Young Lords' Ten-Point Health Program and Platform, centered on preventive care, health education, and socialized medicine, and held a series of meetings in September and October 1969 in East Harlem and at Metropolitan Hospital on the lead poisoning crisis. They framed the problem in terms of racial, environmental, and housing justice. For several weeks, they distributed leaflets and informed residents of their upcoming door-to-door testing campaign in collaboration with Metropolitan's residents in training from New York Medical College. In what is perhaps their most enduring legacy, the group brought militancy to a preexisting campaign against childhood lead poisoning that pressured city hall to take action on a silent public health crisis. The Lead-Based Paint Poisoning Act of 1971 ban on lead-based paint in residences constructed or rehabilitated by the federal government or with federal assistance became effective in 1978.

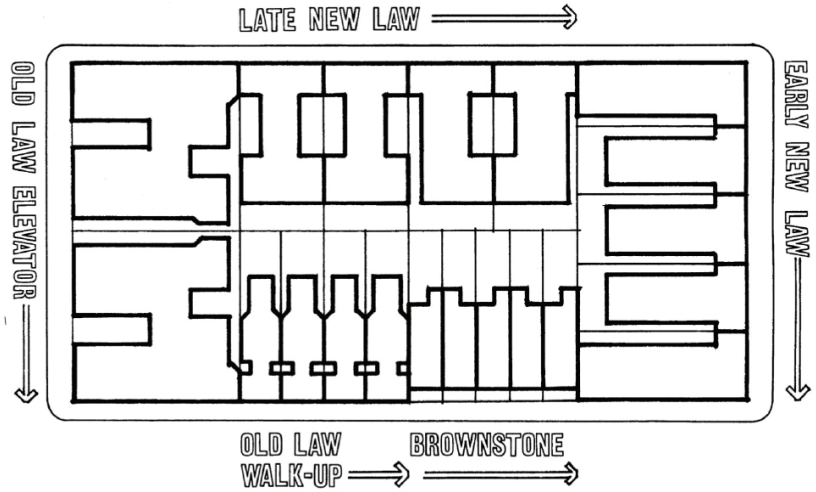
Before the 1980s, landlords were required to remove lead from apartments only after a child was poisoned. In 1982, under Mayor Ed Koch (1978–1989), the City Council passed Local Law 1, which many observers considered much more aggressive in attacking the lead paint problem (Lazaroff 1999). The law required landlords to strip, replaster, and repaint walls painted before 1960 in any residence of a child aged six years or younger. Under the rule, safety standards for abatement work procedures fell under New York City health code regulations, and the City was required to establish enforcement procedures.

LEADED GASOLINE

In 1923, lead was introduced into gasoline to give cars more power. In early 1925, the New York Public Health Council authorized the distribution of tetraethyl lead and the sale of leaded gasoline to the public. In 1990, the Clean Air Act Amendments issued a final ban on leaded gasoline for most motor vehicle use, but the historic deposition of lead in soils remains an ongoing challenge, especially in parks and gardens.

INDOOR, AIR, LIGHT, AND VENTILATION

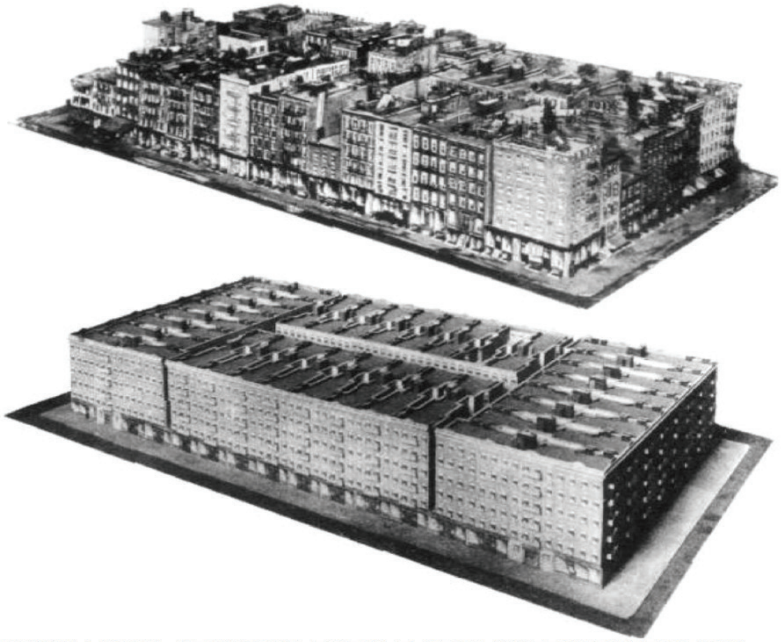
Mimi Vaughan and Shannon Trono



Plan of a typical block layout in Harlem, c. 1969.

THE PHYSICAL CONDITIONS AND POLICIES OF HOUSING

Interior qualities of light and air are dictated by a building's surroundings, such as the make-up of a block and its solid and void spaces. A rendering of a typical block layout in Harlem from the Architects Renewal Committee in Harlem in 1969 depicts the tightness and proximity between tenements. This dense packing of tenements leaves no opportunity for light to access spaces within structures, compounded by the general lack of windows. To expand on this, a model of tenement housing blocks in Harlem (from Plunz 1990) shows the density and scale of a typical block, showing the solids and voids in three dimensions. The figure below shows a typical block of Pre-Law and Old-Law tenements, all ranging between three to five stories. In contrast, the image below shows a typical New-Law tenement block that became the standard for dwelling construction in 1901.



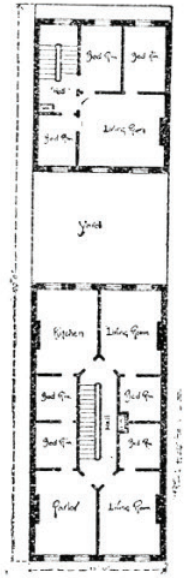
(ABOVE) MODEL OF TYPICAL PRE AND OLD LAW TENEMENT BLOCK
(BELOW) MODEL OF TYPICAL DUMBBELL TENEMENT BLOCK

3D models of Pre-, Old-, and New-Law tenements, c. 1990.

The history of the tenements in Manhattan begins prior to 1867, referred to as Pre-Law tenements; a typical floor plan can be seen in the illustration. Pre-law structures were unregulated, with few restrictions on occupancy, sanitation, ventilation, or light and air access. Once a majority of the building typologies throughout Manhattan, these tenements are now obsolete. These dwellings were rectangular structures with party walls on either side, on a 25 feet by 100 feet lot, covering 90 percent of the lot with built structure. Light only reached the front and back elevations, from the street front and back yard, between the dwelling and privies. This typology was often referred to as "rail-road flats," as they consisted of two units running the length of the building parallel to each other. The floor plans of these flats consisted of rooms with no hallways, so that the only means of circulation was by traveling from one room to the next.

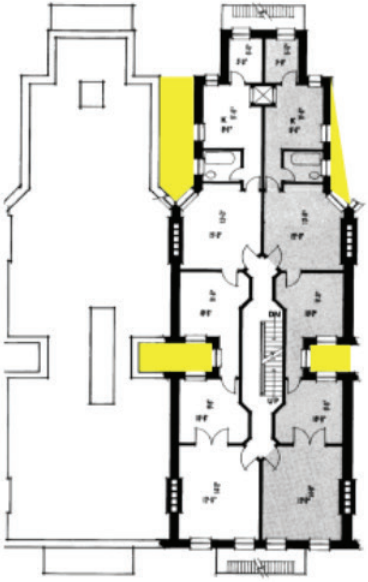
In 1867, Pre-Law tenement buildings were deemed not-to-code as the first Tenement Law was enacted, prescribing better ventilation and access to light for each unit within a structure. The structures built in this time period, between 1880 and 1901, later coined the term Old-Law tenements and enacted features such as interior light wells or air-shafts. This law allowed for ventilation to be achieved by constructing interior windows leading into other rooms, which did not aid in the ability of residents to achieve better ventilation in their units. The plan of these tenements was often referred to as "dumbbells," due to their resemblance to a dumbbell weight. Many Old-Law tenements are 80 feet long and 25 feet wide, built on lots 25 feet wide and 100 feet deep. A typical plan consisted of flats on either side of a dark, narrow, unventilated public corridor. At the same time, the interior light wells or air shafts offered a slight increase in ventilation and natural light access, but at the same time created new issues, such as an inaccessible pocket where tenants often discarded garbage. As a result, they were severely condemned in the Tenement Housing Committee Report of 1900 by housing lawyer Robert DeForest, who described the light wells as "foul air shafts... receptacles for garbage and filth... and a conveyor of smells and noise" (Veiler 1900).

Image of an interior window leading to another room.



PRE-LAW

Prior to the tenement house legislation of 1879.

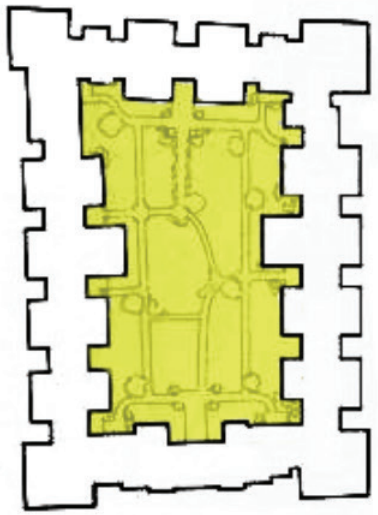


OLD-LAW

Architects Renewal Committee in Harlem. *Housing in Harlem*. 1969.

OLD-LAW

Architects Renewal Committee in Harlem. *Housing in Harlem*. 1969.



NEW-LAW 'O' SHAPE

Floor Plan of Knickerbocker Village Showing Large 'O'-Shaped Light Well, 1924.

An overview of tenement forms based on policy. Highlighted areas show light-wells, c. 1879-1924.

In 1901, the Tenement Law was amended, creating a new typology of building referred to as New-Law tenements. The amendments mandated lot coverage of no more than 70 percent, replacing the unenforceable 65 percent maximum in the Old-Law, according to Richard Plunz in his 1990 text, *A History of Housing in New York City*. Air shaft dimensions were increased to courtyard size, allowing for foot traffic and obliging builders to utilize larger sites.

The conditions enabled access to interior light, air, and ventilation, and their formal layouts affected the livelihoods of those who inhabited them. In the 1901 mandate, each apartment was required to have its own (non-communal) bathroom(s) and each room was to have a window.

The history of tenement laws in New York began in 1867, when New York established the first standards for minimum room size, ventilation, and sanitation in tenement dwellings. By enforcing mandatory codes, architects and builders incorporated the placement of a window in every room and shared wash closets into the tenement design. Tenements built before 1867 were typically 25 feet wide and 80 to 90 feet deep, with party walls on both sides, occupying up to 90 percent of the lot with built structure. The lack of light wells and the only windows on the front and back facades of the building created hot, stagnant air spaces, which further perpetuated miasma theory, the idea that bad air causes disease (Kannadan 2018).

The Pre-Law tenements were banned in 1879 as the local Manhattan government further expanded the Tenement Act. Those built after 1879 are what we now refer to as Old-Law tenements, which accounted for 48 percent of housing typologies in Harlem as of 1969. The amendment updated portions of the Act, instilling more open space on the building lot itself, which remained 25 by 100 feet. The Old-Law tenements covered up to 90 percent of their lots, with most units receiving light and air only through small interior air shafts and narrow courts between buildings, which often collected trash and created fire hazards. The Old-Law tenements were originally designed to provide eight to ten "railroad flats" (corridor-less apartments with walk-through bedrooms), creating quite unhealthy conditions due to the lack of access to airflow and light exposure (Fryer 1901).

In 1901, further amendments were made to promote rehabilitation of deteriorating tenements, and new construction under this act, between 1901 and 1929, has been referred to as New-Law tenements. These amendments mandated better lighting and fireproofing, and most importantly, the law required that outhouses or privies must be replaced with indoor toilet facilities connected to city sewers, with one toilet for every two apartments. While the lot size remained the same (25 feet by 100 feet), the coverage of the lot dropped to 70 percent, allowing for more air, ventilation capabilities, and light to enter the dwellings, and the amendments prohibited ventilation by air shafts on the interior of buildings. By 1927, the State Legislature declared that the Tenement House Law had "outlived its usefulness" and replaced it with the Multiple Dwelling Act, which is still in place today (Marques 2019).

The federal Housing Act of 1949 declared that the general welfare and security of the United States required the establishment of a national housing policy and to realize, as soon as feasible, the goal of a decent home and a suitable living environment for every American family. Authorized federal advances, loans, and grants to localities assisted slum clearance and urban redevelopment. The Act also converted the public housing program from its war and defense housing status. It substantially expanded it by authorizing federal contributions and loans for up to 810,000 additional housing units over six years.

The Housing Act of 1954 broadened the initiation of slum clearance and redevelopment programs of the 1949 Act into the urban renewal program by including federal assistance for rehabilitation and conservation of blighted and deteriorating areas. "Blighted" areas or "slums" were defined as areas in which most buildings had declined productivity because of obsolescence, depreciation, or other causes. Generalizing terms like "blighted areas" or "slum-like areas" allowed developers to justify to local housing officials the development of new projects in "bad areas," which were often just lower-income communities with higher concentrations of people of color. Beginning earlier with redlining practices in the 1930s, designating an area a "slum" meant that building owners in this area could no longer receive loans for fundamental repairs and adequate maintenance. Thus, entire neighborhoods were earmarked for more comprehensive redevelopment. The 1954 Housing Act required that a community have a workable program to prevent and eliminate "slums" and listed "blight" as a prerequisite for federal assistance for public housing and urban renewal.

In 1968, the Fair Housing Act prohibited discrimination in the sale, rental, and financing of dwellings, and in other housing-related transactions because of race, color, religion, sex (including gender, gender identity, sexual orientation, and sexual harassment), familial status, national origin, and disability. The Fair Housing Act was then amended in 1988 to authorize the federal government to act on behalf of individual victims of housing discrimination, initiate investigations without formal complaints, and impose stiff civil penalties on those who discriminate. Notably, the amendment helped avoid the imposition of unreasonable federal inspection requirements on new multifamily housing construction and required the inclusion of features providing adaptability for use by people with disabilities.

RESPONSE TO INEQUITY THROUGH ACTIVISM

While the establishment of these acts seemed to provide equitable access to housing, many government-sponsored and distributed rehabilitation materials still referred to substandard or insanitary areas as "slums" or "blighted areas," a choice in rhetoric that creates a negative and racially-biased perspective of the Harlem neighborhood and its residents. Urban renewal and rehabilitation pitfalls ultimately failed to address ulterior factors contributing to neighborhood poverty, such as drug use, addiction, and homelessness. As the policy was changing for tenement living in the mid-century, many activists, community groups, and organizations helped lead the fight for adequate housing.

Jesse Gray is arguably one of the most influential housing reform advocates. Gray, a prolific tenement activist, was the leader and founder of the Harlem Tenants Council. This community organization rallied Harlemites to band together to advocate for improved housing conditions. In 1963, Gray helped facilitate rent strikes to protest subhuman living conditions with other local activist groups.In 1964, Gray led the infamous rat strike in a publicity attempt to raise awareness of the dire need for housing reform. Gray instructed fed-up Harlem tenants to bring a rat—dead or alive—to Rockefeller Center to shock disaffected and disengaged local government officials. The "Rats to Rockefeller" campaign encouraged people to mail rubber rats to the New York governor, Nelson Rockefeller. Gray's activism pressured state officials to improve living conditions in Harlem tenements through policy-based action.

Gray raised awareness about the lack of government policing or monitoring of egregious "slumlords" as well as the lack of renovated, affordable, low-income public housing in Upper Manhattan. His influence reached beyond Harlem, prompting other large urban centers such as Chicago and Philadelphia to join the fight for fair housing within their low-income, predominantly Black communities. Gray, in many ways, fueled the interest in mid-century urban renewal and rehabilitation of low-income housing.

Through the efforts of community groups such as the Lower Harlem Tenants Council and Rent Strike Organizers, there were several tenement, row house and brownstone, and framehouse rehabilitation projects proposed to the city, most notably "The House on 114th Street" and "Housing in Central Harlem: Part one, the potential for rehabilitation and new vest pocket housing" proposed by the Architects' Renewal Committee in Harlem in 1969. These plans included a variety of interventions, ranging from standard, extensive, and minimum rehabilitation.

- **Standard Rehabilitation:** Rehabilitation to the minimum property standards of the Federal Housing Administration (FHA).

- **Extensive Rehabilitation:** Alterations more extensive than those required to meet the FHA standards, providing a more substantial improvement in housing quality.

- **Minimum Rehabilitation:** Actions *necessary* to provide an adequately functioning dwelling that meets minimum standards of health and safety as defined by the building codes, but does not include changes to the interior design of the building.

The rehabilitation potential of each of the typologies was then cost-estimated and architecturally diagramed. Architects would create proposals to rehabilitate existing tenements, and these plans would be approved and funded by the government and/or private investors. As described in the "Housing in Central Harlem: Part one, the potential for rehabilitation and new vest pocket housing" proposed by the Architects' Renewal Committee in Harlem in 1969,

> *Although many older buildings in Harlem cannot, because of their original design and construction, provide rehabilitated housing which is equal in quality to new housing (their land coverage is high and their structures cannot be economically altered to meet modern standards for light, ventilation and open space), rehabilitation does offer the possibility of providing improved housing.*

Details for rehabilitation were then described, along with the viability of each typology.

Old-Law Tenements
These buildings can be improved substantially by rehabilitation, but because of their depth and narrowness, poor light, and ventilation, they cannot, after rehabilitation, provide housing of high quality. The physical shortcomings of these buildings are such that even with "gut" rehabilitation, the structures cannot be brought to general FHA minimum property standards.

Frame Houses
These buildings are made entirely of wood, are two to three stories high, and were initially designed as single-family homes. Very few remain in Manhattan, where it is no longer legal to build them or to rehabilitate them for multi-purpose family use because of the fire hazard they represent.

Row Houses and Brownstones
These buildings were typically three to four stories high over a semi-basement. Their plot size was the same as for tenements (25 feet by 100 feet), while the brownstones (row houses) were typically 15 to 25 feet wide and 40 to 50 feet deep—only covering half their lots. Typically built as single-family homes between 1878 and 1890, they were generally in good condition due to upkeep by long-term owners or occupants.

The Architects' Renewal Committee in Harlem did not include low-rise apartment complexes in rehabilitation standards, as they were in good condition due to the fact that they were quite new at the time of the report's publication. These plans document the set of operations that led to the rehabilitations, while the post-rehabilitation reports analyze these measures. In particular, one case study was centered around West 114th Street, where blocks of row house buildings were converted to multi-residential apartment units—the same set of residents who participated in the Rat Strike.

CASE STUDY: "REVITALIZATION" OF A WEST 114TH STREET DWELLING AND THE MANGUM FAMILY IN 1966

The West 114th Street project emerged as more than just another New York example of a growing nationwide trend toward rehabilitation in the late 1960s. Instead, it became a national example. At this time, rehabilitation was framed as the ideal, cost-efficient solution to address poor living conditions in dilapidated tenements. Rehabilitation on the first set of buildings began in 1965, including: built-in amenities (closets, cupboards, counters, etc.), re-plastering of walls and ceilings, molding finishes and floors, and installing new heating units.

The House on W. 114th Street is a booklet distributed in 1968 by the United States Department of Housing and Urban Renewal. The booklet framed "revitalization" as a massive success by providing compelling before-and-after photos of an interior intervention and pictures of a happy family. The project was showered with praise: "The Mangums are blessed with a better home—but meals will still be frugal, the paycheck won't go any farther. Yet in some way, the life of each member of the family holds promise of even better things to come."

The publication also included a chapter entitled "The Spirit Restored," which detailed how the transformation of interior space poured out into the streets of Harlem: "The Mangums' response to the rehabilitation project has been the typical response of any American family when it is offered an opportunity to solve its problems. People are quick to take advantage of the help. They are equally quick to devise ways to help themselves. And by becoming involved with their neighbors' efforts, they are taking the first steps towards helping others."

The chapter ends with: "It will cease to be a slum and a ghetto—it will be a community. Can victims of the slums be helped to improve their economic condition with their housing? Do residents of the slums want to stay in their neighborhoods with their familiar stoops and shops and churches and sidewalks, or is this a sentimental middle-class assumption?"

THE INEQUITY OF THE RESPONSE: WEST 114TH STREET, TWO YEARS LATER

In 1968, two years following the initial block-wide renovation of West 114th Street, the living conditions of the apartments were assessed by the Harvard-MIT Joint Center for Urban Studies through photographs and interviews with tenants living in their "newly" renovated apartments. The assessment illuminated the physical failures in the rehabilitation effort, many emerging almost immediately upon completion of construction. These findings contradicted the picture-perfect narrative that investors proudly showcased in their advertising materials—it was all propaganda for their financial gain. In reality, residents faced multiple problems with their rehabilitated apartments, including gaps between floors and molding and vertical risers, which served as entry points for rats and roaches to enter homes. The rehabilitation yielded nothing but cosmetic fixes that would need to be remediated only several years later due to the decision to use cheap and incompatible materials—ultimately costing more than a new build.

In the late 1960s, officials and observers cast rehabilitation as a cure for urban renewal's harms. Yet the history of the West 114th Street project suggests that the story was never so simple. Rehabilitation contained its contradictions, especially an overdependence on physical solutions that connected this project to urban renewal and back to the earliest days of urban planning.

OPEN SPACES AND GREEN RESOURCES

Elaf Alsibyani and Jacqueline Danielyan

Prior to settler colonization, Manhattan was populated by the Lenape Tribe, whose trails led north through 98th Street and Park Avenue, crossing the upper part of Manhattan and the Harlem Plains (Harrison, Noonan, and Presa 2015). The land of Harlem was largely farmland, planting fields, and fishing camps (Harrison, Noonan, and Presa 2015). The first colonial settlement in Harlem was in 1639 by Jochem Pieterson Kuyter, who called the area Zendendaal, which translates to "Blessed Valley" (K. Williams 2015).

