Centering The Pedestrian:

The Potential of Public Bus Terminals in New York City

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Natalie Keyssar for The New York Times, 2022

Issue Statement

It is widely acknowledged that burning fossil fuels output carbon dioxide and other pollutants into the Earth's atmosphere, which induces a steady rise in its overall temperature. This rapid warming is leading to sea-level rise and an alarming increase in extreme weather events – heavy rainfall, flooding, drought, extreme heat, and others – that continue to destroy systems and infrastructure billions of people depend on.[3] At the same time, cities, which most people on Earth call home, are massive producers of greenhouse gases (GHG), with transportation and buildings being the largest polluting sectors nationwide.[13] Municipalities globally face the task of adapting their infrastructure to accommodate the impending, massive shift away from fossil fuel dependency and toward electric-powered vehicles.

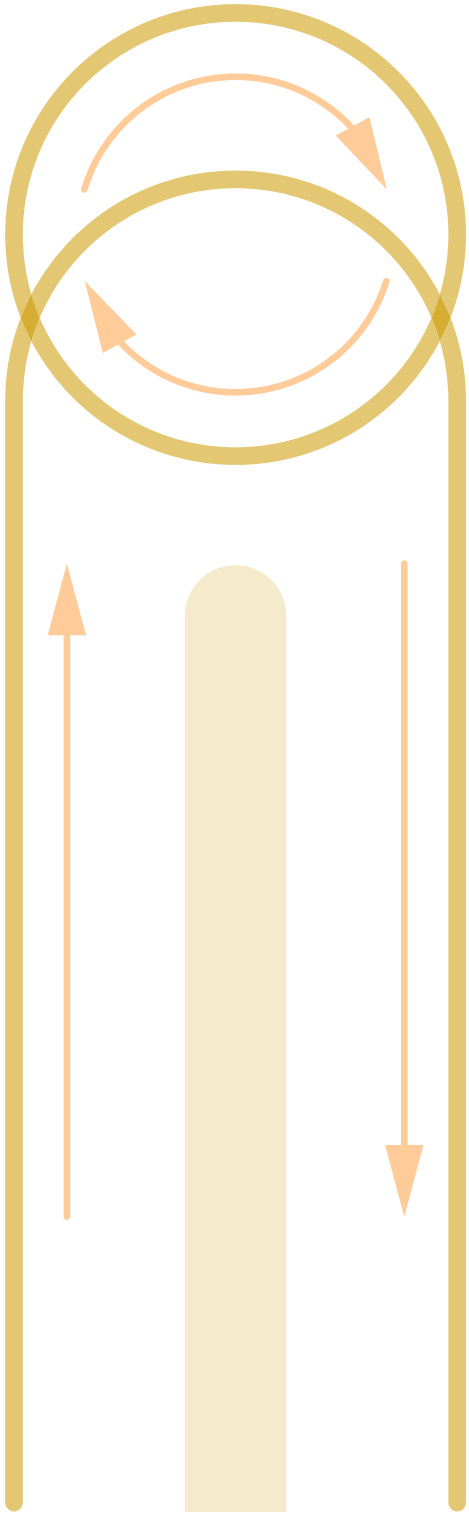
In a concrete acknowledgment of this pressing challenge, the Biden Administration passed the Bipartisan Infrastructure Law, better known as the Infrastructure Investment and Jobs Act, in 2021, which allocates funds to mend America's infrastructure at a scale not seen since Franklin D. Roosevelt's New Deal almost a century ago. This legislation includes $7.5 billion to build out a national network of electric vehicle (EV) chargers, nearly $90 billion in new funding and reauthorization to modernize public transit, and $110 billion in additional funding to repair roads and bridges.[8] Despite this colossal federal investment, there is no comprehensive plan for the infrastructure of the largest city in the United States (U.S.). As such, the professions that shape the built environment must consider how these inevitable alterations to the physical landscape can exceed the foundational intent of reducing GHG emissions and proactively create restorative bridges, new routes, and spaces of stasis, respite, and community.

American car manufacturers are intentionally designing electric cars to be visually indistinguishable from gas-powered cars. This seems intuitive from a consumer uptake perspective, as people are more likely to make

the conversion to electric vehicles if the experience and routines that surround their use and storage are generally familiar to them. Although many cities across the country have imposed legislation to phase out the sale of gas-powered vehicles, consumer buy-in is required for the enforcement of these policies nationwide. It is also intuitive that in the immediate future, where EVs and gas-powered cars must coexist in neighborhoods, on roads, and in parking lots, that the design or scale of EVs should not put them at a disadvantage in the existing built environment. This leaves us with a moral conundrum: If we design electric cars to be used and stored in the same manner as gas-powered cars, we're doomed to have our cityscapes forever beholden to the personal automobile. This junction represents a fleeting opportunity to shake the antiquated hierarchy of our public realm, and design rights-of-way that encourage micro-mobility, biking, vehicle sharing, mass transit, and most importantly, human-scale pedestrian experience.

@seanmattison via Instagram, 2020

Goals & Objectives



Through centering the 'bus terminal' typology, the goal of this research is to investigate the potential of human-scale urban design to counteract decades of community harm that have routinely followed the construction of large-scale transit infrastructure in urban areas in the United States (U.S.) Of all the elements of the public realm designed for bus usage –bus stops, bus lanes, bus boarding islands – I've chosen to frame my research around bus terminals largely because of the potential warranted by the scale and public nature of these spaces. Within this larger goal, I identify the following objectives:

Objective 1:
Define how racist planning and urban design have historically harmed communities to support the value and urgency of this research.

Objective 2:
Assess best practices of public space analysis and develop an analysis framework that applies to multi-modal transit nodes and holistically integrates tenants of equitable urban design.

Objective 3:
Test the framework by conducting a site-specific analysis, and propose solutions that offer concept and design improvements to the existing conditions.

Joshua Bright for The New York Times, 2018

Methodology Overview

For this thesis, I utilize a mixed methods approach. My research, analysis, and recommendations are validated by the pervasive planning problem described in my literature review, compiled from scientific journals and historical literature. I devised a structured framework for analyzing bus terminals by compiling relevant best practices in public plaza and transit street design analysis, drawing from the works of Kevin Lynch, William H. Whyte, Jan Gehl, and the National Association of City Transportation Officials. Lastly, I conducted in-person site visits to collect information in the form of photos, video recordings, hand sketches, and written notes consistent with the analysis framework to provide site-specific design recommendations.

Literature Review: Environmental Racism and the Influence of the Built Environment on Public Health

Features and qualities of the built environment – roads, sidewalks, buildings, and public spaces and their respective maintenance – significantly impact the physical, mental, and social health of the people who regularly utilize them. Renalds et al. in 2010 even go so far as to assert that "The built environment can be considered a foundation for health and Wellness." This is true in multiple ways. A place's physical and experiential features influence people's choices in how they go about their daily lives, which impacts individual and public health. Areas with safe walking trails and bike infrastructure, whether destination driven or leisure-oriented, are associated with "increased physical activity, increased social capital, lower overweight, lower reports of depression, and less reported alcohol abuse".[9] Regarding social health, areas designed with porches or building setbacks (architectural features that facilitate visual and social contact) promote interaction between neighbors, fostering strong social infrastructure that residents can lean on in times of crisis.[9] People live healthier lives when an environment is conducive to healthier lifestyle choices.

The adverse is also true. Features of a built environment that do not 'present a choice' so much as they are 'things residents are subjected to' also have massive impacts on health. Crowded living conditions and insufficient daylight, both products of thoughtless or intentionally capitalist urban design and architecture, have been proven to increase psychological distress and depressive symptoms. Poor urban planning that allows for misaligned cohabitant land uses – locating housing near industrial facilities, airports, etc. – introduces the byproducts of air, light, and noise pollution into people's neighborhoods, causing emotional anguish in addition to increasing rates of asthma, cancer, and other physical health conditions.[2]

All elements of the built environment, from comprehensive planning down to materiality, impact the users of those spaces. The combined choices of those who shape the manufactured realm can induce healthy or unhealthy living on residents, and the care or lack of care, with which these choices are made, frequently depends on who is affected.

Public resources and capital used to design and materialize the built environment are prioritized to areas with more political power and are thus unequally distributed. When it comes to self-advocacy, communities with higher educated, higher-income white people are more likely to be successful in their collective resistance to or advocacy for changes in their neighborhoods. "The best predictor of success is pre-existing social capital".[1] Because of this, it is no surprise that areas of concentrated poverty and communities of color are historically disinvested due to their lack of political power. Poorer people and people of color are more likely to live within built environments with features and qualities that cause harm: social, mental, and physical.