The area's different communities, green resources, and open spaces have changed drastically throughout time. Leading to the 1650s, the Dutch wanted to expand Nieuw Nederland, where Peter Stuyvesant formally established Nieuw Harlem in 1658 (Williams, Keith 2015). After 1673, the Harlem community boomed under British rule. Leading up to the American Revolution, there were about 1,900 people living in Harlem, as well as a large population of freed Africans (K. Williams 2015). After the Battle of the Harlem Heights in 1776 in Manhattanville, also known as Hollow Way, the British responded by burning down Harlem.

Open spaces were converted to public properties as the creation of parks began. In 1811, the Commissioner's Plan applied a grid plan to Manhattan, creating twelve avenues and 155 cross streets, without regard to the existing topography, including the sparsely settled farming community of Upper Manhattan. The land was later subdivided and sold into smaller lots during the second quarter of the nineteenth century (Harrison, Noonan, and Presa 2015). During the 1820s and 1830s, there was a dramatic change in New York. With the opening of the Erie Canal, New York City became the final stop on the ten-day journey from Buffalo. A real estate boom made a massive impact, leading to social and environmental changes evident in the new parks and tree-lined streets of the city (McNeur 2014). During that period,

Map of Upper Manhattan, illustrating the Battle of Harlem Heights, c. 1776.

the New York and Harlem Rail Road began service, leading to rapid expansion, and Harlem retained its reputation as a retreat for the wealthy (Williams, Keith 2015). New Yorkers believed that green spaces could solve the city's problems, making the area a healthier and more "elite" space, following the cholera outbreak of 1832 (McNeur 2014). What used to be farmland and homes for immigrants became estates and Harlem became a middle- and upper-class neighborhood in the 1880s (Harrison, Noonan, and Presa 2015). During the nineteenth century, increased real estate values caused exclusivity and reduced access to green resources, leading to displacement. Governor Morris, General Simeon DeWitt, politician DeWitt Clinton, and former-senator John Rutherford indicated that "public spaces were intended more for the circulation of air than for beauty or recreation" (McNeur 2014, 51). Yet, green resources did not benefit all equally; some were located on private property.

Street trees complicated the boundary between private and public spaces, as they were private trees on public lots, protected by the City, yet financed by private organizations (McNeur 2014). Although street trees were seen as private possessions and individuals would purchase trees and plant them outside of their homes, they were planted in public spaces with public access. In 1791, the Common Council of New York put a ban on street trees, qualifying them as a danger and obstacle to sidewalks and street traffic (McNeur 2014). During the 1830s, the ban on street trees was lifted due to the new citywide creation of public parks and a booming real estate market. As parks began to emerge, however, many were exclusionary spaces set in wealthy neighborhoods, where the upper-class petitioned for and funded them. The elite believed that parks buffered them from

immigrants and African Americans, creating a visible division between the classes (McNeur 2014).

Meanwhile, a 1995 census of trees throughout Manhattan showed that Harlem was lacking in tree plantings in comparison to the rest of the city (NYC Dept. of Parks and Recreation 1995).

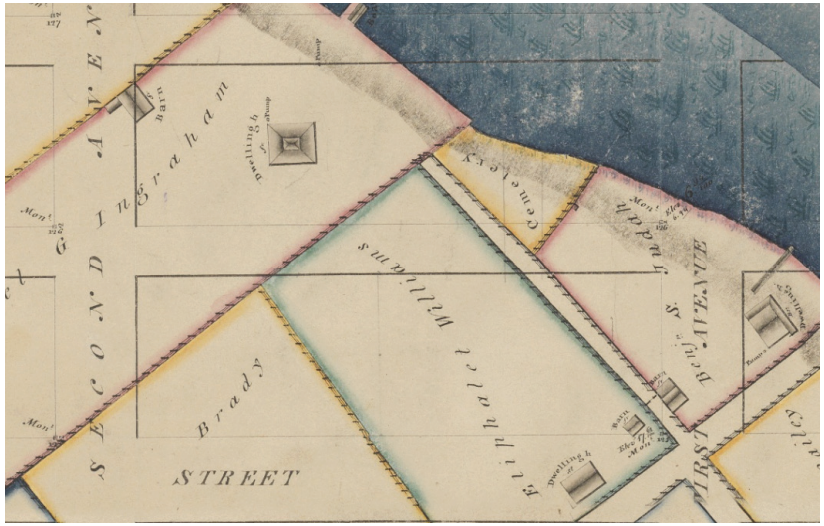
During the Harlem Renaissance, the Tree of Hope was a site of great significance to the Black community. On Seventh Avenue, known then as the "Boulevard of Dreams" and presently known as Adam Clayton Powell Jr. Boulevard, performers would visit the elm tree and touch it for good luck. When the avenue was widened in 1934, the tree was cut down. A piece of the tree's trunk was preserved and kept in the Apollo Theater, located nearby (Troshynski 2020). In 1971, artist Algernon Miller created an eight-foot Tree of Hope sculpture using cor-ten steel, to honor the original (NYC Dept. of Parks and Recreation, "NYC Public Art," n.d.).

The Tree of Hope, c. 1920-1930.

Children at the tree trunk of the Tree of Hope, c. 1937.

The Tree of Hope sculpture by Algernon Miller, c. 2004.

Open spaces are not important just for air circulation or public gathering and socializing, but also as spiritual and memorial spaces. This 1820 map indicates that the plot located at 126th Street and First Avenue was initially a church and an enslaved peoples' burial ground owned by Nathaniel G. Ingraham. The burial ground occupied the portion of the lot closest to the Harlem River. The Harlem African burial ground was located on the less desirable marshy land that joined the wide tidal zone. In addition, there was disrespectful behavior toward this sacred site, which started in the 1830s when Judge Ingraham, a member of the church, used the burial ground to keep farm animals (NYC Economic Development Corporation, n.d.). This inhumane attitude continued for decades. Since the late nineteenth century, the lot has been used for Sulzer's Harlem River Park, an amusement park, an African American army camp, a media and film studio, and today's MTA Bus Depot on 126th Street (NYC Economic Development Corporation, n.d.).



The Harlem African Burial Ground, depicted as the "Cemetery" on marshy land next to the Harlem River on this 1820 farm map.

Around 1900, the amount of informal open spaces and undeveloped lands decreased. The subway line's construction, which connects Harlem to the rest of the city, created the opportunity for people to move to Harlem to escape the overcrowding downtown. In 1904, real estate developers took their chance to build over undeveloped land to squeeze as many people as possible into small spaces. The efforts to construct pocket gardens and areas for leisure were primarily in areas occupied by wealthier residents (Compton 2017). There was a desire for additional public space for the most densely populated areas of the city like Harlem. Designed landscapes often did not reflect the needs of users or recognize

the varied recreational habits of diverse publics. Reformers created activities and organized play to teach social content through games, classes, including Americanization and naturalization classes, crafts, and pageants. They worked to instill certain American middle-class values into immigrants and African Americans instead of allowing them to reflect their own values onto the parks (Carr et al. 1992, 64).

The rate of ambitious real estate plans for Harlem slowed after the violence that erupted in New York City in the summer of 1900, known as the "Race Riots." While the riots did not take place in Harlem, the moment still shaped the physical and demographic structure of the neighborhood. Press coverage of the riots portrayed White Americans as the victims of African American violence, despite the opposite being more true. As a result, innocent African Americans were attacked on street corners, sidewalks, and stairs. They were not permitted to share space in parks or recreational facilities with White people (Compton 2017). Up until 1935 in Harlem, public spaces were shaped by poor conditions and racial discrimination.

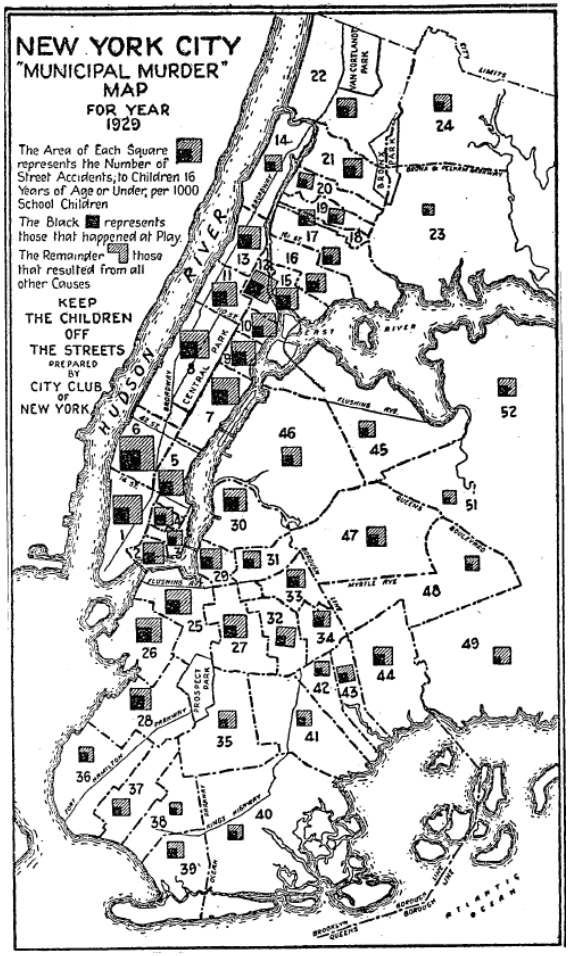
Rioters dragging a woman out of an Eighth Avenue streetcar and beating her during the Race Riot, c. 1900.

Public spaces and green resources are essential for human beings in general and are even more important in places like Harlem because of the overcrowded and unsanitary housing that Harlemites lived in during the 1930s, driving people outdoors to escape poor living conditions (Compton 2017). Black residents of Harlem had limited housing options due to racist policies, such as restrictive covenants (Tritter 1998). From the beginning of the twentieth century, the distribution and formation of open spaces and parks were influenced by racial segregation. Governmental funding would be deemed worthy if facilities were only used by White people (Compton 2017).

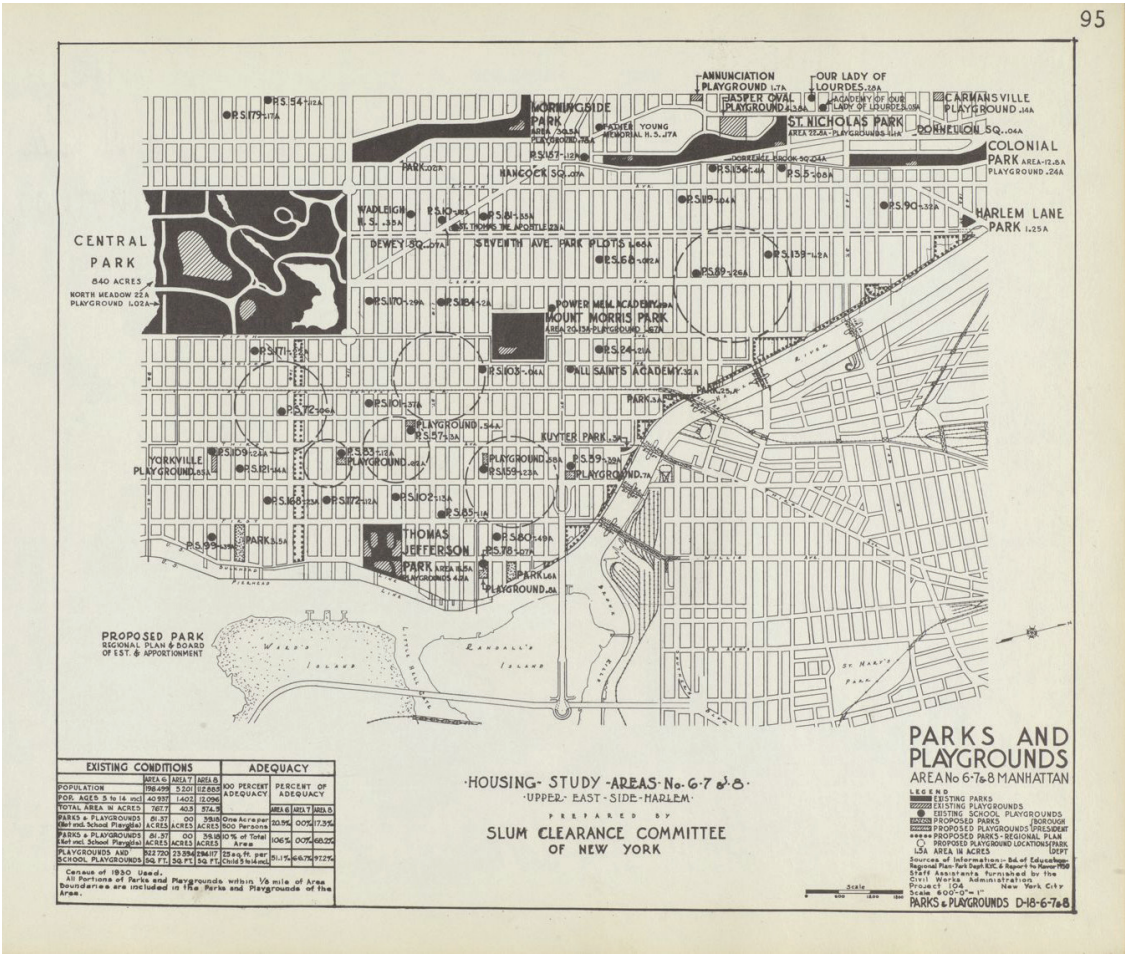
Lack of public spaces forced people to use the streets, sidewalks, and stoops as their primary recreational open space. During the Harlem Renaissance, 135th Street was used for art exhibitions, concerts, reading spaces, and meeting areas (Gill 2012, 256). Children were forced to do the same, and the advent of the automobile made this practice increasingly dangerous. A 1930 article from the *New York Times*, "Playground Appeal Cites 'Murder Map,'" features a map that illustrates the number of children killed by cars while playing on city streets. In 1930, the Children's Aid Society estimated that Central Harlem contained only 15 percent of the recreational facilities that its population required. At that time, the Children's Aid Society bought fourteen lots on the block between West 133rd and 134th Streets and Lenox and Fifth Avenues for playgrounds with the support of Rockefeller (*New York Times* 1930). In the 1930s, the city built recreational facilities with public pools in Thomas Jefferson and Colonial Parks, designed to serve the different demographics that lived in Harlem. New York Parks Commissioner Robert Moses encouraged

Children had to play on Harlem's streets because of the lack of public spaces, c. 1929.

One of the playgrounds built with the support of Rockefeller, c. 1923.



New York City "Municipal Murder" map, c. 1929.



Unequal distribution of parks and playgrounds. Central Harlem had only 15 percent of the recreational facilities that its population required, c. 1930.

segregation and sought to prevent people of color from using Thomas Jefferson Pool by employing only White people and intentionally leaving the water unheated, assuming that this would deter people of color from swimming (Wiltse 2009, 140).

By the 1930s, the city was more aware of the importance of playgrounds and open space, deciding to create twenty-six parks. Eight were supposed to be located in Harlem; however, those eight parks together received less than 10 percent of the total budget. Of the 255 neighborhood playgrounds built under the direction of Robert Moses, only one was located in Harlem (Caro 1974). The *New York Amsterdam News* reported in 1935 that African Americans had limited open space facilities in comparison to the rest of the city. In all of Harlem, there were just two playgrounds, and only used during summer (Compton 2017). Between 1940 and 1960, this disparity was addressed somewhat by several massive housing projects that included more open space for recreational facilities and playgrounds (Bell 2013).

MORNINGSIDE PARK

Morningside Park is a case study in understanding the management issues of green space. Completed in 1895, Morningside Park naturally separates the high terrain of Morningside Heights and the low terrain of Harlem. With the expansion of Columbia University, cultural tensions grew between the two sides of the park. Morningside Park is viewed as a place that physically segregated the university from Harlem's Black and Brown residents. Neglect of parks and poor management are factors that make the parks unwelcoming. During 1929-1933 and after the Great Depression, parks were viewed as extremely dangerous places. Throughout history, Morningside Park suffered from issues associated with race, culture, and class. Issues of unequal funding contributed to their problems. Other parks close to Morningside Park, such as Central Park and Riverside Park, secured their funding through private, nonprofit, and park-benefit organizations that work independently from the City. However, Morningside Park did not have this kind of organizational support. Besides the Parks Department, an organization called Friends of Morningside Park, founded in 1981 by Tom Kiel, a Columbia student, helped improve the condition of the park and raise external funds (Ayoub 2017).

MARCUS GARVEY PARK

Drastic transformations of the environmental relations are evident when looking at Marcus Garvey Park, founded as Mount Morris Park in 1839 (Harrison, Noonan, and Presa 2015), as well as Baerfem Square, dating back to the Commissioner's Plan of 1811. Obtained by New York City in 1839, Mount Morris Square was a place of added attractions, such as country walks, picnics, and race tracks, essentially creating an open space area for the middle- and upper-class citizens of Harlem. The area was considered the perfect area for development, as row houses began to line the Square and trees were planted across Lenox Avenue (Harrison, Noonan, and Presa 2015). Mount Morris Park also became home to the Harlem Cultural Festival, which previously did not have a permanent location, instead hosting their events on 128th Street between Madison Avenue and Fifth Avenue. In 1969, the Festival moved to the park, creating community gatherings in open and green space (Brooks 2019). By 1977, Mount Morris Park was renamed Marcus Garvey Park, after the creator of the Black Star Line, African American nationalist, and founder of Universal Negro Improvement Association (UNIA), which promoted racial unity, . Marcus Garvey Park includesan amphitheater, named after the renowned composer Richard Rodgers who grew up across from the park, and a swimming pool (NYC Dept. of Parks and Recreation, "Marcus Garvey Park," n.d.). Marcus Garvey Park continues to host arts and culture programs, undertake capital projects including improvements to the park, and conducts park maintenance, as a strong and equal community resource toward environmental justice.

Commissioner's Plan of Manhattan from 1811.

Harlem Cultural Festival, c. 1969.

OUTDOOR AIR

Hongye Wang and Yinjie Tian

The history of outdoor air injustice in Harlem starts in the late eighteenth century, when wealthier New Yorkers abandoned gardening and raising livestock and began to purchase their food at local markets, while poorer New Yorkers struggled to make that transition (McNeur 2014). Pigs, as one of the primary food resources for poor communities, also offered economic security. In the mid-nineteenth century, a large section of Midtown in the 50s between Sixth and Seventh Avenues was known as "Hogtown," or even "Stinktown," as it was home to numerous pig farms (McNeur 2014). Based on the miasma theory prevalent at the time, which held that diseases such as cholera and chlamydia were caused by "bad air" (Sze 2006), swine on the street were more than just a bad smell but also a threat to public health. As the population of residents and hogs grew, the controversy became a hot topic for New Yorkers, revealing friction between wealthier and poorer neighborhoods.

Several riots occurred in 1825, 1826, 1830, and 1832 as lower income communities tried to protect their livestock from confiscation. As the city grew, low income communities with their livestock were pushed beyond the edge of the city—around City Hall, Five Points, Dutch Hill—to the Piggery District near 50th Street. The tension came to a peak in 1859 with the Great Piggery War, which resulted in a new law that banned all piggeries and offal-boiling establishments south of 86th Street (Boyce 2020). Low-income New Yorkers were driven into shantytowns on the northern edge of the city, which was located at the southern boundary of what is called Harlem today. At that time, these disadvantaged New Yorkers were not only the victims of such outdoor air issues; they were deemed responsible for it.

As the city expanded and the practice of raising pigs was slowly abandoned, a new outdoor air issue arose. Carriages and wagons pulled by horses were the main mode of transportation before motorization. However, horse manure and the remains of dead horses littered the streets, spreading diseases and causing a public health crisis. In the nineteenth century, the New York City government organized a street cleaning department to mitigate the issue. However, with a limited budget, only the busiest avenues, namely Fifth Avenue and Seventh Avenue, were maintained (Kohlstedt 2017). Wealthy New Yorkers would pay street sweepers to clean their residential streets, but most inhabitants had to manage as best they could. In 1889, the situation was so severe that the mayor George E. Waring, Jr. organized the first international congress on urban planning with horse manure as a central theme and established a new force for street cleaning, called the "White Wings," to clean the poorest sections of the city. Eventually, the piles of horse manure downtown were completely cleared. Meanwhile, children in the Italian

Hogs and dogs mingle with carriages, carts, and pedestrians on Broadway, in front of City Hall, c. 1820.

Loose animals mix with pedestrians behind City Hall, near the office of the Board of Health, c. 1808.

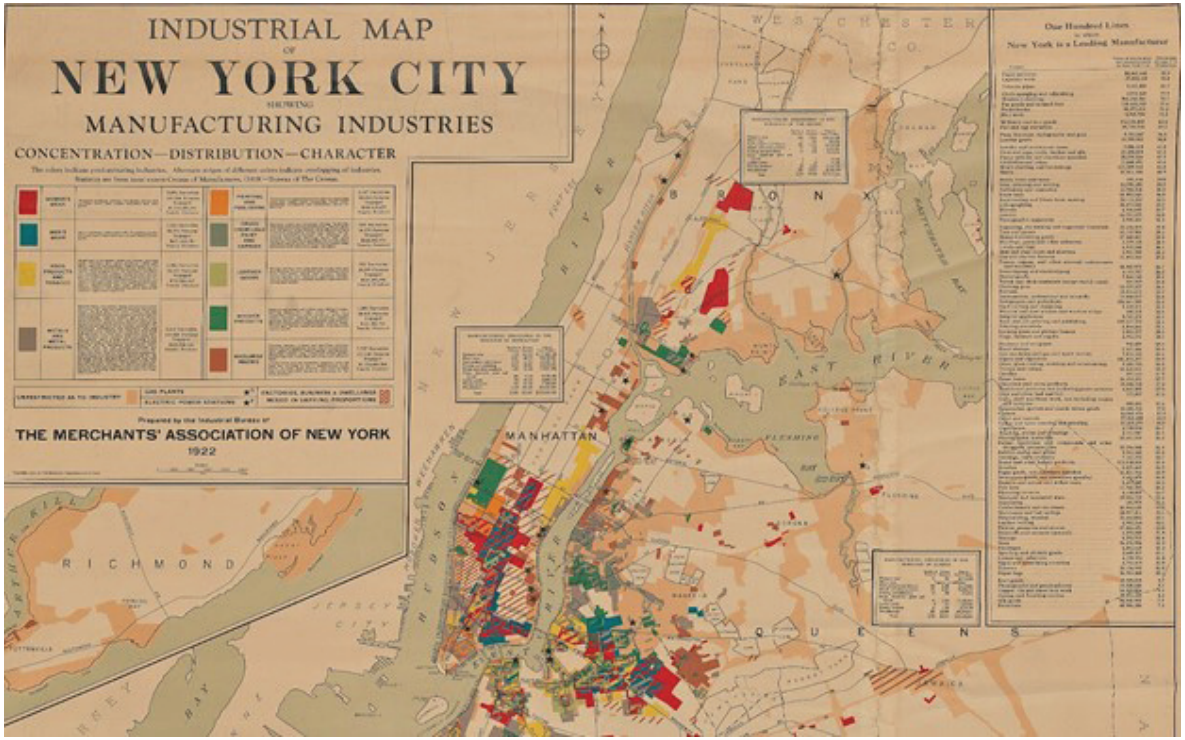
Plate 76, Atlases of New York City. The Community Known as Dutch Hill, Along the East River. The Shanties Are Indicated By the Haphazardly Placed Wooden Structures Within the Blocks, c. 1857.

American neighborhood of East Harlem were collecting horse manure from the street for backyard gardens, facing unsanitary living environments and potential health issues (McShane and Tarr 2007). This history reveals how low-income communities of immigrants and people of color were more vulnerable in dealing with foul smells and potential respiratory diseases than wealthy communities. The strategy of the government also shifted from publishing laws against poor communities to setting up government-funded agencies to solve the problem.

The cause of outdoor air pollution transformed from organic sources to industrial sources, as motored transportation and manufacturing industries converged during a thriving era of development. The 1919 Industrial Map of New York City illustrates the manufacturing industrial activities, as reported to the 1919 Census of Manufactures. The list on the right indicates that New York produced more than 50 percent of the total national output in twelve lines of manufacture, and was competitive in many more. From the map, one can also see that compared to downtown Manhattan, industries in the Harlem area were scattered mostly around El Barrio, Manhattanville, and Central Harlem along the East River. From the late nineteenth century into the 1940s, around 60 percent of New York workers had manufacturing jobs (Onion 2014). The Great Migration of African Americans from the South of the United States in the early twentieth century included the recruitment of African American workers to manufacturing industries in Harlem. By 1920, around 300,000 African Americans from the South had moved north, and Harlem was a keyl destination for these families (Miami Universtiy Art Museum 2018). After World War II, the City reduced the number of M zones, which prompted factories to move out of central and downtown Manhattan, and development tended to turn warehouses into offices and corporate headquarters. However, the remaining M zones have experienced a higher concentration of noxious uses, and areas like the Bronx and Harlem, two of the least affluent districts with higher percentages of non-White residents, had the most major M zone increases and the fewest major decreases. On the other hand, Manhattan, especially the most affluent central and downtown areas, received the fewest major M zone increases and the most major decreases (Maantay 2000). Residents in districts with higher percentages of non-White residents, such as Harlem, have suffered an uneven burden of outdoor air pollution from manufacturing industries due to economic vulnerabilities, privatization and gentrification, and the lack of community empowerment in fighting against environmental threats on public health.

Photo of horse remains and manure on the street, c. 1875.

Photo of the White Wings' annual parade., c. 1899.



NYC industrial map, c. 1919.

THE WASHBURN WIRE FACTORY

The Washburn Wire Factory, located at 520 East 117th Street, was one of the largest factories in Manhattan. The area around the Washburn Wire Factory has had the highest rate of hospitalizations for asthma in the country, and many believe that poor air quality is a contributor (WE ACT 2001). The factory was constructed in 1903, with six buildings occupying the site from 117th Street to 118th Street by the East River, to manufacture wire products, from springs and piano strings to wire for Amtrak's northeast corridor. In 1917, a disastrous fire broke out in three places, and only two of the buildings survived. The factory reportedly stayed in business until 1976, when a group of local entrepreneurs bought the facility under the name "Harlem Community Council, Inc." with the dream of preserving manufacturing jobs in Harlem. However, the business plan was flawed, and multiple projects failed without turning a profit. The abandoned Washburn Wire Factory lay vacant from 1981 until 2004 before redevelopment, when the site was turned into Costco, Home Depot, Target, and a parking garage.

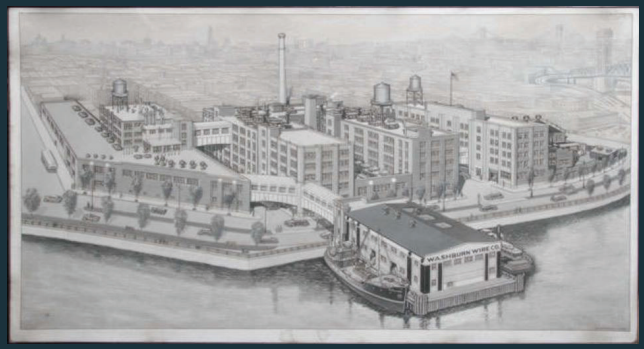


Illustration of Washburn Wire Co, c. 1930.

THE TRAILBLAZING STUDEBAKER AUTOMOBILE AND FACTORY,

The Trailblazing Studebaker Automobile and Factory, located at 615 West 131st Street, was constructed in 1923. Communities around the automobile factory complained that the intensive car emissions threatened the air environment for residents. The six-story building was constructed largely of brick with a decorative white porcelain trim. In 1937, Studebaker sold the building to the Borden's Milk Company as a milk processing plant. It later became a warehouse for the American Museum of Natural History and a small manufacturing plant for the Madame Alexander Doll Company. Finally, in the 1980s, Columbia University bought the building and transformed it into its offices for Human Resources.

Tax photo of Borden's milk processing plant, c. 1940.

CONSOLIDATED EDISON, INC

Consolidated Edison, Inc., one of the largest investor-owned energy companies in the United States, planted two large gas tanks on 100th Street and First Avenue in 1867. These tanks supplied natural gas for the majority of upper Manhattan, reaching as far south as 79th Street. The two gigantic gas tanks not only stole sunlight from nearby residents, but also created noise and toxic smells that threatened local public health, especially for respiratory diseases. The air pollution in Harlem was seriously threatening local residents' health, as Angela Bella described in her memories of the old East Harlem, as people would forget the harm that the tank emissions caused: "Never once did I hear my dad complain about those gigantic gas tanks stealing the sunshine from their apartment! I never heard him complain about the noise or the smells from the gas tanks. Surprisingly, he told me that mothers would often walk by the gas tanks, with their sick children, to try to alleviate their respiratory ailments as the steam had some beneficial effects" (Bella 2020).

Consolidated Edison, Inc, c. 1935.

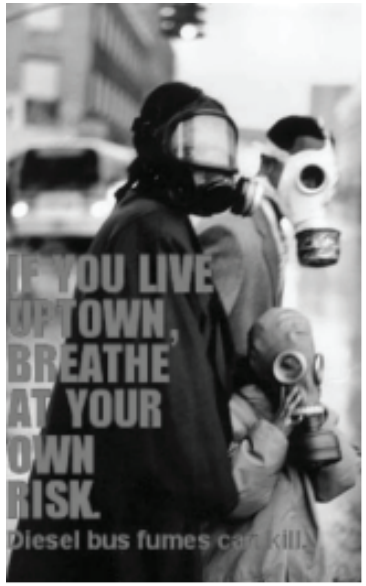
By the 1960s, smog in New York City was putting the health of millions at stake, as people could not only smell the air pollution but also see it and even touch it. Until the New York City smog disaster of 1966, when sulfur dioxide and carbon monoxide in the air caused the death of 200 people over the Thanksgiving holiday, outdoor air quality measurements for all of New York City were recorded from only a single station, the Harlem Courthouse Building, located on East 121st Street in Harlem. The smog disaster was a catalyst for pertinent legislation. For example, the Air Pollution Control Bill included updating city incinerators and replacing apartment building incinerators with other garbage disposal methods. The air quality measuring system was replaced in November 1968, when the City opened thirty-eight monitoring stations to cover the whole city. The City also purchased a computer system and equipment from the Packard Bell Corporation for $181,000, which is equal to approximately one million dollars in 2020 (Dwyer 2017). All these acts aimed to build a cleaner air environment for all New Yorkers. However, even with the strict post-smog air control regulations, the Harlem community still suffered from the sewage odor of the North River Sewage Treatment Plant due to regulation failure. The high concentration of hydrogen sulfide and sulfur dioxide exceeded New York State air quality standards, such that the sewage odor had a potential impact on the health of the community (Blankson 1992).

The 1966 smog in New York City, c. 1966.

Harlem Courthouse building, the only air quality monitoring station in New York City until 1966.

The dawning of environmental consciousness during the 1960s led to a nation-wide commitment to clean air and people began to realize the intrinsic relationship between environmental and social justice. Activism groups such as WE ACT organized campaigns on environmental and social justice topics in a peaceful yet impactful manner that pushed multiple clean-act laws to be established and enforced. In May 1997, WE ACT launched a major public awareness campaign urging the MTA to invest in clean-fuel buses, as Harlem had to bear a disproportionate amount of air pollution from diesel buses. The accompanying map reveals an uneven distribution of MTA diesel bus depots in New York City in 1990, as eight out of ten of these diesel bus depots were located north of 100th Street, concentrated mostly in neighborhoods that have higher percentages of non-White populations. Through the campaign, WE ACT not only informed the Harlem community of the harm that diesel buses could bring to local public health, including various respiratory diseases such as asthma, but also delivered a strong message that the Harlem community should unite to protest environmental and social injustices. There were five diesel bus depots actively in use by 1990: the Amsterdam Depot, the Mother Clara Hale Depot, the Manhattanville Bus Depot, the 126th Street Bus Depot, and the Tuskegee Airmen Bus Depot (100th Street Bus Depot). Among the five bus depots, the Amsterdam Depot and the 126th Street Bus Depot were officially shut down by the MTA, and the other bus depots now accommodate natural gas and other green-fueled buses.

WE ACT Dirty Diesel Campaign, c. 1997.



WE ACT Dirty Diesel Campaign, c. 1997.

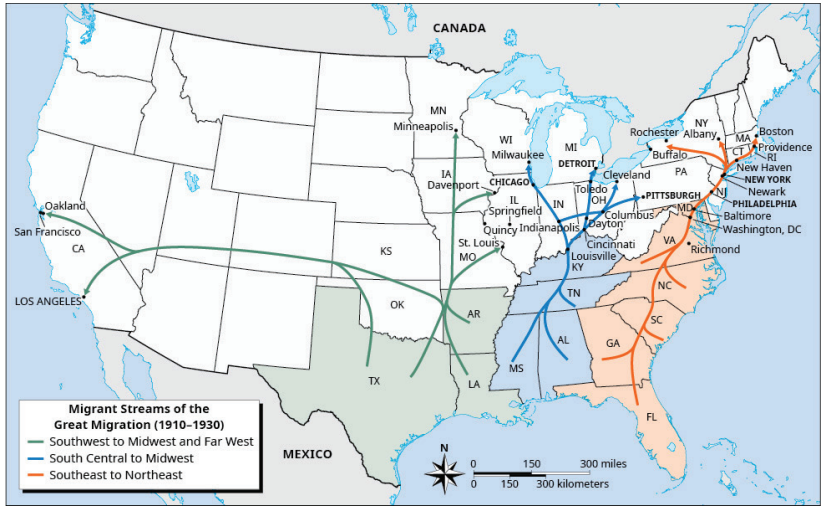
REDEVELOPMENT AND DISPLACEMENT

Shuya Zhao and Wenjing Xue

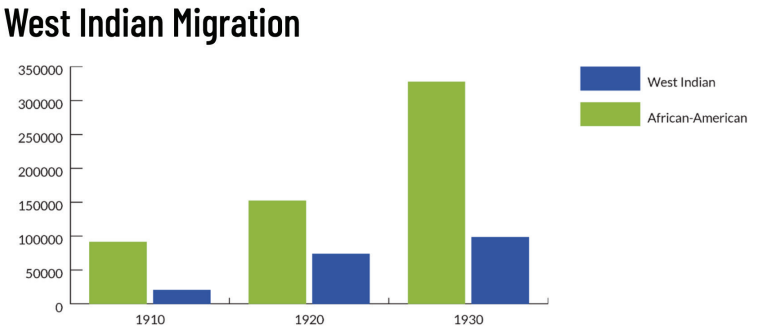
Displacement history and policies in Harlem over the last century and more provide a lens through which we can examine environmental injustice in Harlem today. The area now known as Harlem has a long history of occupation that often involved the displacement of pre-existing publics. Before European settler colonialism, the original inhabitants of Harlem were the Lenape. In 1626, Peter Minuit negotiated the purchase of Manhattan from the Native Americans and in 1658, the village of New Haarlem was founded by the Dutch, and cementing the progressive dispossession of the Lenape. After the capture of New Amsterdam in 1664, the English supplanted the Dutch. Over a century later, with the victory at the Battle of Harlem Heights in 1776, the American colonists defeated the British.

During the nineteenth century, Harlem served as a residential location for marginalized populations, including Black people and various immigrant groups. In the book *The Heart is the Teacher*, Leonard Covello noted that East Harlem was once home to thirty-four different ethnicities and twenty-seven different languages (Covello 2013). In the 1870s, Harlem served as a refuge for poor Jewish or Italian immigrants. In the 1890s, residential buildings boomed in Harlem. The New York and Harlem Railroad, as well as the Interborough Rapid Transit and elevated railway lines, helped Harlem's economic growth. In the 1910s, the Jewish and Italian demographic decreased, while the Black and Puerto Rican population increased. From 1916, because of a labor shortage in industrial cities during World War I, millions of African Americans would flee the rural Jim Crow South, heading for jobs and a better life in northern cities. New York saw its Black population expand exponentially.

In response to the large influx of Southern and Eastern Europeans to the United States, the country enacted the Immigration Restriction Act of 1921. The 1921 laws contributed to the rapid transformation of Jewish East Harlem. By the mid-1920s,



The migrant streams of southern African Americans during the Great Migration from 1916 to 1930.



Increasing population from the West Indies and Black people in Harlem.
Data Source: Department of National Archives of the United States, New York City 1930.

one-fourth of the Jewish population had left East Harlem and the number shrunk to 123,000 from the peak number of 175,000. Two years later, the number had dropped to 88,000 (Bell 2013, 48). By the late 1960s, the population of Italian East Harlem declined rapidly to about 11,000. Today, approximately 600 to 1,000 Italians reside in East Harlem.

In the 1920s, the increasing Black population in Harlem resulted in many property owners renting to Black families. During World War I, many construction materials went to support the war and real estate developers could not invest in East Harlem. The neighborhood's housing stock declined after the war and rents rose because of a housing shortage. Subdivided housing units resulted in smaller living spaces, and at the same time, many businesses closed down.

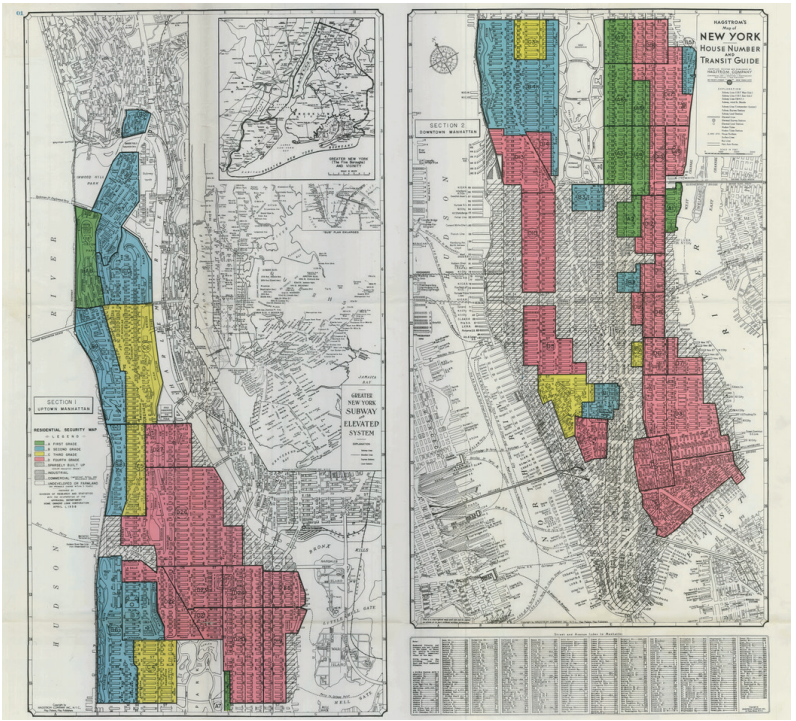
REDLINING AND SLUM CLEARANCE

In the mid-1920s, even as building construction returned to prewar levels, rents remained conspicuously high in Harlem. The Great Depression worsened the situation. President Franklin D. Roosevelt enacted a series of regulation programs, public work projects, financial reforms, and regulations to stimulate the economy and create jobs, through the New Deal.

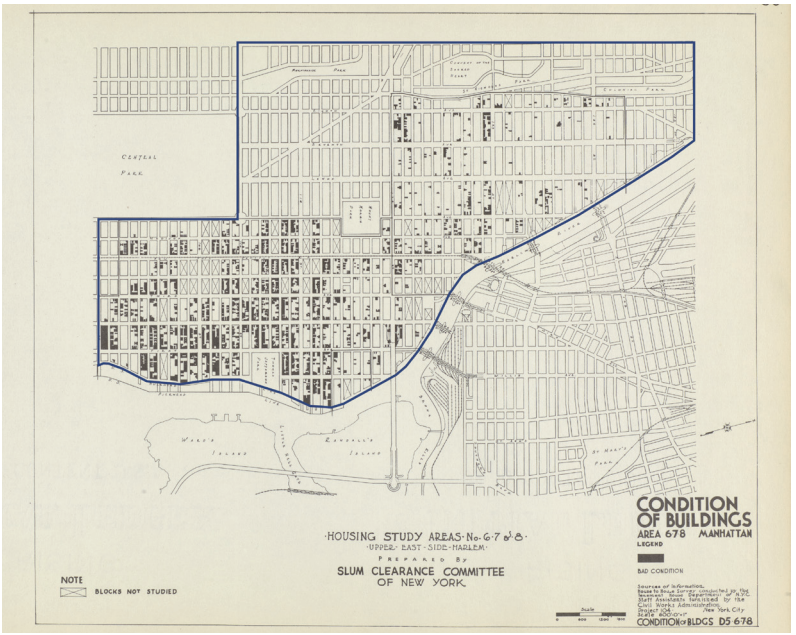
In 1935, the Federal Home Loan Bank Board (FHLBB) asked the Home Owners' Loan Corporation (HOLC) to create "residential security maps" to indicate the level of security for real estate investments in 239 surveyed cities. Maps like those from the HOLC, which was established in 1933, appraised properties on whether they were suitable for mortgages. On the maps, those considered desirable for lending purposes were outlined in green as "Type A." These were typically affluent suburbs on the outskirts of cities. "Type B" neighborhoods, outlined in blue, were considered "Still Desirable," whereas older "Type C" were labeled "Declining" and outlined in yellow. "Type D" neighborhoods were outlined in red and were considered the riskiest for mortgage support. This shade was based almost entirely on race (Jackson 2021). Once redlined, these neighborhoods became destined for disinvestment and concentrated poverty. People of color, including Black and Latinx people, were increasingly concentrated in redlined areas. In the studio study area, large areas in East Harlem and South Harlem were redlined. Consequently, in the *Maps and charts prepared by the Slum clearance committee of New York, 1933-1944*, many buildings in the redlined areas of Harlem were identified as "in bad condition," and "bad condition."

The New Deal also helped to frame slum clearance projects as a positive urban renewal strategy to regenerate derelict or run-down districts to construct housing, highways, and other developments, which largely overlapped the redlined area in the studio study area. The areas identified as "slums" often correlated to new public housing. Harlem's housing stock at the time offered, in the words of a housing expert, "the best laboratory for slum clearance... in the entire city." "Harlem conditions," wrote a *New York Times* reporter, are "simply deplorable" (Osofsky 1965).

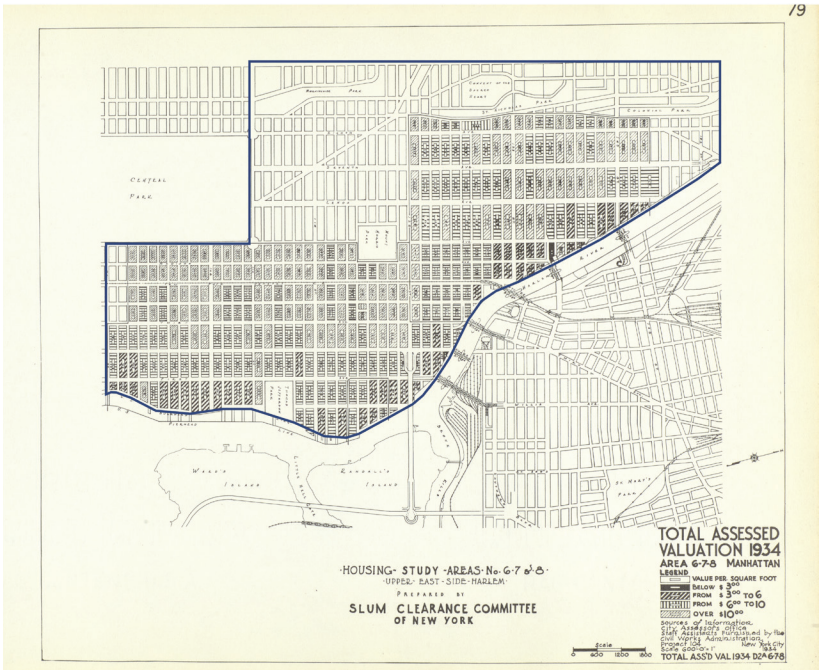
The 1933 National Industrial Recovery Act focused on slum clearance and home construction for low-income families, and produced nearly sixty projects that built around 24,500 new houses (Schlesinger 2003). From this program came the Public Works Administration (PWA). A housing division was also part of the PWA. Next, city, state, and federal governments passed several measures to carry out slum clearance. The New York City Housing Authority was created in 1934. In 1937, Senator Robert F. Wagner, Sr. of New York helped pass the Wagner Act, which appropriated half a billion dollars towards public housing.