Not all explanations for these disproportionate injustices are explicitly racist. The most obvious example is the placement of a new industrial factory. When industry is driven by profit maximization, there is rarely an explicit objective to intentionally harm poor or Black and Brown communities, yet environmental racism can be the outcome. A company looking for sites to build a new industrial facility will likely prioritize affordable land, proximity to material sources and labor pools, and the path of least political opposition or controversy. Since racial and ethnic minorities disproportionately live in low-income communities with limited resources (time and money) and political power, they are more likely to become neighbors to polluting industrial facilities. Once industry begins introducing noise, noxious odors, traffic congestion, air pollution, and the fear of adverse health impacts, those with the means to leave may do so, leaving poorer residents behind. Flight from neighborhoods reduces property values and cost of living, drawing even more low-income residents and further exacerbating the concentration of poorer residents around the facility. This intensifies such facilities' disproportionate impact on marginalized communities.[4]

The same pattern is true for other features and qualities of the built environment that cause harm in less obvious ways. As climate change continues to induce more frequent extreme weather events globally, billions of people are at risk of experiencing flooding or extreme heat intensified by the conditions of their built environments.

Natural elements like bodies of water and greenery have heat-absorption properties. Tree cover can create shade and block sunlight from being absorbed by pavement. Natural, permeable surfaces or green infrastructure elements like bioswales can absorb water in a rain storm. Hard infrastructure like buildings, paved roads, and parking lots, absorb and re-emit heat from the sun back into the environment: a phenomenon called heat island effect. Even the arrangement and spacing of structures in the built environment, compounded by elevated greenhouse gas emissions in places more reliant on cars (i.e., the suburbs), can induce heat island effect.[14]

Studies have found direct correlations between days per year of extreme heat conditions and urban neighborhoods that were subject to redlining and subsequent public and private disinvestment in the second half of the 20th century. These policies, and the White Flight they induced, lead to higher heat stroke and death in predominantly Black and Brown neighborhoods. Poorer and less white neighborhoods can be five to 20 degrees Fahrenheit hotter in the summer than the whiter, wealthier neighborhoods of the same cities. Unlike the market-driven placement of industry, grayer, hotter, and more disconnected neighborhoods are disproportionately poorer and Black and Brown as the result of intentional policies enacted by local and federal officials over the last 100 years, with the explicit intent of reinforcing racial segregation and diverting investment.[7] Whether explicitly racist or not, instances in which minority communities are disproportionately subjected to harm caused by features or qualities of their environments can be considered environmental racism.

Scholars acknowledge an action taken in Warren County, North Carolina in 1982 as the genesis of the environmental justice movement as it is known to politics and academia today. In response to a plan by the State of North Carolina to dispose of 120 million pounds of contaminated soil in the state's most proportionately African American county, civil rights activists sought to stop them. The activists' notion that people feared for their lives and faced disproportionate ecological risks based on the color of their skin brought a novel lens to the mainstream movement of environmentalism.[4]

In the decades that followed, interdisciplinary researchers have concluded time and time again that "ethnic minorities, indigenous persons, people of color, and low-income communities confront a higher burden of environmental exposure from air, water, and soil pollution from industrialization, militarization, and consumer practices."[4] In 2023, it is more widely acknowledged by planning practitioners that the core ethos of the fields of urban planning and design are shifting because of the breadth and depth of its influence on people's lives. After decades of being ignored at best and actively harmed at worst, many communities are rightfully distrustful of city planners whose main job is to 'engage' them. Even in New York City, the goals of urban planners and planning agencies are evolving, as is their approach to the work.

The concept of reparative planning centers acknowledgment, atonement, and active rectification of the harm created historically by the field of planning. Although not without immense challenge, there is a strong movement of planners who go beyond theory to create collaborative futures via a web of tactics. Frequent dialogue is wielded towards coalition building and organizing. Beyond strategic thought, action is taken toward disrupting and restructuring institutions. These practitioners center acknowledgment and atonement to honor the agency of individual communities and take responsibility for past harm. The work of Knapp et al. (2022) defines three guiding principles central to succeeding in the actions: radical honesty, confronting whiteness, and radical imagination.

> *"We are all too familiar with the legacies of racial and sexual violence, the traumas wrought by racism, anti-semitism, patriarchy, homophobia, capitalism, colonialism and more. Whether we are wounded by or complicit in these forces, it is not so much humanity in general but individual people, one by one, who suffer because of their persistence. However,... we have tried to resist being so captured by yesterday's terrors that we cannot imagine today's and tomorrow's possibilities."*
>
> *Courtney Knapp, Jocelyn Poe, John Forester*

Jonah Markowitz for The New York Times, 2021

Chapter 2

Background

2.1 Defining Terms

2.2 MTA Logistics

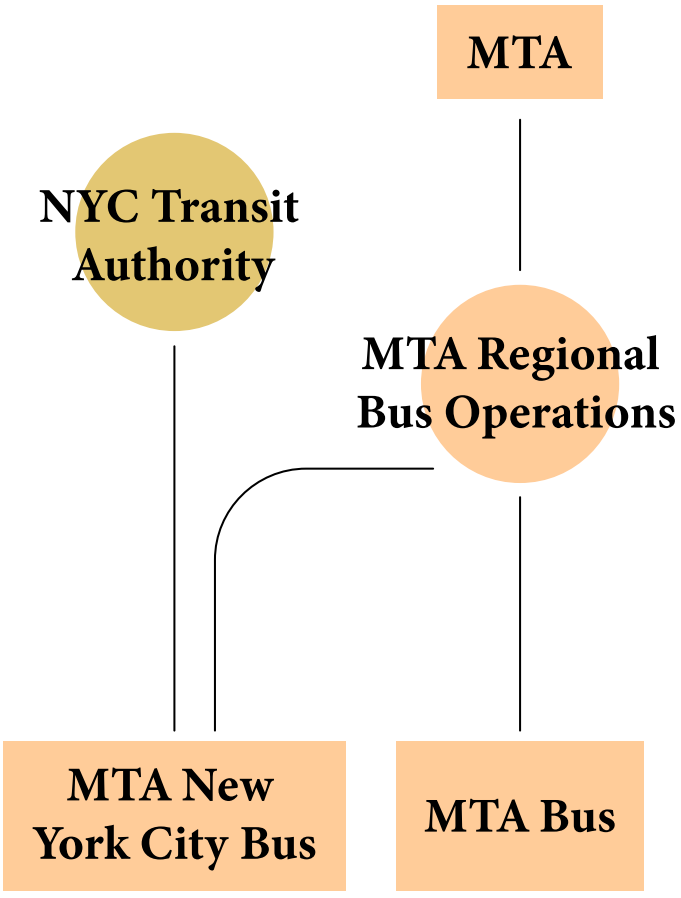
Jose A. Alvarado Jr. for The New York Times, 2022

Fordham Plaza Bus Terminal, MNLA, 2015

Defining Terms

Bus terminals are simply the terminus of bus routes. They are distinct from bus depots, which are typically enclosed facilities that are used for mechanical maintenance and dispense buses back to their respective routes from afar. There are typically fewer bus depots per city than there are bus terminals. Bus terminals are frequently outdoor, paved, public spaces that are often integrated into the communities they serve. The buses in NYC provide a vital, supplemental connection for folks who live in neighborhoods without access to the subway, and especially those with mobility challenges.