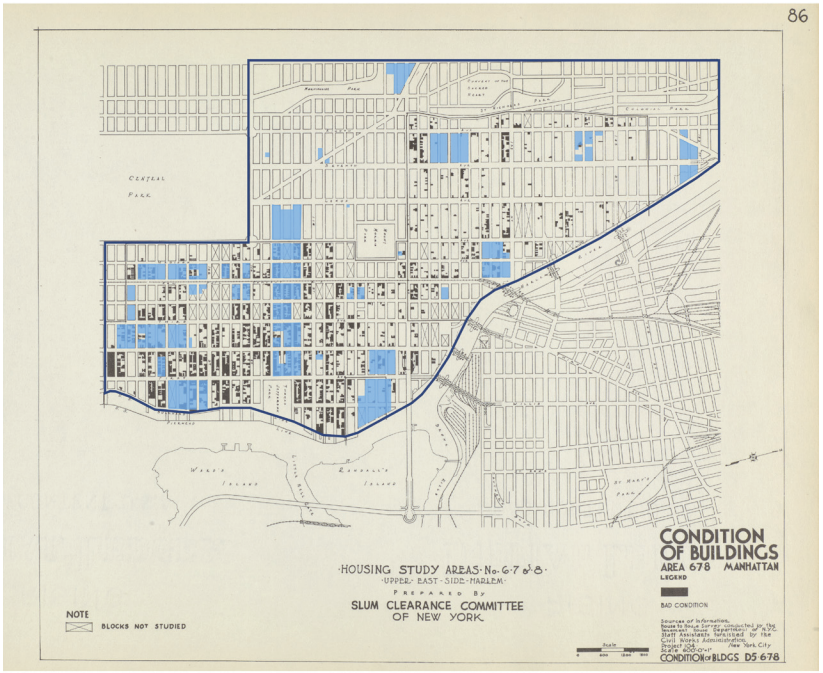
Redlining map of New York City, c. 1938.



Condition of buildings map, c. 1934.



Total assessed valuation map,c. 1934.



Public housing projects on the condition of buildings map, c. 1933.

In the studio study area, the development and displacement in Morningside Heights and Manhattanville were mainly led by institutions, such as Columbia University, while governmental projects mainly focused on East Harlem. Leonard Covello, principal of Benjamin Franklin High School, spearheaded the fight for public housing in East Harlem. Also in 1937, the mayor's Committee on City Planning issued a report on East Harlem, which said that most of New York City never looked to East Harlem for business or industry and seemed less likely to do so in the future. In addition, East Harlem's population accounted for 10 percent of the city's population, yet the neighborhood's space comprised only 6.6 percent of Manhattan. 90 percent of East Harlemites resided in only 60 percent of the neighborhood (Bell 2013, 47). The committee made recommendations to improve the neighborhood. It said it would be futile to rehabilitate individual tenement buildings. The committee felt that many cross streets should be eliminated, allowing several blocks to be combined into a super-block, where public housing would be built. In 1939, Covello, with the aid of several neighborhood and civic organizations, won approval for public housing in East Harlem.

PUBLIC HOUSING

With the intention to improve quality of life, public housing projects brought great changes to the city. Rising out of slums and blighted areas, the NYCHA public housing projects created oases of cleanliness when first built, contrasting sharply to media portrayals of existing conditions (Zullo 1950). Buildings in these newly built projects covered only 20 percent of the land and there was often an accompanying landscape and play area for children. Public housing projects provided residents with better building environments and facilities in terms of heat, elevator, plenty of hot water, etc. in the early years. However, public housing also became fraught with development and maintenance issues over its evolution.

In the *Maps and charts prepared by the Slum Clearance Committee of New York, 1933-1944*, the houses along the Harlem River were determined to have the lowest value in East Harlem, most of which were from three to six dollars per square foot. The location of the first public housing complex in East Harlem, the East River Houses, was along the riverside, on First Avenue between 102nd and 105th Streets. The complex was developed by NYCHA. When the East River Houses development was built, only four families were relocated from their neighborhood, compared to the nearly 1,000 families who would be relocated for the construction of the Johnson Houses in 1948 (Bell 2013, 106).

EAST RIVER HOUSES

East River was the first multiracial housing project in the city. Before the East River Houses were built, housing was segregated across the city. East River was built primarily for the Italian community because at that time many Italian families lived in East Harlem. Congressman Vito Marcantonio convinced the housing authority to allow all races to apply for the East River Houses. Every race lived there except the Germans and Japanese because of World War II. Italians, Jews, Puerto Ricans, Filipino, Dutch, southern blacks and West Indian blacks all lived in the East River Houses.

— Ray Grist, oral history in Bell (2013)

Nearly 17,000 East Harlemites applied for 1,166 available units of the East River Houses... [O]n May 28, 1941, East River Houses was completely tenanted. There were 1,166 families, plus one field officer and three residential employees for a total of 1,170 residents housed in 5,000 rooms Apartments ranged from two to six and a half rooms. A two-room apartment cost $16.65, while six-room apartments were priced at $31.66. Each apartment was equipped with amenities, including: a refrigerator, a gas stove, running hot water, and state-of-the-art bathrooms. An elevator, incinerator, laundry, and indoor and outdoor recreation areas were also part of the East River Houses. Ten housing projects were constructed. Seven were six stories high. Two were ten stories and one was eleven stories. The projects were built on a diagonal plan near the East River which allowed more sunlight into each room.

— Christopher Bell, *East Harlem Remembered* (2013)

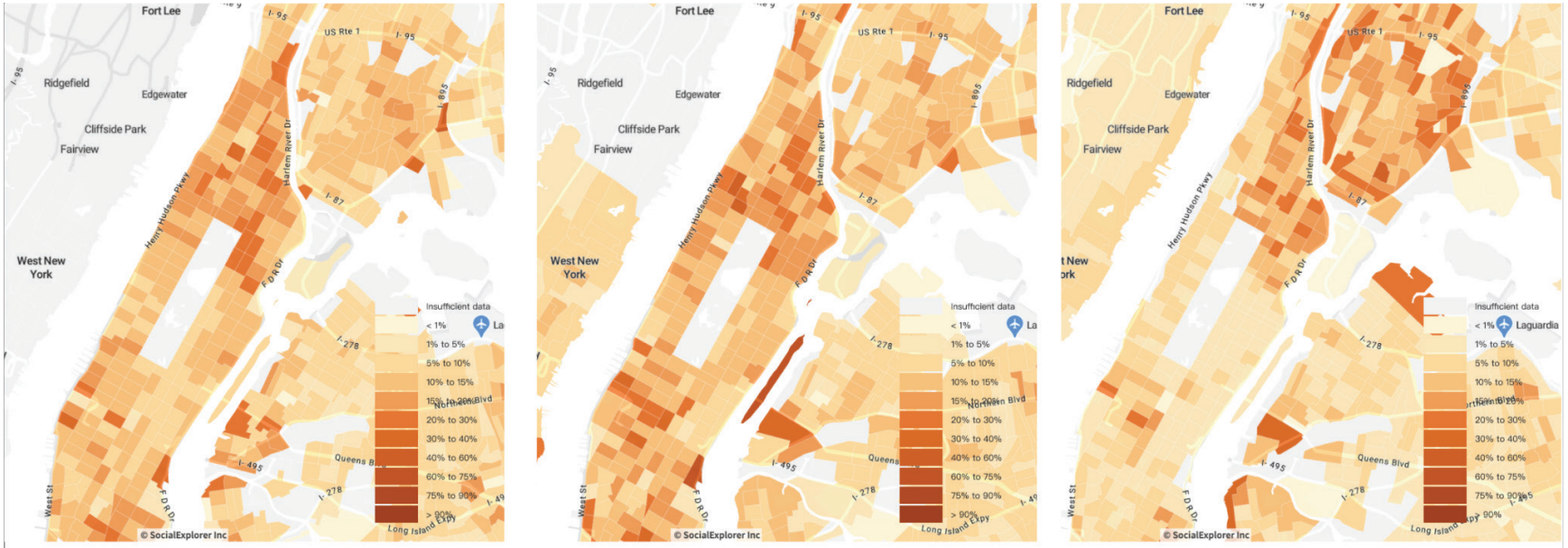
East River Houses, c. 2010.

When more and more massive buildings were completed from the 1940s to the 1960s, some unexpected problems began to appear, especially in East Harlem, where most of the projects were located. The construction of public housing was always accompanied by demolition and relocation. Instead of rebuilding existing apartments and moving people back into their buildings, the city moved people out and scattered them all over the city. Nearly 1,000 families were relocated when the James Weldon Johnson Houses were constructed, while only four families were relocated from their neighborhood when the East River Houses were built. While there was a Black community in East Harlem, many Black people still retained a close attachment to West and Central Harlem. Marilyn Goodman, originally from West Harlem, was part of one of the first Black families to live in the James Weldon Johnson Houses. She describes how her family spent time in both East and West Harlem: "We went to the movies on the West Side in Harlem, for my life was still there because many blacks in East Harlem attended church in Harlem" (Bell 2013, 50). Public housing construction forced many people to move to the Bronx or other places. Johnny Colon, who once lived on 180 East 106th Street between Madison and Park Avenues, remembers:

> *We had three selections to choose our housing project and we moved to the Patterson projects in the Bronx. My mother selected that project because of its diversity and there were some Puerto Ricans, Italians, Irish and Jews and plenty of African Americans... Relocation ripped a major [hole in] my life for I was dislocated and taken away from my friends and acquaintances. In the Bronx, people did not look out for each other because like my family, the people were relocated from other neighborhoods and placed in these projects. (Bell 2013, 109-110)*

When public housing arrived in East Harlem, many African Americans who lived in nearby Harlem or throughout New York City moved into the neighborhood. After the public housing boom, Black people resided in all of East Harlem's housing projects. Most East Harlemites who remained in the neighborhood and moved into public housing saw their neighborhood become segregated, as the majority of East Harlemites were now African American or Puerto Rican. Most remaining Whites who lived in East Harlem were Italians, and many of them later moved out. In addition to the neighborhood's physical transformation, economic conditions changed as well. As resident Willie Lopez recounted in *East Harlem Remembered: Oral Histories of Community and Diversity*, only low-income East Harlemites could live in public housing, and these residents were forced to move if their salaries rose and exceeded the pay scale (Bell 2013, 113). The accompanying income map indicates that most of Harlem remained a low-income neighborhood during the boom of public housing projects.

During the second half of the twentieth century, with the decline of public housing projects, other affordable housing programs were implemented. Two major types were the Mitchell-Lama and the Housing Choice Voucher programs. The Mitchell-

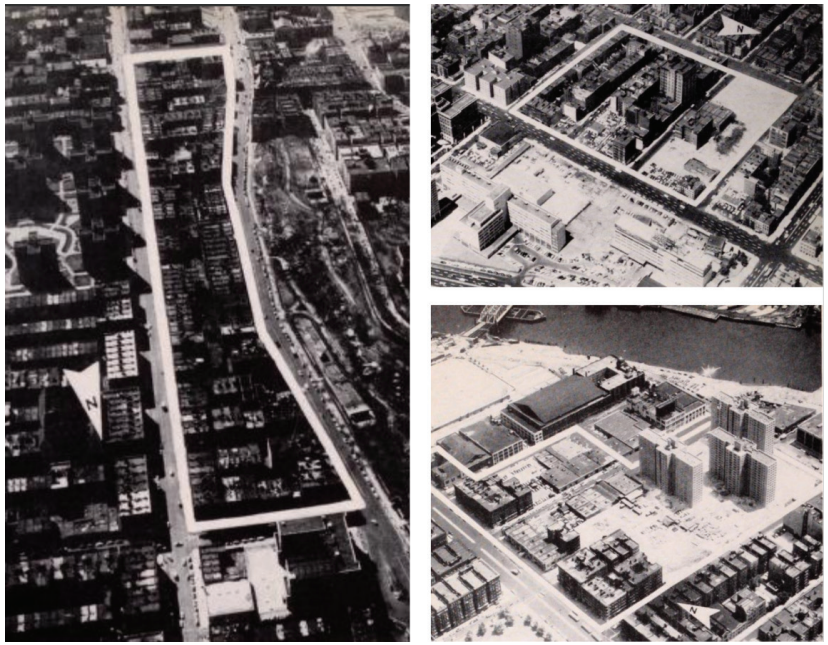


Household income mapping in 1950, 1960, and 1980. Data Source: Social Explorer.

Lama provides City- and State-supervised affordable rental and cooperative housing to moderate- and middle-income families. Created by the Housing and Community Development Act of 1978, the Housing Choice Voucher program, also known as Section 8, provides assistance to eligible low- and moderate-income families to rent housing in the private market. However, the applications were strict in terms of income limits and family sizes. The social and economic equity that was initially hoped for in affordable projects has rarely been achieved and displacement is still an issue.

LOSS OF BUSINESSES

Before the emergence of public housing projects, Harlem was home to many tenement buildings and "mom-and-pop" stores on every blocks, which allowed neighbors to interact with one another. This interaction helped Harlemites to develop support systems, which were helpful in this working-class neighborhood (Bell 2013, 103). However, in order to build public housing, many cross streets were eliminated, allowing several blocks to be combined into a super-block. The land use map from the Slum Clearance Report overlaid with newly built public housing projects indicates the replacement of some commercial areas. The creation of these super-blocks gradually led to the erosion of Harlem's local businesses and harmonious communities.



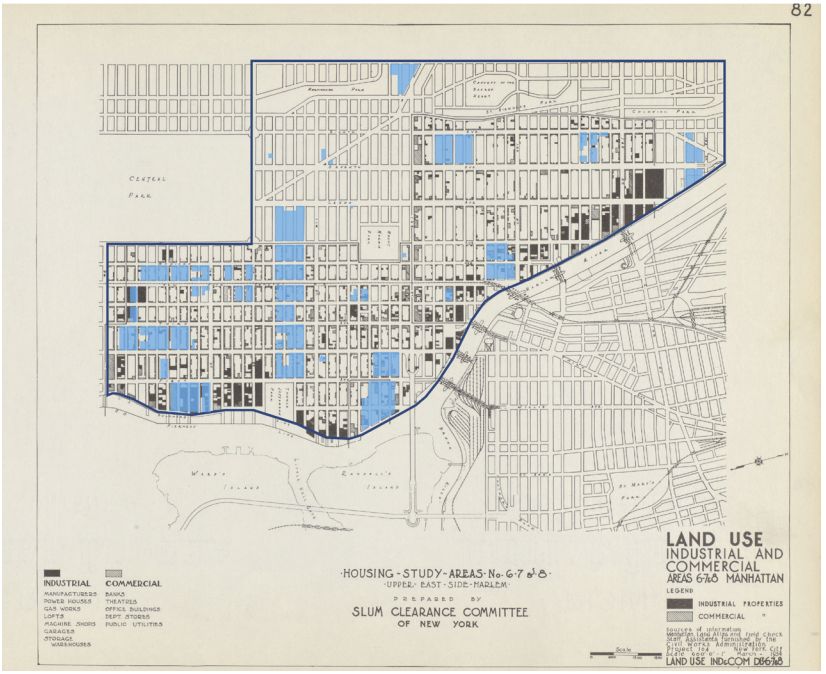
Super-blocks in Harlem, c. 1953.

The comparative photos, taken at different times at the same location, show the brownstones and tenements and small stores that were demolished and replaced by public housing.

After World War II, East Harlem was still a vibrant, sustainable, and functioning community with stores and local entrepreneurs. However, within fifteen years, the neighborhood that East Harlemites knew almost disappeared because of the construction of public housing projects. Families and neighbors were scattered. Stores, movie theaters, and other businesses that brought life and vitality to East Harlem faded into history. For example, within the area of about two square miles from 96th Street to 135th Street between Fifth Avenue and the East River, demolition for public housing wiped out nearly 1,600 retail stores and over 4,500 jobs in East Harlem. The chart in page 51 shows how the housing projects built before the early 1960s led to the permanent loss of blocks and stores.

Brownstones and tenements with storefront businesses, c. 1950.

Brownstones, tenements, and stores were replaced by public housing, c. 2000.



Public housing areas overlaid with land use map showing commercial and industrial properties.

Small business owners and tenants in East Harlem complained about the alleged neglect of "human values" in their dislocation from sites chosen for public housing and other slum clearance efforts. Stanley Unger, the operator of an Army and Navy supply store, said that when the city took ownership of a site, it helped residential tenants to find new homes and often paid their moving costs, but did nothing for a business tenant. Unger described the state condemnation law as "outdated" because it made no provision for compensating a store for its goodwill and reputation (*New York Times* 1956a).

Social workers and some housing planners believed that if small stores were built into the projects, a rapport would develop between the merchants and the neighbor-customers (*New York Times* 1957). However, it was estimated that of eighty-two projects completed before 1957 housing 90,500 families in New York City, only nine had built-in stores (*New York Times* 1957). In response, the city administration and NYCHA took steps to provide adequate space for additional stores in subsequent projects. At the Benjamin Franklin Houses, which later became Franklin Plaza Cooperative, a thirty-one store shopping center divided into three clusters served as replacements for the many stores that were removed in the extensive slum clearance (*New York Times* 1957).

SOLID WASTE MANAGEMENT

Shivani Rajwade and Adam Brodheim

WHAT IS SOLID WASTE?

Solid waste comprises materials generated by domestic, commercial, industrial, and agricultural human activity. Today, these materials are generally recycled, composted, incinerated (burned), or placed into landfills, but historically, solid waste was at times used for land reclamation, processed into industrial products, or simply and unceremoniously dumped in waterways for disposal. In its earliest form, solid waste consisted of kitchen waste, agricultural products (manure, deceased livestock), discarded clothing, furniture, and building materials, and heating ash (from wood or coal). Today, solid waste management still poses serious environmental concerns beyond aesthetic and olfactory issues. Further, it is not just the solid waste's smell and appearance that pose concerns, but also its very management, including smoke from incinerators, fumes from sanitation vehicles, and the hydrogen sulfide produced by anaerobic bacteria "chewing garbage underwater" (Miller 2000).

INITIAL SOLID WASTE MANAGEMENT PROGRAMS

The earliest attempts to manage solid waste in New York began in the 1650s and involved street cleaning and the collection and disposal of solid waste. A 1657 ordinance designated proper disposal sites and encouraged residents to clean the streets in front of their homes. Historian Sidney Pomerantz in *New York, An American City* (1938) points out that pigs were commonly believed to be natural street cleaners because of their appetite for the garbage left in the streets by humans. Later, during the 1670s, cart men were granted a monopoly in exchange for the weekly removal of refuse disposed of by the residents (Corey 1994).

In the nineteenth century, rich neighborhoods hired private street cleaners, but the rest of the city continued to rely on roaming pigs and rag pickers. On account of the 1849 cholera pandemic, the pigs were pushed further north, and by 1860, they were removed from south of 86th Street. Pigs made the streets seem not only dirty but also diseased, catching the blame for the lethal spates of cholera.

Into the 1890s, the practice of dumping garbage into the rivers was the main mode of trash disposal. Each city ward, which was a division for administrative purposes, had a dumping ground at the end of a street leading to the waterfront. These dumps were used for loading refuse collected by cart men onto scows. Scows carried valuable materials like manure to farmers outside Manhattan and unsalvageable waste into the harbor for sea disposal (Chronopoulos 2014).

Pigs in New York City, c. 1827.

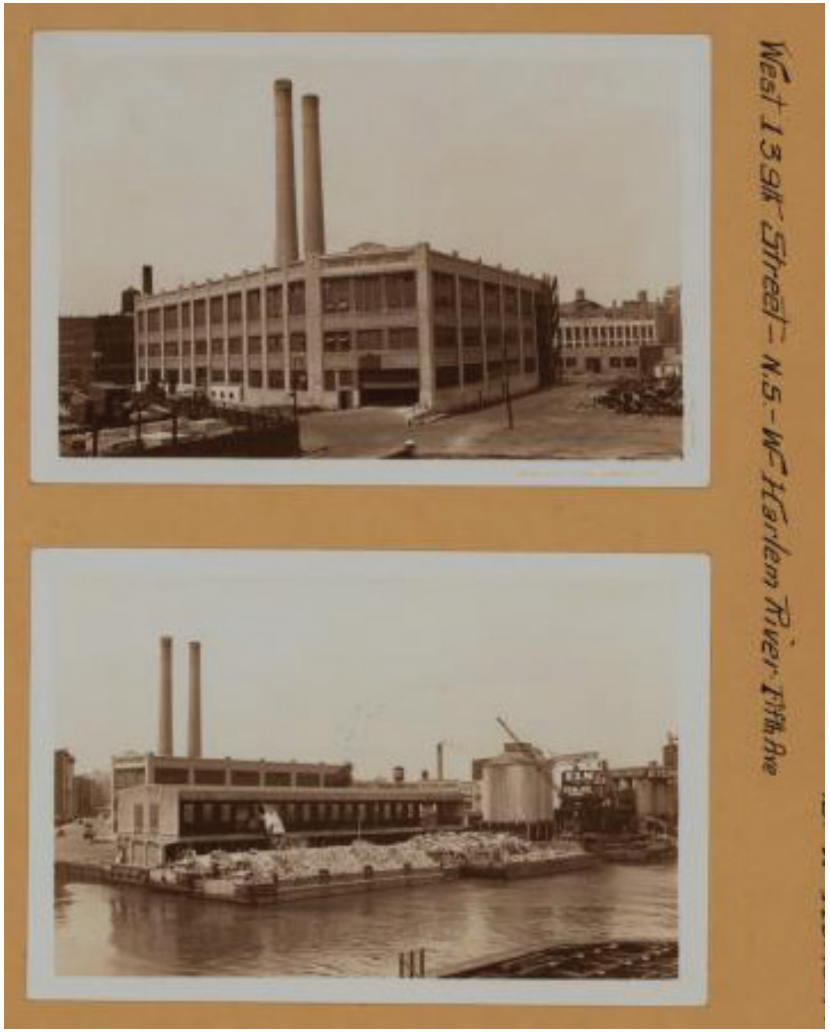
TOWARDS A CODIFIED MUNICIPAL WASTE MANAGEMENT PROGRAM

Though New York had instituted systems of trash "picking" throughout the 1870s and 1880s, refuse continued to be piled in the streets. While ash from stoves was nominally placed in cans along the street, household waste, manure, and even deceased animals would be left in the street. The waste would be picked up by private pickers who would sort through the trash for anything of value before depositing the rest in the waterways surrounding New York City. That would change when George Waring was appointed sanitation commissioner in 1895. He would organize the first municipal sanitation workers who would properly sweep and clean the streets of New York. Waring thought of the sanitation employees who worked for him like an army and mandated that they wear white uniforms to convey a sense of cleanliness. These employees became known as the "White Wings." Further, Waring organized a system of separating waste that, for the first time, stopped ocean dumping. Ash and rubbish were shipped by barge to landfills throughout the city, while organic waste was steamed and pressed to create grease for industrial and commercial uses (Sze 2006).