MTA Logistics



New York City has a public bus fleet of over 5,800 buses, almost 300 routes, and ridership of over 380 million in 2021 - representing about three-quarters of ridership numbers pre-pandemic. For comparison, the New York City subway system saw about 760 million riders in 2021. Like all public transit nationally, bus ridership in New York City declined substantially with the onset of the Covid-19 pandemic, and has yet to return to pre-pandemic levels. Although all routes saw decreased ridership from 2019 to 2020, some routes were more affected than others. The M15 line, which runs from 125th St in East Harlem to South Ferry on the east side of Manhattan, saw the highest ridership of 2021 at almost eight-million rides. The BX12 line, running from Inwood, northern Manhattan, to Pelham Bay in the Bronx, and the B46, running from Kings Plaza to Williamsburg, Brooklyn, saw the second and third highest ridership, respectively.[5, 6, 10, 11]

Two different franchises manage all bus operations and maintenance in New York City under the umbrella of the Metropolitan Transportation Authority (MTA). The Regional Bus Operations is the surface transit division of the MTA. The MTA New York City Bus falls under the New York City Transit Authority, and is composed of the 228 public bus routes acquired by the City before 2005. MTA Bus is an amalgamation of the 81 bus routes of seven formally-private city bus operators. The two franchises formally merged in 2008, and now collectively operate all public bus routes in the city.[5]

The City of New York has committed to operating a 100% electrified fleet of MTA buses by 2040 as part of a more significant push towards sustainability. Between 2017 and 2021, the MTA ran a pilot that included the installation of electric bus chargers in certain bus depots and on certain routes to accommodate ten battery-electric buses that the City leased. Concurrently, in 2019, the MTA purchased fifteen fully zero-emissions buses and permanently installed sixteen electric bus charging stations within its network. Between 2017 and 2021, the M42, M50, B60, B39, B32, B24, and Q59 routes utilized electric buses. This year, 2023, the City intends to integrate sixty battery-electric buses into its network and install supporting infrastructure at five bus depots. Between 2025 and 2026, the City intends to have 470 battery-electric buses enter service, with supporting infrastructure to be installed at 11 depots. By 2029, all new buses, replaced when aging out, will be zero-emissions vehicles. This transition will be facilitated by $1.1 billion from the MTA's $54.8B 2020-2024 Capital Plan. As of 2023, about 60 of the MTA's 5,800 buses are electric.[15]

The MTA's official statements on this plan, titled Transitioning to a Zero-Emissions Bus Fleet, reference the New York State's 2019 legislation, the Climate Leadership and Community Protection Act, "which seeks to reduce the state's greenhouse gas emissions by 40% by 2030, and 85% by 2050". [15] The MTA claims that this transition from their diesel-fueled buses will prevent over 500,000 metric tons of carbon emissions from entering the atmosphere annually. Beyond the MTA's central goal related to carbon reduction, the agency has defined a collaborative series of partnerships and a set of guiding principles. They note partnerships with bus and charger manufacturers, Con Edison, and NYSERDA, prioritizing safety and efficiency standards and innovation. They mention an intent to engage community groups during the roll out. In addition to goals surrounding customer experience, workforce empowerment, and cost-driven pushes for efficiency, the MTA explicitly notes "prioritizing environmental justice" as one of their central guiding goals through the transition. [15] However, there's only one instance in the report where environmental equity is a primary consideration in decision making. Asthma rates in surrounding communities were used to determine the hierarchy of which routes and depots will be electrified before others.[7] The disproportionately high asthma rates that plague certain predominantly Black and Brown neighborhoods like Mott Haven, BX and Red Hook, BK, are a direct result of dense traffic and idling vehicles, buses included. This is a common-sense, applaudable criterion in designing the roll out. It is also the very least they could do.

This Transitioning to a Zero-Emissions Bus Fleet plan demonstrates the MTA's surface-level engagement with the concept of environmental justice. It fails to recognize their massive, disproportionate presence in the built environment. A culture of deference to public transit in large cities like New York - the dichotomy that public transit is good and cars are bad - allows the MTA to avoid substantive criticism (beyond operationally) about their utilization of public space. Grade-level public transit systems in the U.S. are equally complicit in and reliant on the reverential personal automobile culture that has solely dictated the wide, paved street networks that is North America's unchallenged status quo. The City of New York is missing a vital opportunity to capitalize on upward trends in public and political will and go beyond the bare minimum they've outlined to substantively address its massive, disparate impact on communities across the city.

fleet:

>5,800

buses

routes:

>300

ridership:

>383M

in 2021

2019 → **2023** → **2040**

15
electric buses

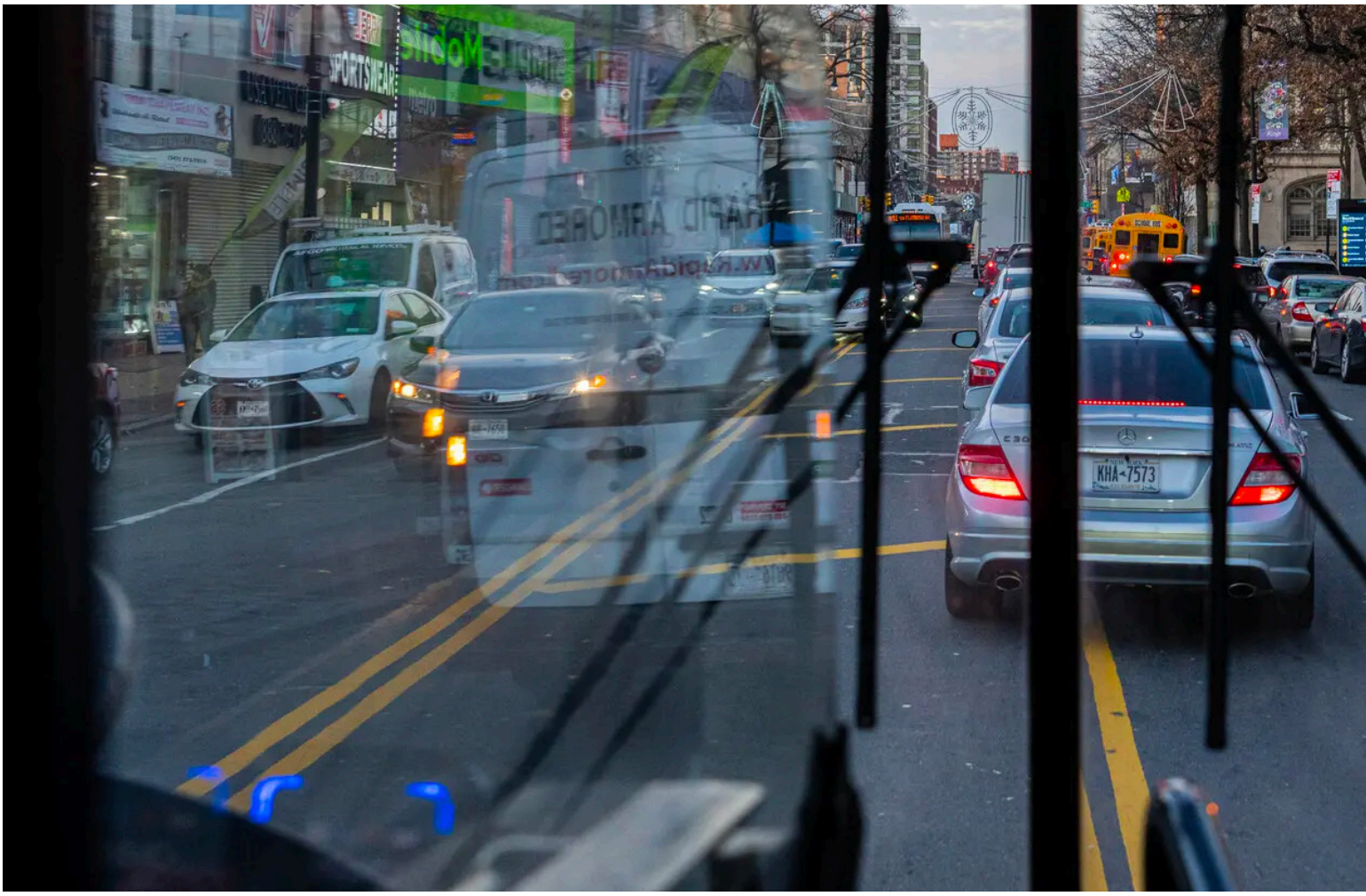
60
electric buses

5,800
electric buses

Gov. Hochul and an electric MTA Bus, Governor's Office, 2022

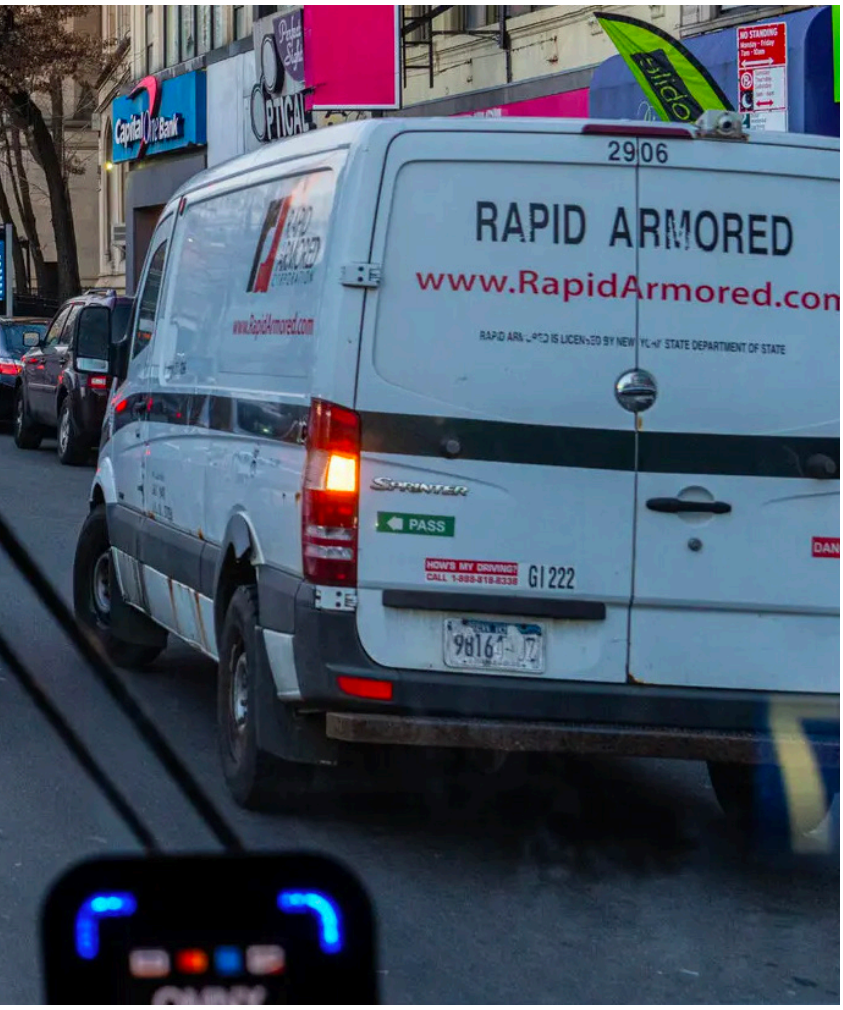
Chapter 3

Features of a Good Bus Terminal



3.1 Why Analyze Public Space?

3.2 Approach to Bus Terminal Analysis



Hiroko Masuike for The New York Times, 2022

Why Analyze **Public Space?**

It's been almost 140 years since the modern field of urban planning emerged in reaction to the industrialization and urbanization rapidly occurring in population centers in Western Europe and the U.S. at the turn of the century. In the decades since the work of urban planners has been both revolutionary and innovative and profoundly reactionary as an innate byproduct of the subject of the work. Planners in the late 1950s and 1960s sought contrast to the disinvestment and White Flight that plagued American cities after World War II, considering "What makes a city good?"

The cornerstone movements towards Civil Rights and early environmentalism significantly influenced urban planning at this time, and practitioners and academics began to center the human being in their research, analysis, and proposals. They concluded that vibrant, safe, socially connected urban environments built to the human scale fostered good public health and economic development. The term "placemaking" was coined in the 1960s by ethnographer and writer William H. Whyte, whose 1980 book "The Social Life of Small Urban Spaces" used direct observation to track behavior patterns in a public plaza in Manhattan, attributing different behaviors to different design elements.

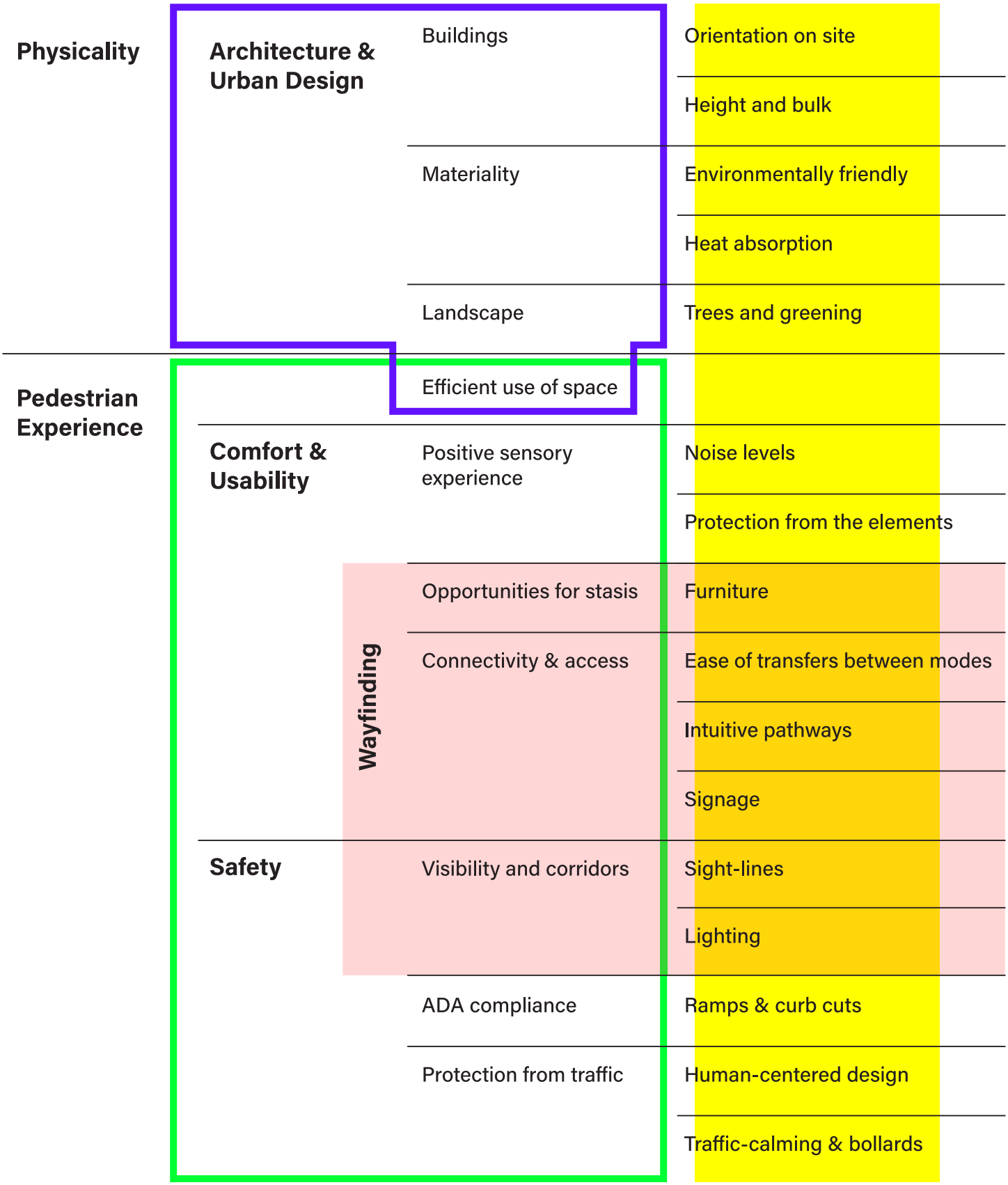
Another giant in the field is Danish architect and urban designer Jan Gehl, whose massively influential work prioritizes human-scale design that is reactive to the needs and preferences of its users. Gehl is well known for his extensive, critical evaluation of public spaces developed through observation and filtered through a well-defined set of criteria. The Gehl Observational Method includes criteria that consider the user experience of both arriving at and utilizing the space and the longer-term societal and environmental implications of the space. Gehl posits that a public plaza should be easily accessible through different modes and provide a variety of activities that encourage social interaction and community, as well as lengthy stays. He believes that public plazas should be pleasant for all users and provide amenities that ensure people feel safe, comfortable, and protected from the elements. Gehl's analysis criteria include sustainability, following his belief that public spaces should utilize environmentally friendly materials and green space.

Stills from *The Social Life of Small Urban Spaces*, 1988

Approach to Bus Terminal Analysis

My analysis approach implemented in the following case study includes a methodology for internet research combined with a framework of criteria for observational research in situ. This "Factors Framework" is a tiered set of elements that have implications for the quality of a bus terminal. This methodology, in total, is a convergence of ethos and best practices drawn from my education in urban design and planning and professional experience in the field of wayfinding. Wayfinding centers the user experience of a given space in a way that is usefully extrapolated. Before designing signage, wayfinding designers analyze the environment by identifying and tracking specific user flows. This allows them to identify decision points and moments of stasis along any given journey. For example, one user flow at an airport might be "public transit to international departure", which would include stops at check-in and security. I have integrated the concept of predetermined user flows into my analysis approach with the intent of capturing a wider breadth of experiences beyond what can be observed by happenstance. This attempts to imbue empathy and shift the lens from ethnographer to fellow user.

Factors Framework

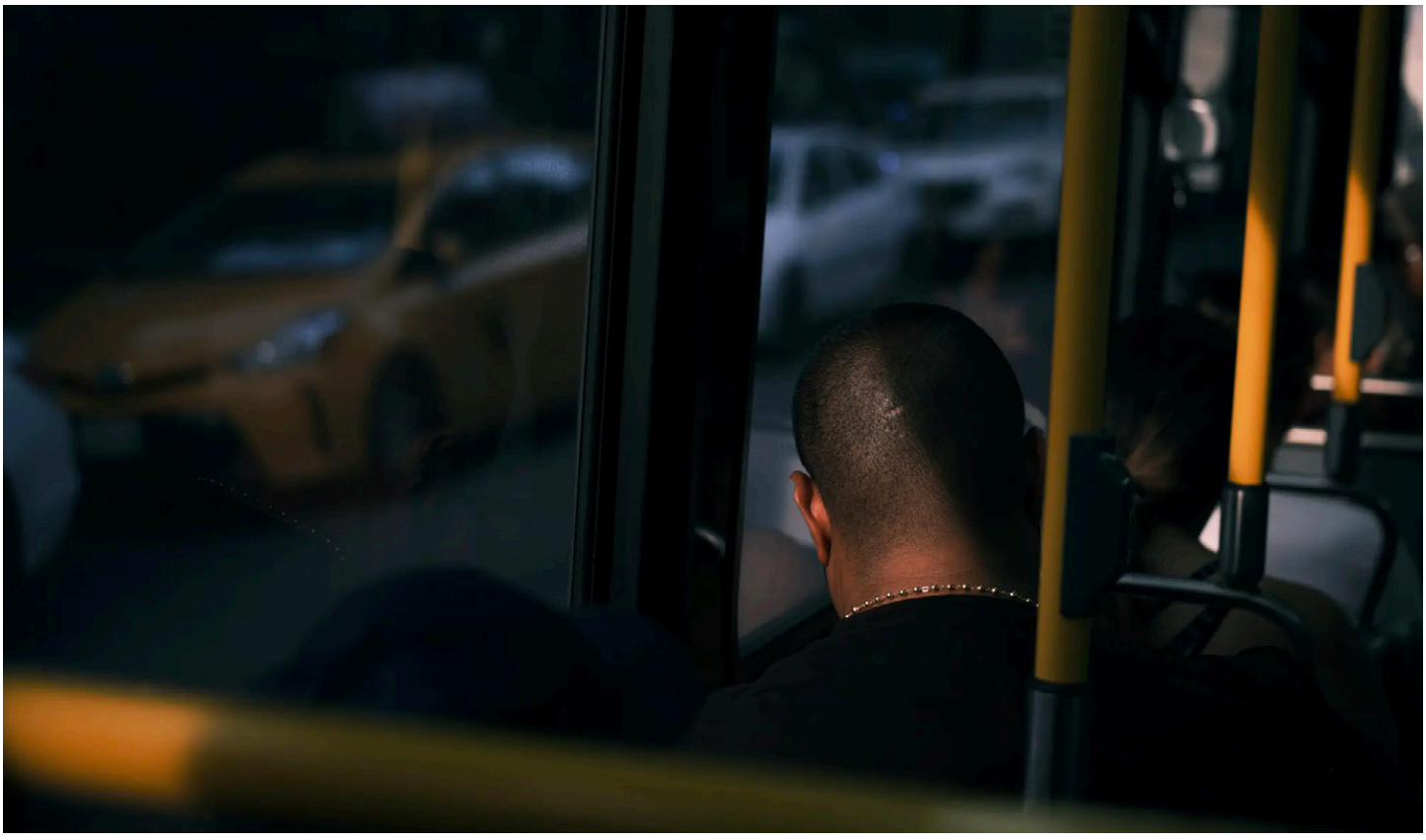


There's always a confluence of factors that affect user experiences, but optimal design can preemptively counteract worst case scenarios. If a plaza is only pleasant on a 70 degree, sunny day, it's impossible to speak to the merits of the plaza itself. The function of a bus terminal as a public plaza is secondary to its purpose as a transit node, and factors that determine its success at each do not overlap 100%. As such, I integrated guidance pulled from the National Association of City Transportation Officials (NACTO) Transit Street Design Guide from 2016 into my framework of analysis criteria, below.

The first tier of criteria are 'physicality' and 'pedestrian experience', two high-level buckets that encompass the entirety of the of qualities and elements that have implications for the user experience. As with the secondary and tertiary criteria, they are not mutually exclusive. Many of the factors under 'pedestrian experience' are physical elements, but factors of 'pedestrian experience' inform a user's more conscious experience of space. Under 'architecture and urban design' are four sub-criteria. 'Buildings' on site and their respective scale, mass, and orientation, have implications for connectivity with the surrounding area. Buildings on site that align with a preexisting street grid and match the existing built character create a more seamless user experience. 'Materiality' and 'landscape' have implications for climate resiliency and public health. The materials chosen for built structures, paths and roads, furniture elements, and planting, should be environmentally friendly and able to actively mediate in floods or extreme heat events. In the case of greening, plants should be native and plentiful.

Within 'pedestrian experience' are two sub-categories: 'comfort and usability' and 'safety.' There is much overlap between the tertiary categories that are encompassed within 'comfort and usability' and 'safety', including a subsection of criteria that are also considered elements of 'wayfinding.' A 'positive sensory experience' is dictated by lack of exposure to loud noises from train and car traffic, as well as 'protection from the elements' such as shelter from the rain, wind, or sun. When users are less distracted by sounds or poor weather, they have more mental bandwidth to focus on getting to where they're going. 'Opportunities for stasis', embodied by designated areas aside from traffic flows with places to sit are especially important for less able-bodied users or users less familiar with their journey. Due to the chronic inaccessibility of MTA subway stations, MTA buses are frequently the mode of choice for elderly or those with mobility challenges, and providing 'opportunities for stasis' is to provide a more equitable service. 'Connectivity and access' are bolstered by an 'ease of transfer between nodes', 'intuitive pathways', and 'signage.' Signage that directs to surrounding transit stops along unobstructed and logical pathways allows for greater connectivity from one transit stop to another.

A sense of 'safety' is vital in encouraging use. A well-lit space with unobstructed sight-lines allows users to perceive the happenings around them, and subconsciously determine their level of risk. Beyond perceived safety, design can ensure experienced safety. All areas within a bus terminal should be accessible to all users, regardless of their mobility. Ramps and handrails assist in this access, but compliance with ADA is the bare minimum in designing accessible spaces. Last but not least, integration of intentional traffic calming measures, protective bollards, and human-centered design are imperative in ensuring the safe use of a bus terminal. Prioritizing pedestrians throughout the design process is vital to creating efficient, welcoming, safe, and pleasant bus terminals, and no operational use needs to be sacrificed to do so. The following case study tests the collective applicability and value of the aforementioned criteria.



Carly Zavala for The New York Times, 2022

Chapter 4

Case Study

4.1 Site Selection and Rationale

4.2 Site Context

4.3 Site Analysis

4.4 Recommendations

Chang W. Lee for The New York Times, 2019

Elizabeth Felicella for MNLA, 2017

Site Selection & Rationale

This work is a continuation of the initial seed of a concept that emerged during my Fundamentals Studio in the fall of 2021. The class was asked to pose recommendations related to physical infrastructure and public health, cultural neighborhood character, and community ownership for El Puente, a community advocacy organization of South Williamsburg. I became obsessed with the Williamsburg Bridge Bus Terminal Plaza as a shining failure of public investment and a lack of creativity. The following assessment serves as a trial of the approach to analysis crafted for this thesis.