Over the next decades, the practice of loading trash scowls along the East River would continue. Like many communities along the eastern shore of Manhattan, Harlem was

Refuse piled along a Lower East Side street, c. 1890.

The "White Wings.", c. 1915.



Views of the 139th Street incinerator and ramp, c. 1934.

home to a pier for loading trash barges, located at 139th Street and the Harlem River, beginning around the turn of the century. The site was responsible for all garbage north of 100th Street and the majority of the street sweepings and ash collected between 90th and 145th Streets on the east side of Manhattan, totalling some 400,000 cubic feet a year. Though complaints no doubt were common throughout the early twentieth century, the first recorded complaint about the site is from 1920, when the North Harlem Community House located on 139th Street and Seventh Avenue wrote about the continued use of the site. The commissioner responded that it would not be possible to relocate the dump, both logistically and morally, as "the garbage disposed of at this dump comes from the very section of the city where the signers of this petition reside" (New York Board of Estimate and Apportionment 1921). The dump remained at this site and was eventually expanded to include an incinerator. It closed in 1958 (Walsh et al. 2001).

MODERN MUNICIPAL WASTE AND THE YOUNG LORDS

In the 1960s, poor municipal trash pickup practices resulted in East Harlem streets piled high with trash.

In 1969, many New Yorkers viewed poor garbage collection and street cleaning as emblematic of the problems confronting their city. Dissatisfaction with solid waste management cut across racial and class lines. Homeowners in Queens argued they received insufficient service, while residents of Harlem and the South Bronx claimed that the Department of Sanitation (DSNY) neglected their needs. This discontent was followed by two protests in East Harlem on August 17 and 22, 1969. In the evening of August 17, residents near Park Avenue and 110th Street engaged in a two-hour protest against the DSNY service. The residents claimed to have protested after DSNY refused to send a garbage truck to pick up refuse from a neighborhood clean-up campaign.

On August 17, 1969, residents of East Harlem blocked the neighborhood's main avenues with uncollected garbage and abandoned cars, which they set on fire—an event known as the Young Lords' Garbage Offensive. A year later, on August 13, 1970, about 400 youths in Harlem used brooms to push garbage onto Lenox Avenue between 138th and 139th Streets to protest the lack of garbage collection in Harlem. They took the brooms to 111th Street and Third Avenue, and together with community members, they swept the garbage into the middle of the street, forming barricades that halted traffic (Fernández 2020b).

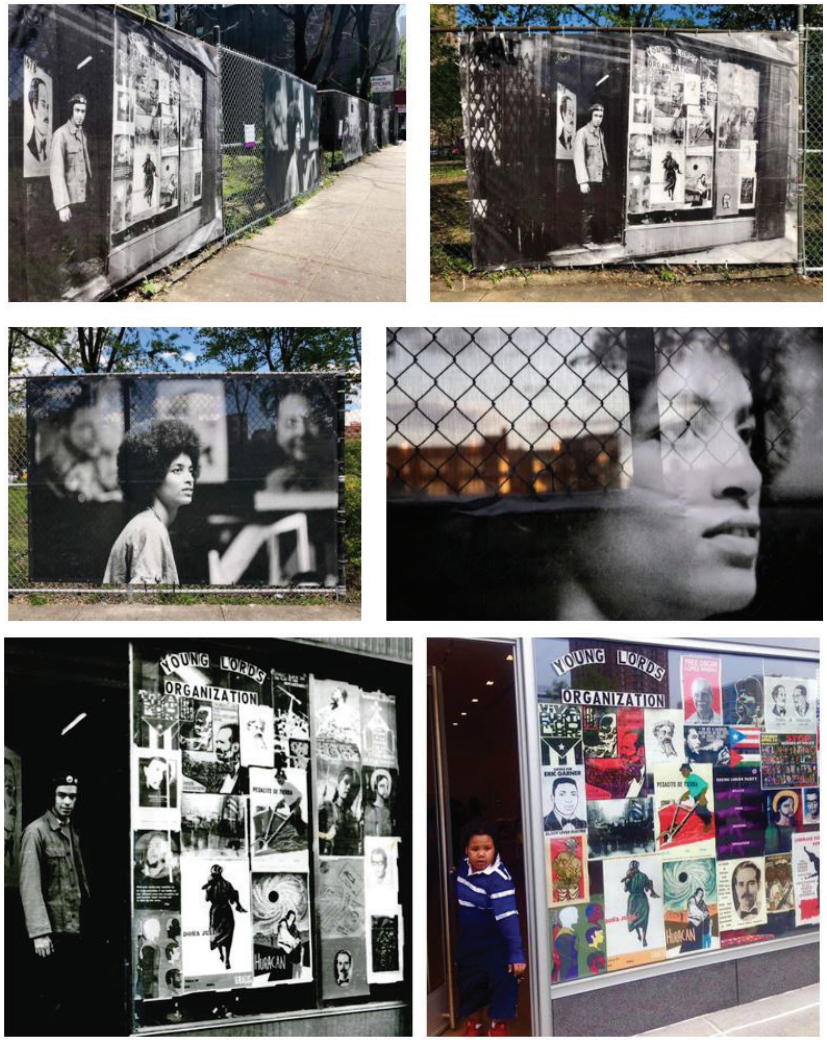
Young Lords protest on Third Avenue, c. 1969.

Community members began dragging rusted refrigerators, old cars, mattresses, and broken furniture off the corners and strewing them across Third Avenue near 110th Street. Later, the Young Lords Organization grew in number and opened a storefront in East Harlem on 115th Street (Older 2019). The Young Lords began to decline in the 1970s, as increasingly extremist factions broke off from the group and faced scrutiny (Westcott 2018). The organization disbanded by 1976.

Young Lords protest locations.

These protests were remembered by a public art project in 2019 organized by artist Miguel Luciano, while in residence at the Metropolitan Museum of Art's Civic Practice Partnership. This project was supported by the Surdna Foundation, A Blade of Grass, and El Museo del Barrio. It explored the activist history of the Young Lords in East Harlem. Historical photographs of the movement were put up throughout the neighborhood (Mapping Resistance, n.d.).

Mapping Resistance project commemorating the Young Lords.



Images of the Mapping Resistance project.

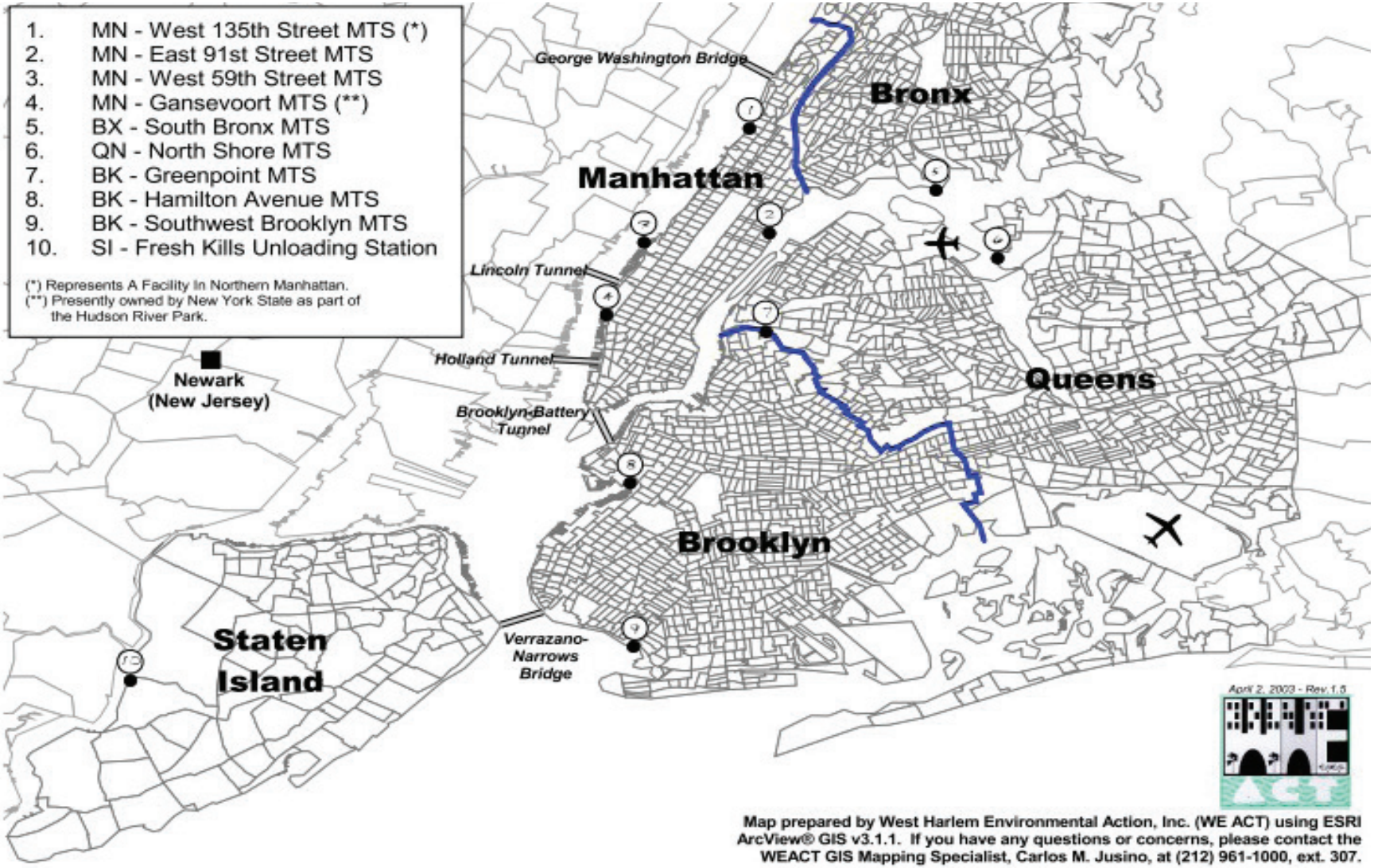
THE CLOSURE OF FRESH KILLS

In the late 1990s, New York City made the decision to close its last remaining landfill, Fresh Kills, and sought a new means of transporting waste out of the city. Initial plans for a privatized carting system for residential trash quickly proved expensive and infeasible, and in 2003, under a new mayor, Michael Bloomberg, a return to a municipally run system utilizing trash barges was put forward. This decision was spurred in part by a citywide coalition of environmental groups under the umbrella "The Organization of Waterfront Neighborhoods" (OWN), which sought a more equitable distribution of solid waste management facilities.

Waste transfer station map
(Credit: Pratt Center for Community Development)

Map of New York City showing operating waste transfer facilities, c. 2000.

OWN sought to reuse and rehabilitate the existing network of Marine Transfer Stations (MTS) so that each community would be responsible for its own solid waste, which was achieved to some degree (Sze 2006). One of these stations was located in Harlem along the Hudson River on 135th Street. Prior to its temporary closure, it had handled between 1,100 and 2,500 tons of waste per day, with as many as ninety sanitation trucks idling along surface streets waiting for their turn to dump waste into the facility (WE ACT 2017). Initially, the City of New York proposed *only* reopening the 135th Street MTS, but OWN advocated for reopening other sites at 59th Street and 91st Street as well (U.S. Dept. of Transportation et al. 2000). WE ACT for Environmental Justice, a Harlem environmental justice organization that was an initial member of OWN, would eventually leave the OWN coalition as it sought to prevent the reopening of the 135th Street MTS (Sze 2006). WE ACT, other community groups, and politicians would be successful in blocking the re-opening of the 135th Street MTS, which currently sits vacant.



Marine transfer stations, c. 2003.

SOLID WASTE IN HARLEM TODAY

Environmental justice concerns with regards to solid waste persist in Harlem. While curbside composting is nominally available in Harlem, it is unclear if landlords—especially Harlem's largest landlord by number of units, NYCHA—will adopt the program in sufficient numbers to keep it viable. Pre-COVID-19 solid waste management on busy corridors such as 125th Street had been raised as a concern, particularly after DSNY removed over 200 trash cans in 2018 (Hu 2018). Finally, the East Harlem community appears to have been misled by DSNY concerning a replacement to the new 99th Street facility, which appears temporary rather than permanent and only partially enclosed instead of fully enclosed, as the City and community had initially agreed (Smith 2021).

TRANSPORTATION

Zihao Zhang and Nina Nahitchevansky

The Hudson and Harlem River Railroads, c. 1855.

The nineteenth century marked the beginning of major transportation infrastructure development in Harlem. The New York and Harlem Railroad was established on the east side of Manhattan in the 1830s, followed by Riverside Drive on the banks of the Hudson River (Thomas 2013). At first, the routes were created to accommodate travel by horse, with the trains of the Harlem Railroad being pulled by horsepower, and the road on the west side was used almost exclusively by horse-drawn carriages and omnibuses. This model was considered a sound way of connecting the northern and southern halves of Manhattan Island (Atkinson 1996).

By 1914, the Hudson River Railroad was built along the west coast of Manhattan and both shoreline railways used steam to power their engines. While the use of steam-powered trains increased the efficiency of travel, it also brought many issues, including pollution from smoke, soot, and embers that came off the trains (*New York Daily Times* 1855). Residents of the west side of Manhattan felt this issue less intensely than their counterparts to the east. The area of Harlem surrounding the Harlem River Railroad was much more congested and the effects of pollution were felt strongly by the residents surrounding the railroad routes. The use of steam engines was prohibited below 42nd Street due to the excessive pollution that resulted from their use (*New York Times* 1857). This tendency on the part of transportation officials to protect the interests of the wealthier residents demonstrates the beginnings of a framework of transportation inequity that persists to this day. The route traveled by the Harlem Railroad is today echoed by the M1 bus line, and the route of the Hudson River Railroad is today the Henry Hudson Parkway.

THE MANHATTANVILLE WATERFRONT

Originally, Manhattanville's waterfront was used by the Lenape peoples for a multitude of purposes, including fishing, harvesting of oysters and clams, and trade. This changed in the sixteenth century, when the Dutch settled New Amsterdam, driving the Lenape away from the shore and eventually converting it into ports for trade. By 1806, New York's waterways were the most vital corridors for trade and travel, and by 1808, regular ferry service across the Hudson River was established from Manhattanville to New Jersey. "By 1850, the first northbound stop of the new Hudson River Railroad at Manhattanville's depot advanced the town's growth as a railroad suburb within half an hour of the city's business center" (NYC Dept. of Parks and Recreation, "West Harlem Piers," n.d.). This led to the development of West Harlem, but also brought with it a sharp increase in traffic, which had the consequence of increased waste and noise.

ELEVATED TRAINS

Subway line 1 was constructed in 1894. The 125th Street Station was a local station on the IRT Broadway-Seventh Avenue Line, located at the intersection of 125th Street and Broadway, at the border of the Manhattanville and Morningside Heights neighborhoods of Manhattan.

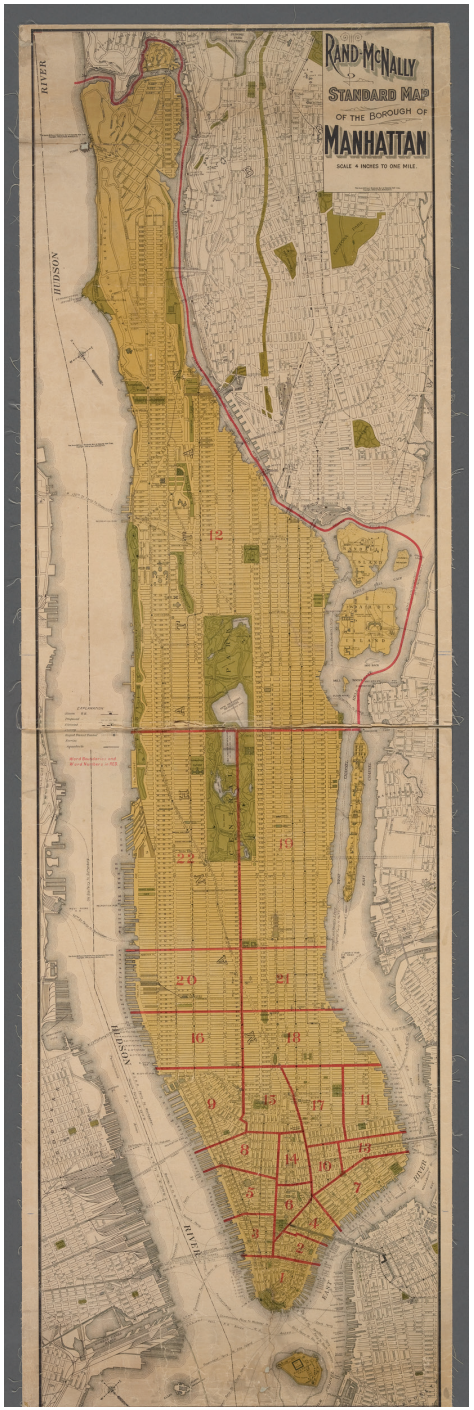
The 125th Street Station is the only station on the 2,174-foot-long Manhattan Valley Viaduct, which bridges Manhattanville from 122nd to 135th Streets. The viaduct allows trains to avoid steep grades while going through the valley.

As the only subway station on the Manhattan Valley Viaduct, it provided greater convenience for residents. At the same time, the close distance between railroad tracks and some residential buildings makes noise a serious problem.

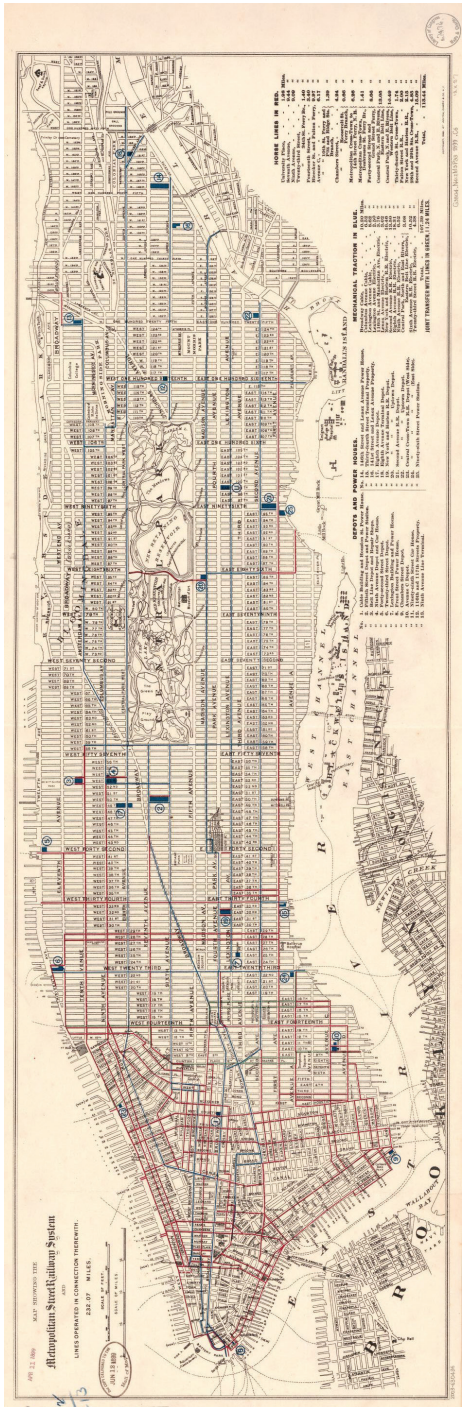
TRIBOROUGH BRIDGE

The designing and planning process for the Triborough Bridge reflects how the decision-making process of city infrastructure was closely related to environmental injustice issues, displacing potential pollution from certain areas to the detriment of other communities.

The Robert F. Kennedy Bridge (formerly known and still commonly referred to as the Triborough Bridge) was constructed and opened on July 11, 1936. It connects the boroughs of Manhattan, Queens, and the Bronx. It consists of four segments. Three



Manhattan (New York), c. 1907.



Metropolitan Street Railway system, c. 1899.

main spans transverse the East River to Queens, the Harlem River to Manhattan, and Bronx Kill to the Bronx. The fourth is a T-shaped approach viaduct that leads to an interchange plaza between the three spans on Randalls Island.

The Harlem River span is a lift bridge that connects Manhattan with Randalls Island. It has a massive transportation load, carrying six lanes of New York State Route 900G and two sidewalks. Across its three spans, the Harlem River span is closely related to the studio study area. At the time of its completion, the Harlem River lift bridge had the largest deck of any lift bridge globally, with a surface area of 20,000 square feet.

Debates surrounding the initial plans of the Harlem River span reflect issues of environmental injustice. A bill to construct the bridge was proposed in the New York State Legislature in 1920. The Port of New York Authority included the proposed Triborough Bridge in a report to the New York State Legislature in 1921. The following year, the planned bridge was also included in a "transit plan" published by Mayor John Francis Hylan, who called for the construction of the Triborough Bridge as part of the City-operated Independent Subway System. In March 1923, a vote was held on whether to allocate money to perform surveys and test borings, as well as create structural plans for the Triborough Bridge. The borough presidents of Manhattan and the Bronx voted for the allocation of the funds, while the presidents of Queens and Staten Island agreed with Hylan, who preferred the construction of the new subway system instead of the Triborough Bridge.

View of the Harlem River span of the Triborough Bridge.

There was also debate about the position of the Harlem River Span Bridge. Queens Borough President Maurice K. Connolly said a bridge between Queens and Manhattan needed to be built further downstream, closer to the Queensboro Bridge. Therefore, the newly built bridge could serve the transportation needs of wealthy people living in the Upper East Side area.