Site Context

History

The Williamsburg Bridge Bus Terminal Plaza, formally known as Washington Plaza, came into being upon the opening of the Williamsburg Bridge in December 1903. For the first few decades, it was a terminal for trolley cars running through Brooklyn and across the bridge into Lower Manhattan. Available trolley service at the plaza shifted over the years, but by 1951, all trolley routes had been motorized into bus routes. This marked the plaza's shifted use as a bus terminal as it remains today.

Williamsburg Bridge Plaza, Brooklyn, N.Y., Library of Congress Prints and Photographs Division, 1906

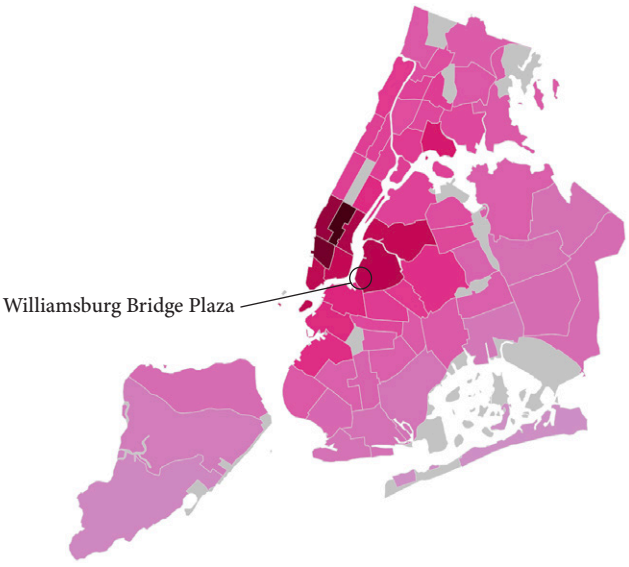
Current Conditions

South Williamsburg is home to a large Latinx population, as well as the largest population of Hasidic Jews outside of Israel. This area of Brooklyn is the genesis of an advocacy movement beginning in the early 1980s, led predominantly by El Puente. Among other things, El Puente has been incredibly vocal about the air pollution that plagues their neighborhood, as evident by disproportionately high asthma rates. The concentration of motor vehicle use is to blame, largely a result of the adjacent I-287 interstate highway (aka the Brooklyn Queens Expressway, or BQE as it is commonly known). Idling diesel buses at the bus terminal contribute as well. Although Williamsburg has seen an incredible amount of public and private investment since the Bloomberg up-zoning of the area in 2005, the asthma rates are still some of the highest in Brooklyn.[7]

In 2013, the City unveiled plans for a redesign of the terminal, which was completed in 2017. The renovation included new paving, landscaping, benches, and a new, enclosed waiting area with a restroom. The project was a collaboration between the MTA and the Department of Transportation (DOT), as DOT owns the lot, but the MTA has operational jurisdiction. The project cost $2M, and is one of many projects in DOT's Capital Street Projects portfolio. Changes made during the renovation have objectively improved the user experience, but only marginally. To go through the time, effort, and public dollar to arrive at only slight improvements proves a massive, missed opportunity to invest in public health and environmental justice for a community begging for public intervention for decades for the sake of their children.

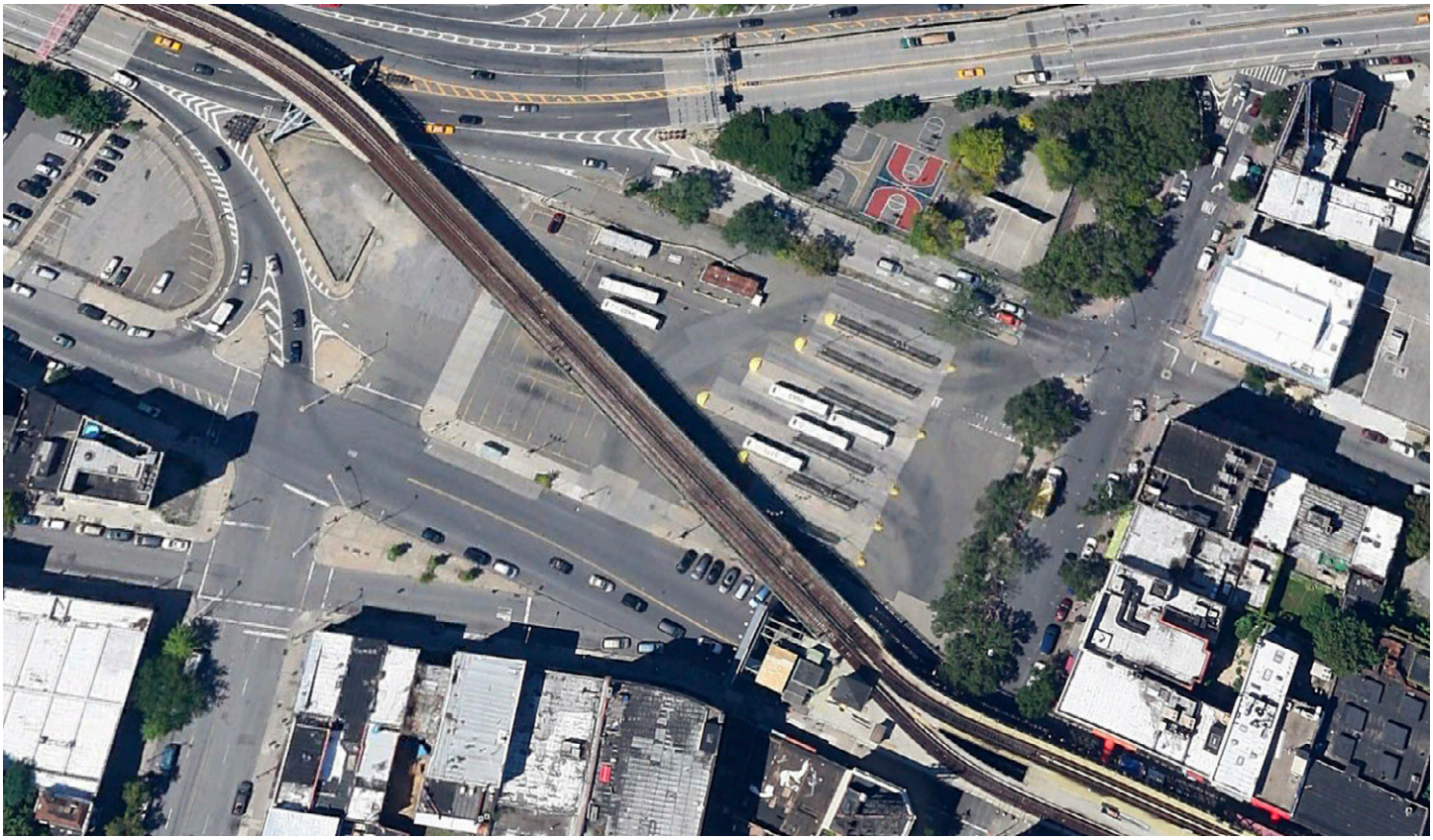
Fine Particles (PM 2.5)

Mean (mcg/m3) by Community District (2021)

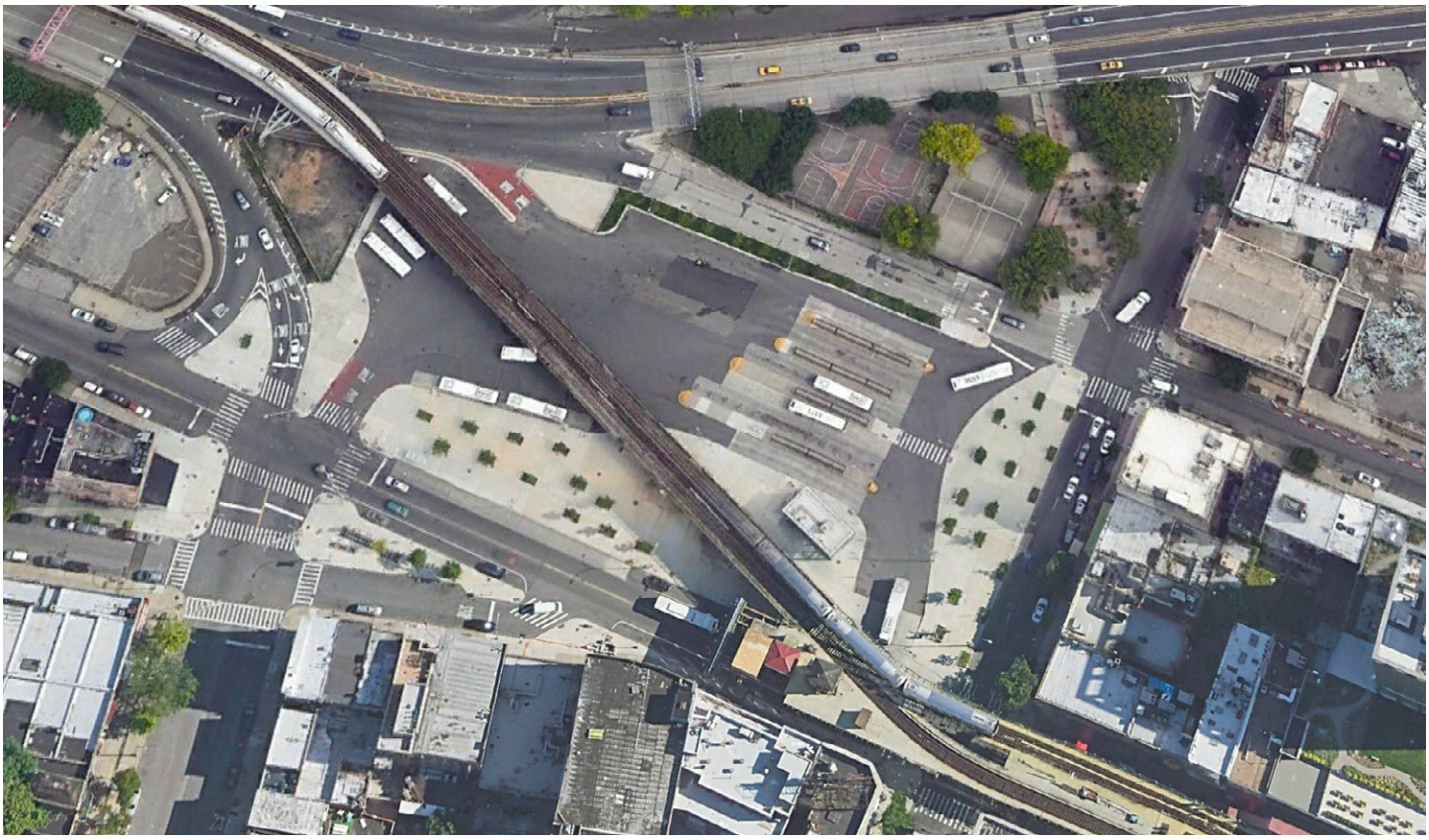


NYC.gov Environment and Health Data Portal, 2023

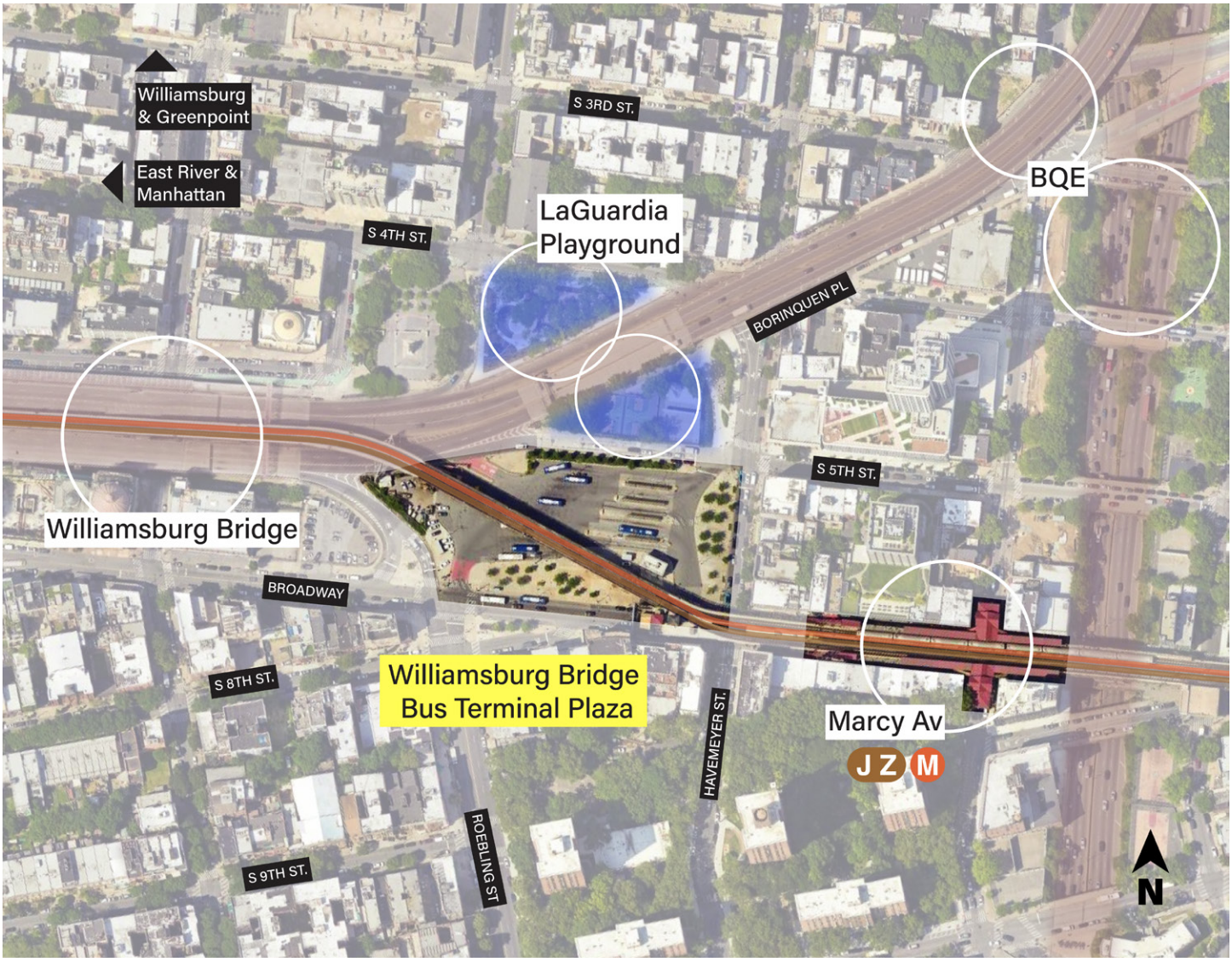
PM2.5 is a particularly dangerous pollutant because its small particles penetrate deeply into the lungs.

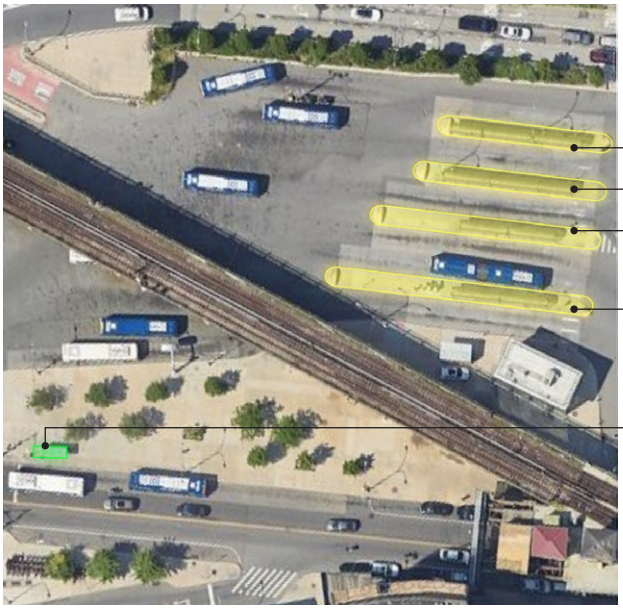


Williamsburg Bridge Bus Terminal Plaza, Google Earth, 2013



Williamsburg Bridge Bus Terminal Plaza, Google Earth, 2017





Lane	*Bus lines served*
Lane 1	B39 B60
Lane 2	B24 Q54
Lane 3	B46
Lane 4	B44 B44SBS
Broadway & Roebling	B32 B62 Q59

Location & Operations

The Williamsburg Bridge Bus Terminal Plaza is in southwest Williamsburg, Brooklyn, at the base of the Williamsburg Bridge. The J, M, and Z trains run diagonally over the length of the plaza on an elevated track that continues east-bound through Bushwick, Brooklyn and into Queens. The Williamsburg Bridge has two off-ramps that wind down to grade and form the northern and western borders of the plaza, respectively. Motor vehicle traffic arriving in Brooklyn via the Williamsburg Bridge can also connect directly to the BQE via an elevated off-ramp one block north of the plaza. The South 5th Street off-ramp of the Williamsburg Bridge splits the plaza from the southern half of LaGuardia Playground, which is, itself, bisected by the Bridge's BQE on-ramp. DOT bike lanes run east-west underneath the elevated BQE on Borinquen Place, one block north of the plaza.