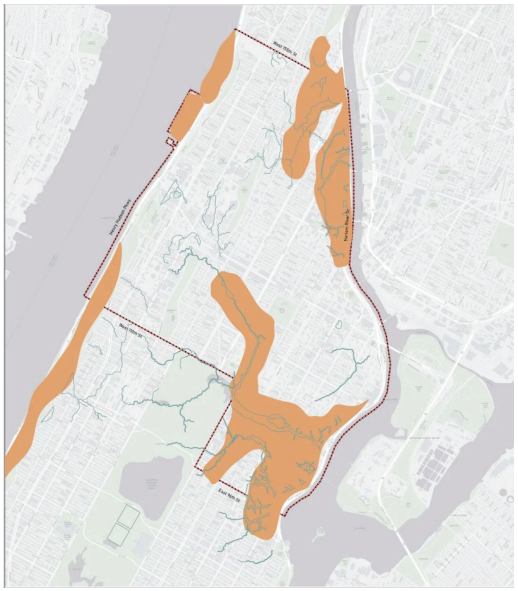
Robert F. Kennedy Bridge and its original plan.

As *The Power Broker* mentions, "Some of you may be heading back to Manhattan and may get there by way of the Triborough Bridge. I have always been fascinated by that bridge because coming in from Queens to Manhattan makes an almost perpendicular, hard right turn north so that the traffic lets out in Harlem, not on the wealthy Upper East Side" (Caro 1974). Even though the bridge could provide more opportunities for the development of the Upper East Side, they decided to move the bridge northwards to the position of 125th Street, which created negative effects associated with redevelopment, traffic, and pollution for Harlem instead.

WATER QUALITY & MANAGEMENT

Schuyler Daniel, Kerrian France, and Xiyu Li

The geographically extensive networks of Manhattan's water dependencies, infrastructure, public and private management, as well as the community and social impact of water resources in Harlem present a complex social and geological history. From the use of natural waterways for trade, transportation, and resources of food by the Leni Lenape, to the expansions, infills, new uses, and pollutants introduced throughout colonization and industrialization, the story of water management in Manhattan and, more specifically Harlem, shows a network of water dependence that expanded geographically over time, coinciding with increasing restriction, policy, and politics on the local level. This research looks specifically at water use and management in Harlem through the lenses of physical interaction (such as swimming), the development of sewer infrastructure, and the management and injustices embedded in those infrastructures today, as well as the supply of potable water to the city through the aqueduct system.



Map showing Harlem's original waterways (in blue) and reclaimed/infilled land since 1844.

WATER AS RECREATIONAL RESOURCE

Natural water sources were once seen as a recreational asset in both Harlem and the greater New York City area. As early as 1882, the *New York Times* reported recreational swimming competitions in the Harlem River. These races were held annually and, evidently, garnered a lot of community enthusiasm as event spectators and readers of the article kept a log of record-breaking times and individuals (*New York Tribune* 1885). However, reporting related to swimming in the Harlem River evolved over the course of the next forty years, as both community and city perspectives on the activity shifted away from excitement and encouragement. Over time, swimming in New York City's natural water bodies was gradually restricted due to both drowning dangers and increased fear of pollutants. In 1937, an unofficial warning was issued in the *New York Times* by City Health Commissioner John L. Rice with the headline "Swimming in Certain Areas Undesirable - Harlem River Listed Among Worst Bathing Sites." The article cites an annual average of 400 fatalities in New York due to swimming and, among the sites now "prohibited" for the activity, lists the Hudson Ship Canal, Hudson River, Harlem River, East River, Gravesend Bay, Jamaica Bay, Arthur Kills, and Kill von Kull. Acceptable swimming locations included shores along Long Island, Staten Island, and Coney Island (*New York Amsterdam News* 1937b). This list of prohibited swimming sites effectively eliminated all of Harlem's access to recreational swimming in natural water bodies. The article did not cite a direct reason, such as water quality, turbulence, or shipping routes, for these prohibitions. Just two years later in 1940, another article announced the death of a boy who had drowned in the Harlem river in an effort to "escape heat" (*New York Amsterdam News* 1940a). Where water had once been perceived as a recreational resource, it was now the subject of environmental fear and criticism.

Boys swimming next to an abandoned boat in Harlem, c. 1932.

SWIMMING IN CERTAIN AREAS UNDESIRABLE

Harlem River Listed Among Worst of Bathing Sites

With the swimming season at hand, the Department of Health this week gave out figures to show that in the last five years an average of approximately 400 persons have drowned yearly in this city, which caused Health Commissioner John L. Rice to urge that everyone, young and old, learn to swim this year.

More than two-thirds of the deaths by drownings occur in the summer months, and the majority of these are boys and young men under the age of 20 years. Last year there were 343 such deaths, of whom 319 were men and boys and 24 women and girls.

In the New York City area the safe bathing beaches are:

Long Island Sound: Ocean— from Norton's Point to Sea Gate along Coney Island; Brighton Beach, Manhattan Beach, Rockaway Peninsula.

Staten Island—along the southeast shores from Fort Wadsworth Reservation to the southernly end of Tottenville, and Little Neck Bay in the Borough of Queens.

The prohibited areas for public bathing in this section are: Harlem Ship Canal, Hudson River, East River, Harlem River, Gravesend Bay, Jamaica Bay, Arthur Kills, Kill von Kull.

Narrows—south to Fort Wadsworth Reservation, Newtown Creek, Little Bay, Powell's Cove, Flushing Bay, Bowery Bay, Upper New York Bay, Gowanus Bay and Coney Island Creek.

Newspaper headline in New York Amsterdam News *from July 1937.*

"MITIGATION" AND ACTIVISM IN RELATION TO WATER INFRASTRUCTURE

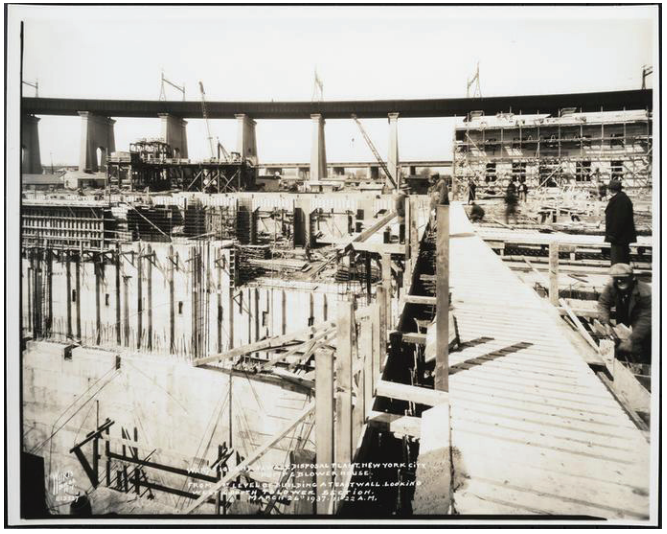
There are three sewage treatment plants that presently process sewage and stormwater from Manhattan and surrounding communities, including Brooklyn and the Bronx. These include the North River plant (west side of Manhattan), the Newton Creek plant (lower Manhattan and east Brooklyn), and the Wards Island plant (Harlem and east Bronx).

WARDS ISLAND WASTEWATER TREATMENT PLANT

By the late twentieth century, major environmental issues in New York City manifested in the water infrastructure development of Harlem and Upper Manhattan. In 1930, the Sanitary Commission tests of the East River water quality determined that the water showed an oxygen content over 20 percent from normal, an unsafe bacterial content (above 90 percent), and a tidal flow insufficient to carry any amount of sewage out, confirming that the river should not be a site for any bathing and was high in disease risk (*New York Times* 1930, 25). Since it was determined that the water quality of the East River needed to be addressed, plans for the Wards Island Treatment Plant were introduced as early as 1906 for pollution control (NYC Department of Sanitation 1937, 11). At the time, the cost of building the plant, which would be the city's largest to date, was the City's greatest concern, but the Metropolitan Sewerage Commission determined that the cost to bring the East River back to its condition in 1893 would cost at least $378,000,000, and no amount of money could possibly bring the river back to its original condition and quality after years of sewage dumping (*New York Herald Tribune* 1930a, 3).

The Wards Island Wastewater Treatment Plant was put into operation by 1937 to prevent further pollution of the East River, but not to a completely favorable response. In 1937, the Merchants' Pollution Committee agreed that "the waters about New York were tainted to such an extent that they have become a menace to health," but argued that the location of the Wards Island plant would be a "sanitary crime" as it neighbored areas of rapid development and would be a source of "discomfort to residents of Riverside Drive and Sutton Place" (*New York Herald Tribune* 1927, 15). During the plant's operation, its main causes for environmental complaints have been its use as one of the first plants to use conventional activated sludge for sewage treatment. Using this process means that sewage would be processed through aeration tanks, leaving a heavy solid, also known as "floc" (NYC Dept. of Sanitation 1937, 16), which places as many as twenty-eight fifteen-ton piles of black sludge at the site (Kennedy 1994, CY8).

The Wards Island Wastewater Treatment Plant was proposed to use the sludge treatment process in response to a 1988 consent decree that required the city to comply with the federal law that prohibited any further dumping of sludge into the ocean. The Wards Island plant was described as an "experimental program by the city's Department of Environmental Protection" to implement the process of turning sewage sludge into fertilizer, while also using the sale of the fertilizer produced to pay for the operation of the plant (Kennedy 1994, CY8). Over the years, both the Parks Department and neighboring community leaders in East Harlem have complained about the odors and noise, particularly regarding its effect on the experience at the park on Wards Island as a community open space resource (Kennedy 1994, CY8).



The construction of Ward's Island Plant continued despite unfavorable response, c. 1937.

The Ward's Island Plant pump changed the quality of open space, c. 1948.

Instances of community disregard and a lack of communication with other stakeholders have occurred since the inception of the Wards Island Wastewater Treatment Plant. The first instances was that the Director of the Wards and Randalls Island section of the Parks Department, Aimee Boden, stated that the Department of Environmental Protection's plans for the sludge treatment process at Wards Island were never communicated, with the Parks Department only finding out after the plans for dry sludge sheds on site were already presented (Kennedy 1994, CY8). Then in 1990, an electrical fire at the plant caused by an overheated sewage pump caused the entire plant to shut down, resulting in at least 120 million gallons of unprocessed sewage to be dumped into the East, Harlem, and Hudson Rivers. The lack of a back-up system at the plant showed that the Department of Environmental Protection lacked in its planning and infrastructural failure response in ways that would directly affect the surrounding community and cause pollution to the rivers.

NORTH RIVER WASTEWATER TREATMENT PLANT

One of the largest environmental justice activism movements regarding water quality and management in Harlem was in response to the North River Water Treatment Plant. In "Turning Sewage Plants Into Friendly Neighbors," Allan Gold (1991b) proposes that the failures of the North River Wastewater Treatment Plant could possibly be defined by a combination of bad design, flaws in the process, and lack of operator morale. This serves as a framework to analyze the plant in its planning, execution, and operation, as it relates to the community and environmental impact.

The proposal of the North River Wastewater Treatment Plant came to fruition from the need to clean up the ongoing pollution and water quality of the Hudson River. Seven facilities were originally proposed to service the west side of Manhattan by the New York City Department of Public Works in 1938, which was later changed to two facilities, then only one to service the entire area. This decision guaranteed that the plant would be functioning over capacity, as one facility could not bear the design sewage load for the entire West Side. In addition, previous plans determined that a wastewater treatment plant was to be built between West 70th and 72nd Streets. This plan was immediately met with resistance from the mostly White demographic of the Upper West Side, and the Department of Public Works determined that "the West 70th Street-West 72nd Street site should not be used for any purpose that could be detrimental to the adjacent residential and cultural development." This led to the City's decision to relocate the sewage plant to Harlem, knowing the environmental effects it would have on the neighboring community. By the time the plans for the North River Wastewater Treatment Plant were in effect, residents reported that a public board meeting in 1968 was the first time they heard of the plan that would be directly affecting their community, and they vehemently opposed it (Miller 1994, 707-711).

Despite community opposition, construction for the plant began in 1972 between West 135th and 145th Streets. During the construction, reportedly no minority contracting, engineering, or architecture firms were involved, despite the largely minority population of the local Harlem community (Miller 1994, 713). The flawed design of the plant itself also led to many of the problems that affected the local community and environment. The design capacity was reduced from 225 million gallons to 170 million gallons per day in an effort to save money. As a result, the plant has been operating near capacity since, and environmentalists state that "if the plant exceeds capacity, it will have to treat sewage less, and discharge dirtier effluent into the river," contradicting the purpose of the plant to clean up the Hudson (Gold 1991a). In addition, the plant started the process of "secondary treatment" in April 1991 that was said to remove 85 percent of the pollutants in the sewage and be a benefit to the water quality of the Hudson River (Gold 1991b). Days later, there were reports in the Harlem neighborhood of the worst odor they have ever smelled (Gold 1991b). The treatment process requires the sewage to go through an aeration tank, but officials stated that an imbalance caused the solid waste to float in the tank and it must float longer to remove more pollutants, causing the odor. The flawed second treatment process occuring at the North River's enclosed plant, where the odor is concentrated unlike at an open air plant, showed a lack of consideration in the design and execution of water treatment services in Harlem. City engineers told community groups that the odor was a temporary issue until the secondary treatment plants were fully executed, but that was not the case (Gold 1991a, A1).

The North River Wastewater Treatment Plant was a source for diminished air quality and noxious odors in West Harlem, date unknown.

Water-related environmental justice activism in Harlem during the twentieth century occurred in response to the issues and injustices that occurred with the North River Wastewater Treatment Plant. The case of the North River Wastewater Treatment Plant shows that the City did not seek to communicate the intentional decision to locate the plant in Harlem or its environmental effects upon the water, air, and noise pollution of the neighborhood, which continued throughout its operation. The City sought to blame the operation of the plant as one of the reasons for its perceived failure (Gold 1991b, B3). However, the fact that only a handful of local residents were hired at the plant and that within a year they all quit or were fired, only furthers the argument that there was a lack of community involvement with the plant (Miller 1994, 713). In 1988, Peggy Shepard, Chuck Sutton, and Vernice Miller-Travis founded WE ACT (West Harlem Environmental Action) to address the poor management of the North River Wastewater Treatment Plant and how it was affecting the minority population that resided in Harlem. In 1993, WE ACT reached a settlement in its lawsuit with the City regarding the North River Wastewater Treatment Plant, which resulted in actions such as a $55 million plan to fix the issues regarding the plant (WE ACT 2015). The City also tried to "mitigate" the effects of the North River Wastewater Treatment Plant with the introduction of Riverbank State Park, which was included as part of the permit for the site. The park features green roofs, a cultural theater, athletic complex, restaurant, and pool on top of the existing treatment plant (Sage 2005, 1311). Though the City has attempted to mitigate the effects of the plant, the inherent issues and intentional planning of the wastewater infrastructure of Harlem shows that the neighborhood has been used as an environmental "dumping ground" by the city in an attempt to address larger issues of New York City's water quality (Miller 1994, 707).

Riverbank State Park was built on top of the North River Wastewater Treatment Plant as a form of restorative justice and mitigation to negative community response.

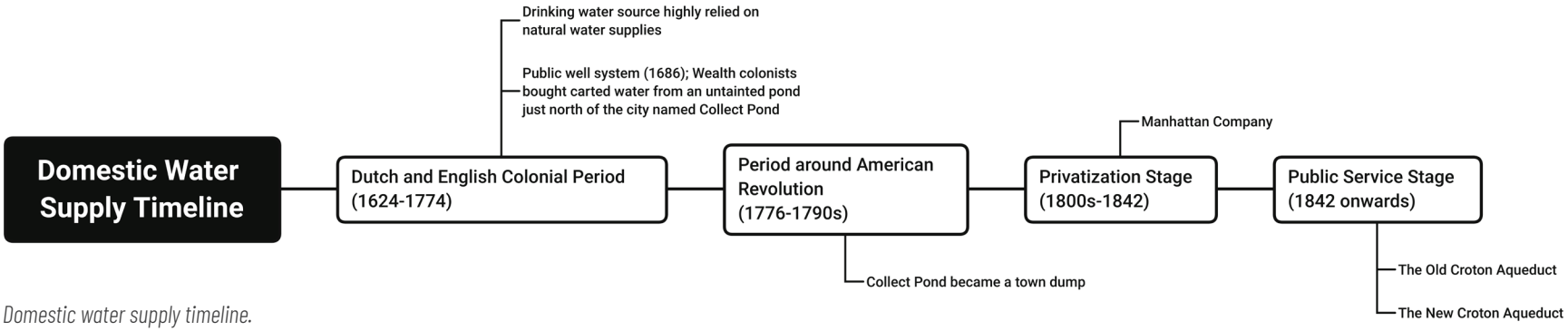
MODERN-DAY SEWER INFRASTRUCTURE AND MANAGEMENT

Looking at the function of the sewer system in Manhattan today, a comparison of the three wastewater treatment plants serving Manhattan exposes critical differences in both operational capacity and environmental stewardship. In the event of a "Combined Sewer Overflow" (CSO), drainage areas in Harlem between East 96th up to West 110th and 155th Streets experience overflow rates, on average, approximately 11.7 million gallons more than other drainage areas in Manhattan outside of this area (Open Sewer Atlas NYC, n.d.). This means that the combined sewer systems serving the Harlem community (North River Sewage Treatment Plant and Wards Island Sewage Treatment Plant) become overwhelmed more quickly in the event of a significant precipitation event. Moreover, of the three sewer treatment plants that serve Manhattan, the regions served by the Wards Island Plant produced 14.5 and 43.4 million gallons more CSO than the regions served by the North River and Newton Creek plants, respectively. In total, the regions served by Wards Island sent approximately 4,003,000,000 gallons of CSO (versus 2,837,000,000 for Newton Creek and 420,000,000 for North River) into the Harlem and East Rivers in 2016. This data shows that the storm water and sewer infrastructure of Harlem is less well-equipped to handle flooding events without depending on sewer outfalls into, primarily, the Harlem and East Rivers, rather than diverting the raw sewage and storm water to the treatment facility.

DOMESTIC DRINKING WATER QUALITY AND ACCESS

Domestic drinking water quality and access are critical components for evaluating environmental injustice in the study area. The city's water supply history can be roughly divided into several stages: the Dutch and English colonial period, the period around the American Revolution, the privatization stage, and the public service stage. Access to water was crucial for colonial settlement. In the Dutch and English colonial periods, drinking water relied on natural water supplies. The people of New Amsterdam drank water from the Fresh Water Pond, also called Collect Pond, whose numerous underground sources would provide drinking water well into the 1800s (Koeppel 2000, 11). In addition to the limited freshwater resources, the people in that era also collected rainwater in cisterns and dug shallow wells (Koeppel 2000, 13).

In the English colonial era, practices of leather production in tanneries would contaminate the water quality (Schifman 2019). The public well system was established in 1686 (Koeppel 2000, 18), becoming the primary water source for residents. Nevertheless, a Boston physician, Benjamin Bullivant, passed through the town in 1697 and observed that many public wells were closed and found those streets "Nasty and Unregarded" (Koeppel 2000, 21). Despite measures to improve the city's notorious sanitary conditions, diseases such as smallpox and yellow fever continued to disrupt city life (Koeppel 2000, 23).



Domestic water supply timeline.

During the turbulent period of the American Revolution, British forces reoccupied New York, resulting in residents fleeing from the city, and the water situation further deteriorated. The important infrastructure of freshwater supply, Collect Pond in time became a town dump (Schifman 2019). After the war, people realized that they needed to search for a new way to supply water to the city, and Aaron Burr, a member of the New York State Assembly, showed his interest in the water problem. His brother-in-law, Joseph Browne, a doctor, proposed finding a new water source beyond Manhattan, yet due to the city's financial condition, the feat could only be achieved by a private company (Schifman 2019). Later, Burr's Manhattan Company was given the exclusive right to convey water to the city, and Burr wasted no time in starting his banking business, perhaps indicating why he desperately showed interest in privatizing the city's water supply (Galusha [1999] 2016, 15).

After events like the disastrous fire in 1828 and the cholera outbreak in 1832, people realized that a sure and pure source of water was imperative (Galusha [1999] 2016, 16-17). The Croton Aqueduct was regarded as a solution to the long-lasting water sanitation problem. Upon its opening in 1842, the city could not hold its excitement for introducing Croton water to Manhattan; city residents held a five-mile-long parade close to City Hall to celebrate the life-changing infrastructure (Galusha [1999] 2016, 30).

Croton Aqueduct parade, c. 1842.

Once the Old Croton Aqueduct reached its carrying capacity forty years after it was built, the New Croton Aqueduct was completed in 1890 (Koeppel 2000, 289).

Groundwater supply system.

Broken Main Floods 10-Block Area Uptown

15 Million Gallons of Water Pour Down Amsterdam, Convent Avs. From 135th

Heat and Light Cut Off

Hospital Marooned, Danger of Shortage Is Denied

A forty-eight-inch water main burst at 5:10 a. m. yesterday, thirty feet south of the water gatehouse at Convent Avenue and 135th Street, which controls the water supply for upper Manhattan, and flooded a ten-block area between 135th and 125th Streets and Convent and Amsterdam Avenues.

The main, which was laid twenty feet below the surface in 1840, spilled

Broken Water Main Floods Ten-Block Area in Harlem

Water main break and resulting flooding in 1935 at 135th Street and Convent Avenue, c. 1935.

However, the newly introduced system proved to be a double-edged sword. Residents from the city realized that an unwelcome creature started to appear—*Blatella Germanica*, known as the Croton bug (Koeppel 2000, 287). In the early twentieth century, the fear of getting typhoid as a result of drinking Croton water emerged again. The unfiltered water from the Croton Aqueduct also contributed to some drinking water concerns over the years, such as organisms found in drinking water caused by copper sulfate in 1925 (*New York Times* 1925), insect larvae in Harlem tap water in 1969, and copepods in 2004 (*New York Times* 2004). Even when the City was ordered to filter its water supply from the Croton system in 1993, the city did not comply with the Safe Drinking Water Act and the Surface Water Treatment Rule until the City was sued by the United States Environmental Protection Agency (EPA) in 1997. The EPA required the Croton filtration system to protect people from giardia and cryptosporidium, which can cause serious illness. Nevertheless, the Croton Water Filtration Plant was in service until 2015, two decades past the first time the City was ordered to improve the water quality of the Croton aqueduct (U.S. Attorney's Office, Eastern District of New York 2015).

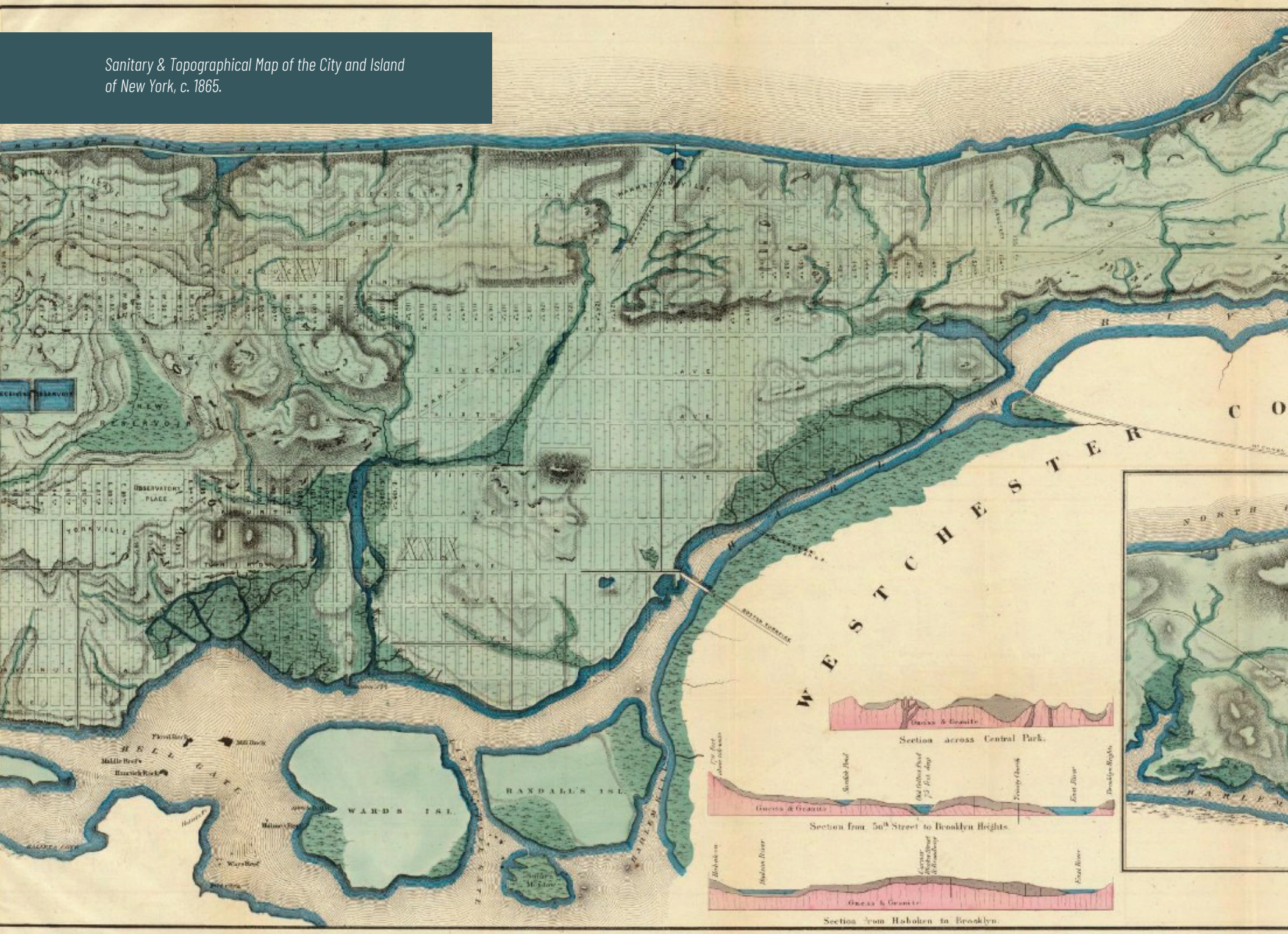
Today, parts of Harlem still drink water from the New Croton Aqueduct (NYC Dept. of Environmental Protection, n.d.).

INFRASTRUCTURE FAILURE

Finally, it is important to note water-related infrastructure failures and their effects on communities. There has been a high concentration of bursts and breaks in underground water mains in Harlem—especially surrounding intersections along Convent Avenue at 127th, 128th, and 135th Streets—since 1880. A break that took place at 135th Street and Convent Avenue in January 1935 was reported as having flooded a ten-block area leaving "thousands of persons… marooned without heat, water, or electricity." Relief efforts from the New York Red Cross reportedly only reached three families, who received blankets, clothes, and shoes (*New York Herald Tribune* 1935).

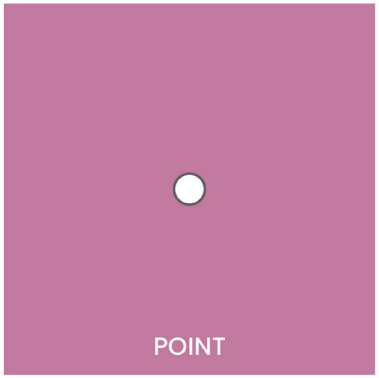
In a water main burst in 1966, flooding "stopped heat and electricity and the 38 families affected were asked to move." The report mentions that only two of these families agreed to relocate to relief housing at the Stadium View Motor Lodge in the Bronx (Schanberg 1966). Here, these infrastructural failures not only indicate mismanagement of the water supply in Harlem, but also serious and dangerous deprivation of heat and electricity for thousands of residents in the coldest months of the year. Moreover, these environmental injustices were exacerbated by the displacement of individuals and families from the community.

Sanitary & Topographical Map of the City and Island of New York, c. 1865.

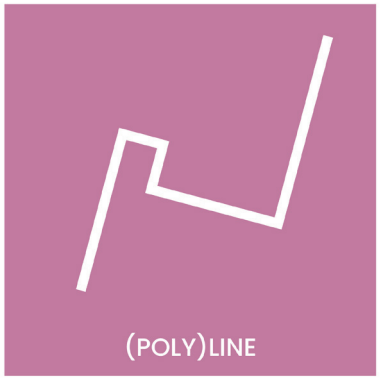


APPENDIX B: HISTORIC ASSETS

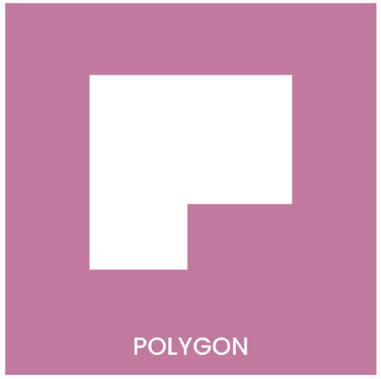
Historic assets are places that demonstrate significant histories under different historic context themes. They can be physical (e.g., a bus depot) or social (e.g., a parade route) in nature, and can be either extant or non-extant. The identification, mapping, and analysis of historic assets enables students to look beyond existing buildings or monuments, and use a place-based language to discover the underlying social-spatial entanglements in Harlem's history of climate and environmental injustice. It also facilitates students' proposal exploration, as they often find sites of historic significance as assets for preservation action or community development.



Example: "Tree of Hope"



Example: Croton Aquedect System



Example: Riverbank State Park

In this year's studio, students collectively identified **190** historic assets across the Harlem study area. In accordance with the data structure of ArcGIS software, historic assets were primarily categorized by their geographic forms—**Point, Polyline, or Polygon**. A **point asset** records a single location (e.g., a sewer outfall or the site of an environmental activism event); a **polyline asset** records a linear feature (e.g., parade routes or transportation routes); and a **polygon asset** records the shape of a particular site (e.g., a landfill, coal yard, waste facility, or building footprint). Students were encouraged to choose data types that best describe the available information of their identified assets.

Once historic assets were identified, students and TAs worked together to construct an ArcGIS database containing both the geographic definition and tabular information of each asset. Key attribute fields in the historic assets GIS database include:

- Asset Name
- Address
- Asset Type (Building; Landfill/Dumpsite; Infrastructure/ Facility; Street Corridor/Route; Area-Open/Green Space; Area-Natural/Topography; Area-Zoning/Environmental Impact Area; Area-Environmental Activism)
- Block, Lot, & BIN Numbers (when applicable)
- Context Relevances (up to 3)
- Access (Public; Private; N/A)
- Built Year
- Extant (True or False)
- Description
- Historic Image

In addition to filling in the fields above through research, the students carried out a field survey in February 2022 to ground-truth the current situation of all historic assets. They documented the material, condition, and current use of historic assets, and looked for marks of flood repairs and the presence of plaques or information boards that communicate historic narratives.

The following pages contain a list of all historic assets identified in this studio, with selected fields of tabular information collected by students through research and field survey.

APPENDIX B-1: POINT ASSETS

NAME & ADDRESS	TYPES	RELEVANT CONTEXTS			BUILT YEAR	ACCESS	EXTANT
Water Main Burst 127TH ST AND CONVENT AVE	Area-Environmental Activism	Water Quality & Management	Hazardous Materials Exposure	Redevelopment & Displacement	1966		
Water Main Burst-1 128TH ST AND CONVENT AVE	Area-Environmental Activism	Water Quality & Management	Hazardous Materials Exposure		1906		
Water Main Burst at 179th St Pumping Station 2405 AMSTERDAM AVE	Area-Environmental Activism	Water Quality & Management	Hazardous Materials Exposure	Open Spaces & Green Resources	1949		
Water Main Burst-2 BRADHURST AVE BETWEEN 144TH ST AND 145TH ST	Area-Environmental Activism	Water Quality & Management	Hazardous Materials Exposure		1957		
Water Main Burst-3 145TH ST AND 7TH AVE	Area-Environmental Activism	Water Quality & Management			1956		
1 Train (125th) W 125TH ST	Infrastructure/Facility	Transportation	Outdoor Air		1908	Public	⬣
The Harlem Courthouse 170 E 121ST ST	Infrastructure/Facility	Outdoor Air				Public	⬣
The Tuskegee Airmen Bus Depot 1552 LEXINGTON AVE	Infrastructure/Facility	Outdoor Air	Transportation				⬣
The 126th Street Bus Depot 2ND AVE & E 126TH ST	Infrastructure/Facility	Outdoor Air	Transportation				

NAME & ADDRESS	TYPES	RELEVANT CONTEXTS			BUILT YEAR	ACCESS	EXTANT
The Manhattanville Bus Depot 601 W 133RD ST	Infrastructure/Facility	Outdoor Air	Transportation			Public	⬣
The Mother Clara Hale Depot 721 LENOX AVE	Infrastructure/Facility	Outdoor Air	Transportation			Public	⬣
The Amsterdam Depot 1381 AMSTERDAM AVE	Infrastructure/Facility	Outdoor Air	Transportation			Public	
The Trailblazing Studebaker Automobile And Factory 615 W 131ST ST	Infrastructure/Facility	Outdoor Air			1923		
Washburn Wire Factory 520 E 117TH ST	Infrastructure/Facility	Outdoor Air			1903		
Sewer Outfall NR-002 W 152ND ST AND RIVERSIDE DR	Infrastructure/Facility	Water Quality & Management	Hazardous Materials Exposure		1985	Private	⬣
Sewer Outfall NR-044 W 138TH ST AND RIVERSIDE DR	Infrastructure/Facility	Water Quality & Management	Hazardous Materials Exposure		1985	Private	⬣
Sewer Outfall NR-43 W 129TH ST AND RIVERSIDE DR	Infrastructure/Facility	Water Quality & Management	Hazardous Materials Exposure		1985	Private	⬣
Sewer Outfall NR-42 W 115TH ST AND RIVERSIDE DR	Infrastructure/Facility	Water Quality & Management	Hazardous Materials Exposure		1985	Private	⬣
Sewer Outfall WIM-017 E 96TH ST AND FDR DR	Infrastructure/Facility	Water Quality & Management	Hazardous Materials Exposure		1937	Private	⬣
Sewer Outfall WIM-018 E 100TH ST AND FDR DR	Infrastructure/Facility	Water Quality & Management	Hazardous Materials Exposure		1937	Private	⬣
Sewer Outfall WIM-019 E 101ST ST AND FDR DR	Infrastructure/Facility	Water Quality & Management	Hazardous Materials Exposure		1937	Private	⬣
Sewer Outfall WIM-043 E 102ND ST AND FDR DR	Infrastructure/Facility	Water Quality & Management	Hazardous Materials Exposure		1937	Private	⬣

NAME & ADDRESS	TYPES	RELEVANT CONTEXTS			BUILT YEAR	ACCESS	EXTANT
Sewer Outfall WIM-020 E 103RD ST AND FDR DR	Infrastructure/Facility	Water Quality & Management	Hazardous Materials Exposure		1937	Private	⬣
Sewer Outfall WIM-021 E 104TH ST AND FDR DR	Infrastructure/Facility	Water Quality & Management	Hazardous Materials Exposure		1937	Private	⬣
Sewer Outfall WIM-022 E 105TH ST AND FDR DR	Infrastructure/Facility	Water Quality & Management	Hazardous Materials Exposure		1937	Private	⬣
Sewer Outfall WIM-023 E 106TH ST AND FDR DR	Infrastructure/Facility	Water Quality & Management	Hazardous Materials Exposure		1937	Private	⬣
Sewer Outfall WIM-024 E 110TH ST AND FDR DR	Infrastructure/Facility	Water Quality & Management	Hazardous Materials Exposure		1937	Private	⬣
Sewer Outfall WIM-025 E 114TH ST AND FDR DR	Infrastructure/Facility	Water Quality & Management	Hazardous Materials Exposure		1937	Private	⬣
Sewer Outfall WIM-026 E 115TH ST AND FDR DR	Infrastructure/Facility	Water Quality & Management	Hazardous Materials Exposure		1937	Private	⬣
Sewer Outfall WIM-027 E 116TH ST AND FDR DR	Infrastructure/Facility	Water Quality & Management	Hazardous Materials Exposure		1937	Private	⬣
Sewer Outfall WIM-028 E 117TH ST AND FDR DR	Infrastructure/Facility	Water Quality & Management	Hazardous Materials Exposure		1937	Private	⬣
Sewer Outfall WIM-029 E 118TH ST AND FDR DR	Infrastructure/Facility	Water Quality & Management	Hazardous Materials Exposure		1937	Private	⬣
Sewer Outfall WIM-030 E 119TH ST AND FDR DR	Infrastructure/Facility	Water Quality & Management	Hazardous Materials Exposure		1937	Private	⬣
Sewer Outfall WIM-031 E 120TH ST AND FDR DR	Infrastructure/Facility	Water Quality & Management	Hazardous Materials Exposure		1937	Private	⬣
Sewer Outfall WIM-032 E 121ST ST AND FDR DR	Infrastructure/Facility	Water Quality & Management	Hazardous Materials Exposure		1937	Private	⬣
Sewer Outfall WIM-033 E 122ND ST AND FDR DR	Infrastructure/Facility	Water Quality & Management	Hazardous Materials Exposure		1937	Private	⬣

NAME & ADDRESS	TYPES	RELEVANT CONTEXTS			BUILT YEAR	ACCESS	EXTANT
Sewer Outfall WIM-034 E 123RD ST AND FDR DR	Infrastructure/Facility	Water Quality & Management	Hazardous Materials Exposure		1937	Private	⬣
Sewer Outfall WIM-035 E 125TH ST AND FDR DR	Infrastructure/Facility	Water Quality & Management	Hazardous Materials Exposure		1937	Private	⬣
Sewer Outfall WIM-036 E 128TH AND HARLEM RIVER DR	Infrastructure/Facility	Water Quality & Management	Hazardous Materials Exposure		1937	Private	⬣
Sewer Outfall WIM-037 E 129TH ST AND HARLEM RIVER DR	Infrastructure/Facility	Water Quality & Management	Hazardous Materials Exposure		1937	Private	⬣
Sewer Outfall WIM-038 E 129TH ST AND HARLEM RIVER DR	Infrastructure/Facility	Water Quality & Management	Hazardous Materials Exposure		1937	Private	⬣
Sewer Outfall WIM-039 W 140TH ST AND FDR DR	Infrastructure/Facility	Water Quality & Management	Hazardous Materials Exposure		1937	Private	
Sewer Outfall WIM-040 W 141ST ST AND FDR DR	Infrastructure/Facility	Water Quality & Management	Hazardous Materials Exposure		1937	Private	⬣
Sewer Outfall WIM-041 W 142ND ST AND FDR DR	Infrastructure/Facility	Water Quality & Management	Hazardous Materials Exposure		1937	Private	⬣
Sewer Outfall WIM-042 W 143RD ST AND FDR DR	Infrastructure/Facility	Water Quality & Management	Hazardous Materials Exposure		1937	Private	⬣
Sewer Outfall WIM-06 W 144TH ST AND FDR DR	Infrastructure/Facility	Water Quality & Management	Hazardous Materials Exposure		1937	Private	⬣
Sewer Outfall WIM-044 W 145TH ST AND FDR DR	Infrastructure/Facility	Water Quality & Management	Hazardous Materials Exposure		1937	Private	⬣
Sewer Outfall WIM-045 W 147TH ST AND FDR DR	Infrastructure/Facility	Water Quality & Management	Hazardous Materials Exposure		1937	Private	⬣
Sewer Outfall WIM-046 W 151ST ST AND FDR DR	Infrastructure/Facility	Water Quality & Management	Hazardous Materials Exposure		1937	Private	⬣
Sewer Outfall WIM-047 W 154TH ST AND FDR DR	Infrastructure/Facility	Water Quality & Management	Hazardous Materials Exposure		1937	Private	⬣

NAME & ADDRESS	TYPES	RELEVANT CONTEXTS			BUILT YEAR	ACCESS	EXTANT
Highbridge Park Water Tower AMSTERDAM AVE AND W 103RD ST	Infrastructure/Facility	Water Quality & Management			1837-1848		⬣
Shell Midden E 121ST ST AND PLEASANT AVE	Landfill/Dumpsite	Solid Waste Management					
Young Lords Protest Site 1 111TH ST AND 3RD AVE	Street Corridor/Route	Solid Waste Management				Public	⬣
Young Lords Protest Site 2 99TH ST BETWEEN 2ND AND 3RD AVE	Street Corridor/Route	Solid Waste Management					⬣
Young Lords Protest Site 3 99TH ST BETWEEN 2ND AND 3RD AVE	Street Corridor/Route	Solid Waste Management					
Citizen Rebelled Police Site 139TH ST AND LENOX AVE	Street Corridor/Route	Redevelopment & Displacement				Public	⬣
Harriet Tubman Memorial ST NICHOLAS AVE AND 8TH AVE	Area-Open/Green Space	Outdoor Air			2008	Public	⬣
Frederick Douglass Memorial 301 FREDERICK DOUGLASS CIR	Area-Open/Green Space	Outdoor Air			Named 1950, Opened 2010	Public	⬣
Tree of Hope BETWEEN W 131ST ST AND 132ND ST AND 7TH AVE	Area-Open/Green Space	Outdoor Air			1930s	Public	⬣
Edgewater Ferry 125TH STREET AND RIVERSIDE DR	Area-Open/Green Space	Transportation			1900-Present	Public	⬣
Sewer Outfall WIM-048 W 155TH ST AND FDR DR	Infrastructure/Facility	Water Quality & Management	Hazardous Materials Exposure		1937	Private	⬣

APPENDIX B-2: POLYLINE ASSETS

NAME & ADDRESS	TYPES	RELEVANT CONTEXTS			BUILT YEAR	ACCESS	EXTANT
Harlem Creek	Area-Natural/Topography	Climate Risk & Response	Fresh Food & Nutrition Access				
Montayne's Rivulet	Area-Natural/Topography	Climate Risk & Response					
Harlem Meer	Area-Natural/Topography	Climate Risk & Response				Public	⬣
El Train Line	Infrastructure/Facility	Transportation	Redevelopment & Displacement	Energy	1878	Public	⬣
Harlem Marsh	Area-Natural/Topography	Climate Risk & Response	Fresh Food & Nutrition Access				
Henry Hudson Parkway	Infrastructure/Facility	Transportation	Outdoor Air	Hazardous Materials Exposure	1937	Public	⬣
East River Greenway	Street Corridor/Route	Transportation	Outdoor Air	Redevelopment & Displacement	1930	Public	⬣
Hudson River Greenway	Street Corridor/Route	Transportation	Outdoor Air	Redevelopment & Displacement	1991	Public	⬣
Harlem River	Area-Natural/Topography	Fresh Food & Nutrition Access					⬣
High Bridge Aqueduct	Infrastructure/Facility	Water Quality & Management	Outdoor Air	Fresh Food & Nutrition Access	1848	Public	⬣

NAME & ADDRESS	TYPES	RELEVANT CONTEXTS			BUILT YEAR	ACCESS	EXTANT
Young Lord Protest 111TH TO 109TH ST BETWEEN LEXINGTON, PARK, MADISON AVENUES, 3RD AND 1ST AVE	Street Corridor/Route	Solid Waste Management				Public	
Row of Different Aged Tenements 144TH ST BETWEEN BROADWAY AND AMSTERDAM AVE	Street Corridor/Route	Indoor Light, Air, & Ventilation				Public	
Eighth Ave Market 139TH AND 145TH ST	Street Corridor/Route	Fresh Food & Nutrition Access				Public	⬣
Lenox Ave Market EAST SIDE OF 6TH AVE, 138TH ST TO 142ND ST	Street Corridor/Route	Fresh Food & Nutrition Access			1913	Public	⬣
The Old Croton Aqueduct	Infrastructure/Facility	Water Quality & Management			1837-1842		⬣
The New Croton Aqueduct	Infrastructure/Facility	Water Quality & Management			1890		⬣
Hudson River Railroad	Infrastructure/Facility	Transportation			1845		⬣
Robert F. Kennedy Bridge (Triborough Bridge)	Infrastructure/Facility	Transportation	Outdoor Air		1929-1936	Public	

APPENDIX B-3: POLYGON ASSETS

NAME & ADDRESS	BLOCK/LOT	TYPES	RELEVANT CONTEXTS			BUILT YEAR	ACCESS	EXTANT
Water Main Breaks and Floods 10-Block area W 135TH ST AND CONVENT AVE		Area-Environmental Activism	Water Quality & Management	Indoor Light, Air, & Ventilation	Energy	1935	Public	
The Harlem (Black) Burial Ground 2ND AVE BETWEEN 126TH ST AND 127TH ST		Area-Open/Green Space	Climate Risk & Response					
Riverbank State Park 679 RIVERSIDE DR	2101 / 117	Area-Open/Green Space	Open Spaces & Green Resources			1993	Public	⬣
West Harlem Piers W 132ND ST AND MARGINAL ST		Area-Open/Green Space	Open Spaces & Green Resources			2009	Public	⬣
Riverside Park BOUNDED BY MADISON AVE, MOUNT MORRIS PARK WEST, WEST 120TH ST, AND WEST 124TH ST		Area-Open/Green Space	Open Spaces & Green Resources			1870	Public	⬣
Marcus Garvey Park BOUNDED BY MADISON AVE, MOUNT MORRIS PARK WEST, WEST 120TH ST, AND WEST 124TH ST		Area-Open/Green Space	Open Spaces & Green Resources			1811, 1839, renamed 1977	Public	⬣
Sulzer's Harlem River Park 2460 2ND AVE	1803 / 1	Area-Open/Green Space	Open Spaces & Green Resources			1867		
Markets and stores in 125th Street 125TH ST, MORNINGSIDE AVE, 3RD AVE								⬣
McDermott-Bunger Dairy building 527 W 125TH ST								⬣

NAME & ADDRESS	BLOCK/LOT	TYPES	RELEVANT CONTEXTS			BUILT YEAR	ACCESS	EXTANT
Morningside Park BOUNDED BY 110TH ST TO THE SOUTH, 123RD ST TO THE NORTH, MORNINGSIDE AVE TO THE EAST, AND MORNINGSIDE DRIVE TO THE WEST		Area-Open/Green Space	Open Spaces & Green Resources			1895-1897	Public	⬣
Thomas Jefferson Park BOUNDED BY 5TH AVE, EAST RIVER, 110TH ST, AND 125TH ST	1705 / 1	Area-Open/Green Space	Open Spaces & Green Resources			1902	Public	⬣
Jackie Robinson Park W 146TH ST AND BRADHURST AVE		Area-Open/Green Space	Open Spaces & Green Resources			1978	Public	⬣
New York Common Pantry- Mobile Pantry 8 E 109TH ST	1614 / 66	Area-Open/Green Space	Fresh Food & Nutrition Access					⬣
Grand Central Food Program 210 E 124TH ST	1799 / 43	Area-Open/Green Space	Fresh Food & Nutrition Access					⬣
120th Street Dept. of Sanitation 2342 1ST AVE	1808 / 1	Building	Solid Waste Management				Public	
130th Street DSNY Garage 1921 PARK AVE	1779 / 1	Building	Solid Waste Management			1936	Public	⬣
Croton Aqueduct West 119th Street Gatehouse 432-434 W 119TH ST	1962 / 35	Building	Water Quality & Management				Private	⬣
New Croton Aqueduct West 135th Street Gatehouse 135TH ST AND CONVENT AVE	1971 / 18	Building	Water Quality & Management					⬣
Croton Aqueduct West 113rd Street Gatehouse 113RD ST AND 10TH AVE	1884 / 36	Building	Water Quality & Management				Private	⬣
Converted Tenement 226 W 114TH ST	1829 / 50	Building	Indoor Light, Air, & Ventilation				Private	⬣
179th St Pumping Station 2405 AMSTERDAM AVE	2106 / 1	Building	Water Quality & Management	Open Spaces & Green Resources			Public	

NAME & ADDRESS	BLOCK/LOT	TYPES	RELEVANT CONTEXTS			BUILT YEAR	ACCESS	EXTANT
Elmendorf Reformed Church 169 E 121ST ST	1770 / 33	Building	Transportation			1900		⬣
Unnamed Tenement House 22-24, 26-28 W 137TH ST	1734 / 1	Building	Transportation				Private	
Metropolitan Baptist Church 151 W 128TH ST	1913 / 1	Building	Transportation			1885	Public	⬣
Cotton Club 142ND ST AND 6TH AVE	2011 / 29	Building	Transportation			1923	Public	
Abyssinian Baptist Church 132 W 138TH ST	2006 / 52	Building	Transportation	Fresh Food & Nutrition Access		1808	Public	⬣
East River Houses 1ST AVE BETWEEN 102ND ST AND 105TH ST	1696 / 1	Building	Transportation			1940	Private	⬣
Manhattan Country School 7 E 96TH ST	1602 / 7	Building	Transportation			1913	Public	⬣
Franklin Plaza 2085 2ND AVE	1656 / 1	Building	Transportation			1959		⬣
Mount Morris Church 15 MT MORRIS PARK W	1720 / 58	Building	Indoor Light, Air, & Ventilation				Public	⬣
Tenant home - Rent Strike 271 W 125TH ST	1931 / 1	Building	Indoor Light, Air, & Ventilation				Private	⬣
Pathmark Supermarket E 125TH ST AND LEXINGTON AVE	1899 / 20	Building	Fresh Food & Nutrition Access	Transportation			Public	
Mt. Olivet Baptist Church Community Meals Program 201 LENOX AVE	1905 / 29	Building	Fresh Food & Nutrition Access			1907	Public	⬣
Union Baptist Church 240 W 145TH ST	2030 / 50	Building	Fresh Food & Nutrition Access			1926	Public	⬣

NAME & ADDRESS	BLOCK/LOT	TYPES	RELEVANT CONTEXTS			BUILT YEAR	ACCESS	EXTANT
Salem Church 2190 7TH AVE	1933 / 32	Building	Fresh Food & Nutrition Access			1920	Public	⬣
Church of the Master 86 MORNINGSIDE AVE	1948 / 7502	Building	Fresh Food & Nutrition Access				Public	
Knickerbocker Progressive Corporation 270 W 145TH ST	2030 / 57	Building	Fresh Food & Nutrition Access			1934	Private	
La Marqueta 1590 PARK AVE		Infrastructure/ Facility	Fresh Food & Nutrition Access			1936	Public	⬣
Union Settlement House 237 E 104TH ST	1654 / 11	Building	Fresh Food & Nutrition Access			1895	Public	⬣
Set of dumbell tenements 43 W 129TH ST	1727 / 14	Building	Indoor Light, Air, & Ventilation					⬣
Set of Old Law Tenements 23 W 131ST ST	1729 / 25	Building	Indoor Light, Air, & Ventilation					⬣
Randolph Housing 204 W 114TH ST	1829 / 38	Building	Indoor Light, Air, & Ventilation					⬣
Set of Tenements 263 W 114TH ST	1830 / 11	Building	Indoor Light, Air, & Ventilation					⬣
Borden's Farm Products 615 W 131ST ST	1998 / 17	Building	Fresh Food & Nutrition Access			1924	Private	⬣
Abe Lincoln Pool E 135TH ST AND 5TH AVE	1759	Infrastructure/ Facility	Climate Risk & Response			1966	Public	⬣
Jackie Robinson Pool W 146TH ST AND BRADHURST AVE	2052	Infrastructure/ Facility	Climate Risk & Response			1936	Public	⬣
Wards Island Sewershed HARLEM RIVER AND AMSTERDAM AVE (ABOVE W 135TH ST), 7TH AVE (BETWEEN W 135TH ST AND W 122ND ST), AND 8TH AVE (BELOW W 122ND ST)		Area-Zoning/ Environmental Impact	Water Quality & ManagementArea			1909		⬣

NAME & ADDRESS	BLOCK/LOT	TYPES	RELEVANT CONTEXTS			BUILT YEAR	ACCESS	EXTANT
Marcus Garvey Pool 124TH ST AND 5TH AVE	1719	Infrastructure/ Facility	Climate Risk & Response			1970	Public	⬣
Sheltering Arms Pool W 129TH ST AND AMSTERDAM AVE	1983	Infrastructure/ Facility	Climate Risk & Response			1970	Public	⬣
Thomas Jefferson Pool E 112TH ST AND 1ST AVE	1705	Infrastructure/ Facility	Climate Risk & Response			1936	Public	⬣
Wagner Pool E 124TH ST BETWEEN 1ST AVE AND 2ND AVE	1800	Infrastructure/ Facility	Climate Risk & Response			1966	Public	⬣
135th Street MTS W 135TH ST	2101 / 120	Infrastructure/ Facility	Solid Waste Management			1970	Public	⬣
99th Street Waste disposal garage 341 E 99TH ST	1671 / 20	Infrastructure/ Facility	Solid Waste Management			1920	Public	⬣
91st Street MTS 1740 YORK AVE	1587 / 27	Infrastructure/ Facility	Solid Waste Management			2017	Public	⬣
139th Street MTS and Incinerator 2301 5TH AVE	1764 / 1	Infrastructure/ Facility	Solid Waste Management	Outdoor Air		1910	Public	
127th Street Garage 217 E 127TH ST	1792 / 5	Infrastructure/ Facility	Solid Waste Management				Public	
North River Wastewater Treatment Plant 679 RIVERSIDE DR	2101 / 117	Infrastructure/ Facility	Water Quality & Management	Hazardous Materials Exposure	Open Spaces & Green Resources	1985	Public	⬣
Wards Island Wastewater Treatment Plant 7 WARDS ISLAND	1819 / 15	Infrastructure/ Facility	Water Quality & Management	Hazardous Materials Exposure	Open Spaces & Green Resources	1937	Private	⬣
Unnamed Pool-1 ST NICHOLAS PARK AND 141ST ST		Infrastructure/ Facility	Climate Risk & Response				Public	
Unnamed Pool-2 150TH ST NEAR 7TH AVE		Infrastructure/ Facility	Climate Risk & Response				Public	

NAME & ADDRESS	BLOCK/LOT	TYPES	RELEVANT CONTEXTS			BUILT YEAR	ACCESS	EXTANT
Unnamed Pool-3 138TH ST BETWEEN 6TH AVE AND 5TH AVE		Infrastructure/ Facility	Climate Risk & Response				Public	
Unnamed Pool-4 112TH ST AND 2ND AVE		Infrastructure/ Facility	Climate Risk & Response				Public	
Harlem Coal and Wood Yard 219-229 E 113TH ST	1663 / 12, 13, 14, 15, 16, 17	Infrastructure/ Facility	Energy			1880		
Harlem Gas Works/Consolidated Gas Company 2141 1ST AVE	1704 / 11	Infrastructure/ Facility	Energy			1867		
Consolidated Gas Company 1880 2ND AVE	1692 / 1	Infrastructure/ Facility	Energy			1890		⬣
Consolidated Edison Co. 2141 1ST AVE	1682 / 11	Infrastructure/ Facility	Energy	Outdoor Air		1981		
Standard Gas Light Company 260 PLEASANT AVE	1714 / 1	Infrastructure/ Facility	Energy			1890		
Coal Yard-1 656 W 125TH ST	1995	Infrastructure/ Facility	Energy			1867		
Coal Yard-2 123 E 129TH ST	1778 / 6	Infrastructure/ Facility	Energy			1867		
Coal Yard-3 233 E 128TH ST	1793 / 1	Infrastructure/ Facility	Energy			1880		
Coal Yard-4 LEXINGTON AVE & E 129TH ST	1803	Infrastructure/ Facility	Energy			1880		
Coal Yard-5 302 E 126TH ST	1802 / 1	Infrastructure/ Facility	Energy			1867		
Coal Yard-6 201 E 125TH ST	1773 / 27	Infrastructure/ Facility	Energy			1867		

NAME & ADDRESS	BLOCK/LOT	TYPES	RELEVANT CONTEXTS			BUILT YEAR	ACCESS	EXTANT
Coal Yard-7 520 E 117TH ST	1716 / 14	Infrastructure/ Facility	Energy			1867		
Coal Yard-8 535 E 119TH ST	1816 / 23, 24, 25, 26, 27, 28, 29, 30	Infrastructure/ Facility	Energy			1880		
Coal Yard-9 45 E 135TH ST	1759 / 65, 66, 67, 68	Infrastructure/ Facility	Energy			1880		
Coal Yard-10 LEXINGTON AVE & E 132ND ST	1779 / 20	Infrastructure/ Facility	Energy			1890		
Coal Yard-11 2350 12TH AVE	2005 / 9	Infrastructure/ Facility	Energy			1890		
Coal Yard-12 2234-2236 1ST AVE	1708 / 45, 46	Infrastructure/ Facility	Energy			1914		
Lumber Yard-1 LEXINGTON & 131ST ST	1779	Infrastructure/ Facility	Energy			1867		
Lumber Yard-2 E 125TH ST & LEXINGTON AVE	1801 / 14, 15, 16, 35, 36	Infrastructure/ Facility	Energy			1867		
Lumber Yard-3 E 125TH ST & LEXINGTON AVE	1802 / 1, 2, 3, 4, 5, 6	Infrastructure/ Facility	Energy			1867		
Landons Lumber Yard 2284 12TH AVE	2004 / 40, 41, 42, 43, 44, 45, 46	Infrastructure/ Facility	Energy			1867		
1 Train (125th) W 125TH ST		Infrastructure/ Facility	Transportation	Outdoor Air		1908		
Macomb's Dam Bridge and 155th Street Viaduct W 155TH ST, BRONX, NY 10451		Infrastructure/ Facility	Transportation	Outdoor Air		1890-1895		
Harlem Flats Landfill	1557, 1556, 1555, 1539, 1540, 1541, 1646, 1647, 1649, 1672, 1673, 1674, 1675	Landfill/Dumpsite	Solid Waste Management					⬣

NAME & ADDRESS	BLOCK/LOT	TYPES	RELEVANT CONTEXTS			BUILT YEAR	ACCESS	EXTANT
Boundry of Homes Involved in Rent Strike E 125TH ST BETWEEN LEXINGTON AVE AND 3RD AVE		Street Corridor/ Route	Indoor Light, Air, & Ventilation					
Second Avenue Railroad Powerhouse 1860 2ND AVE	1668 / 650	Building	Energy					
New York Edison Company 1840 1ST AVE	1575 / 293	Building	Energy					
Interborough Rapid Transit Powerhouse 183 E 98TH ST	1626 / 21	Building	Energy					
Consolidated Gas Company 80 LA SALLE ST	1978 / 37	Building	Energy					
New York Railways Company 721 MALCOLM X BLVD	2015 / 6	Building	Energy					
Prentis Hall 632 W 125TH ST	1995 / 44	Building	Fresh Food & Nutrition Access			1909		⬣
Sheffield Farms Stable 3229 BROADWAY	1996 / 23	Building	Fresh Food & Nutrition Access			1903		
Joe Louis' Restaurant 11 W 125TH ST	1723 / 31	Building	Fresh Food & Nutrition Access					
Red Rooster Restaurant 2354 7 AVE	2023 / 36	Building	Fresh Food & Nutrition Access			1891		⬣
Second Avenue Railroad Powerhouse-2 230 E 127TH ST	1781 / 25	Building	Energy					
New Colonial Ice Corporation 2844 FREDERICK DOUGLASS BLVD	2037 / 57	Building	Energy					
Global Community Charter School 158 E 126TH ST	1774 / 7501	Building						

NAME & ADDRESS	BLOCK/LOT	TYPES	RELEVANT CONTEXTS			BUILT YEAR	ACCESS	EXTANT
The Smile, Harlem Luxury Rentals 1811 PARK AVE	1773 / 72	Area-Zoning/ Environmental Impact						
Livery Stables 498 W 130TH ST		Building	Outdoor Air					
Manhattan Stables 201 E 127TH ST		Building	Outdoor Air					
Carriage Factory 209 E 125TH ST		Building	Outdoor Air					
Stable 216 DR MARTIN LUTHER KING JR BLVD		Building	Outdoor Air					
Excelsior Livery Stable 3170 BROADWAY	1168 / 51	Building	Outdoor Air					
Depot of the Tenth Ave Cable R. R. 1381 AMESTERDAM AVE		Building	Outdoor Air					
Chatauqua Stables 131 W 128TH ST		Building	Outdoor Air					
Stable 103 W 108TH ST		Building	Outdoor Air					
Morris Stables 160 E 120TH ST		Building	Outdoor Air					
Eureka Stables 62 E DR MARTIN LUTHER KING JR BLVD		Building	Outdoor Air					
North River Sewershed HUDSON RIVER AND AMSTERDAM AVE (ABOVE W 135TH ST), 7TH AVE (BETWEEN W 135TH ST AND W 122ND ST), AND 8TH AVE (BELOW W 122ND ST)		Area-Zoning/ Environmental Impact	Water Quality & Management			1985		⬣

APPENDIX C: CONTEMPORARY ASSETS

The studio team collectively identified contemporary assets within the study area, meaning organizations, institutions, and associations that serve as, or have the potential to serve as, connectors within a community. While not an exhaustive list, these contemporary assets, or "connector organizations" have missions that share values with the studio inquiry and might instrumentalize these histories and associated assets as part of their mission.

> AdaptNY (Harlem Heat Project)

> American Lung Association in New York

> Ascendant

> Broadway Housing Communities (BHC)

> Carver Federal Savings Bank

> Center for Urban Community Services (CUCS)

> Centro - Center for Puerto Rican Studies

> Columbia Climate School, The Earth Institute (Project: Addressing the Urban Heat Island through an Equity Lens: A Citizen Science Project)

> Community Board 0

> Community Board 10

> Community Board 11

> Division of Environmental Remediation

> East Harlem Community Alliance

> East Harlem Merchants Association (Uptown Grand Central)

> East Harlem Triangle

> El Barrio Unite (End Gentrification in Harlem)

> Frederick Douglass Boulevard Alliance (FDBA)

> Friends of Morningside Park

> GreenThumb

> Groundwork Hudson Valley

> Harlem Children's Zone

> Harlem Community Development Corporation

> Harlem Community Justice Center / Court of Innovation

CONTEMPORARY ASSETS CONTINUED

> Harlem Congregations for Community Improvement

> Harlem Grown

> Harlem Park to Park

> Harlem Restoration Project

> Harlem River Working Group

> Harlem Seeds

> Harlem United

> Historic Harlem Parks

> Home Energy Assistance Program (HEAP)

> Hope Community

> La Guardia Memorial House

> Marcus Garvey Park Alliance

> Mission Society of New York City

> NAACP

> Nazareth Housing

> New York City Economic Development Corporation (NYCEDC)

> New York Restoration Project

> New Yorkers for Parks (NY4P)

> NYC Parks

> NYC Parks (Cool It! Project)

> P.A.'L.A.N.T.E. (People Against Landlord Abuse and Tenant Exploitation) Harlem

> Puerto Rican Association for Community Affairs

> Real Great Society/Urban Planning Studio

> Save Harlem Now!

> Schomburg Center for Research in Black Culture

> Shabazz Center

> Sierra Club NYC

> The Fresh Air Fund

> The Greater Harlem Chamber of Commerce

> The Trust for Public Land

> Union Settlement

> West Harlem Environmental Action (WE ACT)

> West Harlem Action Network Against Poverty

> West Harlem Community Preservation Organization

> West Harlem Group Assistance, Inc. - Communities For Healthy Food Hub (CFHB)

> Whole Foods Company

> Young Men's Hebrew Association

APPENDIX D:
CONNECTOR ORGANIZATION INTERVIEWS

After identifying contemporary assets/connector organizations, the studio reached out to all of them to request an interview. A subset responded positively, and semi-structured interviews were conducted by students with a representative or "key informant" from the organization. The following interview questions were shared in advance and served to guide the dialogue.

The following connector organizations agreed to provide interviews to the studio, Which were conducted in the second half of the semester by students.

> New Yorkers for Parks

> Ascendant

> West Harlem Environmental Action (WE ACT)

> Friends of Morningside Park

> Groundwork Hudson Valley

> Harlem Community Development Corporation

> Harlem Park to Park

> Historic Harlem Parks (HHPC)

> Trust For Public Land

> Columbia Climate School, The Earth Institute

> Marcus Garvey Park Alliance

> Save Harlem Now!

> Shabazz Center

INTERVIEW QUESTIONS

MISSION/ISSUES

> How does the history and current work of your organization connect to the broader aims of environmental and climate justice?

> What do you/your organization see as priorities for promoting environmental justice in Harlem (long term and/or short term) ?

> How has COVID potentially changed the issues/priorities of your organization?

> How has the climate crisis changed the issues/priorities of your organization?

PROJECTS

> How does your organization select or fund community-based projects, activities, or events?

> How do you measure the success/impact of your projects, activities, or events?

> What is your organization most proud of or what is your best success story?

PUBLICS

> Are there particular publics within Harlem that you prioritize or serve in your work (for example, business owners, women, children, etc.), and if so, why? Have you experienced any changes in the publics with whom your organization engages?

> Is there a particular geography/neighborhood within Harlem that you prioritize or serve in your work, and if so, why? Are there boundaries that you see as important?

> How do you encourage community engagement in your organization's work?

> Has displacement of Harlem residents (historically and/or today) impacted with whom you work, your projects, and/or your mission?

> What Harlem-based facilities or (re)development projects have most harmed or displaced residents, in the view of your organization (historically and/or today) ?

COLLABORATORS

> Are there particular institutions or non-profit organizations in the Harlem community with whom you collaborate in your work, and if so, how?

> Are there particular government agencies with whom you work or engage, and if, so how?

> What are some of the challenges/opportunities in your organization's relationship to government and institutional actors?

ASSETS/ACTIONS/NARRATIVES

> When you think about the histories of environmental justice/injustice in Harlem, what comes to mind? Could be person, place, event, project, etc. – anything?

INTERVIEW QUESTIONS

> What kinds of places/spaces does your organization see as priorities in promoting environmental/climate justice (e.g. open/green space, gardens, affordable housing, interpretive spaces, community gathering spaces, etc.)?

> What types of actions or adaptive investment does your organization see as priorities in promoting environmental/climate justice (e.g. energy retrofitting housing, adapting for flooding, remediating brownfields, etc.)

> What stories or histories are important to transfer across generations to understand or promote environmental/climate justice?

CONNECTIONS

> Before this interview, did you see a clear connection between the work of your organization and environmental/climate justice?
    > If Yes, explain?
    > If No, do you think there is something to be further explored? If, so what?

> Before this interview, did you see a clear connection between the work of your organization and historic preservation?
    > If Yes, explain?
    > If No, do you think there is something to be further explored? If, so what?

> When you think about important or historic places to preserve or learn about in Harlem – whether associated with environmental justice or not – what comes to mind?
    > If you had to pick three words to describe Harlem today, what would they be?

APPENDIX E: BIBLIOGRAPHY

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