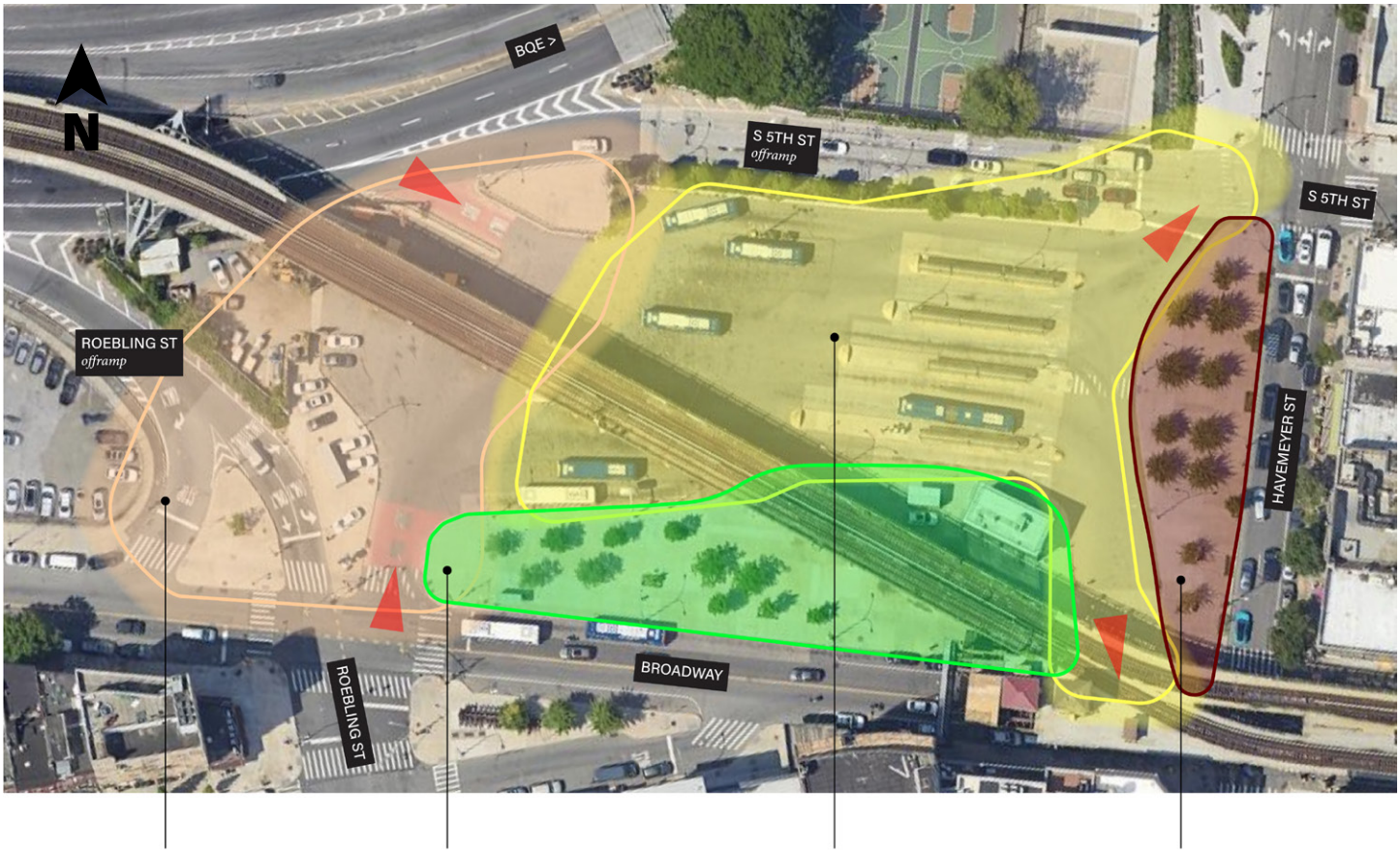
The Williamsburg Bridge Bus Terminal Plaza is a multi-modal transit node, and the plaza acts as the terminus for nine bus lines. The B39, B60, B24, B44, B44SBS, and Q54 stop within the plaza, and serve the Lower East Side, Manhattan, Canarsie, Greenpoint, Mill Basin, and Sheepshead Bay, Brooklyn, and Jamaica, Queens, respectively. There are also bus stops for the B62, B32, and Q59 bus lines on the corners of Roebling and South 8th Streets and Broadway and Roebling Streets, respectively, along the southern border of the plaza. These three lines serve Downtown Brooklyn, Long Island City, and Rego Park, Queens, respectively.

Site Analysis

Methodology

Prior to visiting the site, I conducted internet research to determine which buses stop where, what transit transfers are available, and other high-traffic destinations or routes within a close radius of the site. I used this information to define a set of user flows to and through the site that are replicable and adaptable to ground-truthing. This method also systematizes and therefore quantifies anecdotal pattern recognition.

Each site visit began by taking an immediate, high-level 'gut check' framed by the secondary categories 'architecture and urban design', 'comfort and usability', and 'safety' outlined in my analysis criteria framework. Answering the question "What elements or experiences do I notice immediately?" provides a foundation from which to build more nuanced observation. Next, I embodied my predetermined user flows, walked their routes, and recorded my experience, making sure to consider each of the tertiary and quaternary analysis criteria. I documented my observations with written notes, hand drawing, video recording, and photography. My most prescient points of observation and analysis are conveyed herein.



Zone 1
vehicle storage

Zone 2
southern pedestrian island

Zone 3
bus parking & passenger area

Zone 4
eastern pedestrian island

Zones

The Williamsburg Bridge Bus Terminal Plaza is defined by four distinct zones experientially. Two raised pedestrian islands, one along Havemeyer Street and one along Broadway, feel distinct from the two central zones used for vehicles. They also feel distinct from each other due to the elevated subway track that runs diagonally across the entire site, eclipsing the island along Broadway. These islands form the eastern and southern borders of the plaza. The southerly island contains one bus stop toward Roebling Street, and one rectangular building adjacent to the elevated. The easterly island does not contain any built structures or bus stops, but does contain trees and benches.

Buses flow into the plaza via a large driveway on the western corner of the southerly island and via an entrance off the Williamsburg Bridge. Buses flow out of the plaza via two large driveways on the northern and southern corners of the easterly island. The center area is a large, paved space, also bisected diagonally by the elevated, designated for bus parking, passenger pickup, and miscellaneous vehicle storage. The westerly portion of this central area feels distinct from the portion used for temporary bus parking and passenger pickup, as there is no obvious system for the trucks and cars being stored there, and the area is strewn with trash and other materials. Many of the vehicles are parked

haphazardly on a pedestrian island that shares a curved, western border with the Roebling Street offramp of the Williamsburg Bridge. Where a planted median separates the parked buses from the South 5th Street offramp of the Williamsburg Bridge, this westerly portion of the site is largely separated from the offramp by a waist-high, iron fence.

In the center of the space, buses park temporarily in a staggered fashion before pulling ahead into their designated lanes for passenger pick-up and drop off at the four bus boarding islands just to the east. The bus boarding islands are outfitted with rounded bollards on either side, standard DOT bus shelters, and standard MTA bus information signage as per any MTA bus stop. The entire space is about 180,000 square feet.

Amelia Clark, 2023

Immediate Observations

1. Noise

The Williamsburg Bridge Bus Terminal Plaza is very loud. The sound of traffic layers over the screeching brakes of J/M/Z trains as they jostle along the steel trusses of the elevated tracks. Cars and trucks whir off the Williamsburg Bridge northbound toward the BQE. People play music. Children yell.

2. Traffic Threats

The Williamsburg Bridge Bus Terminal Plaza is a dangerous place to be a pedestrian. People stream around vehicles, both stopped and in motion, in all directions. Elevated islands and painted crosswalks indicate where pedestrians are welcome, and vehicles are very obviously at the top of the hierarchy.

3. Inefficiency

The Williamsburg Bridge Bus Terminal Plaza is designed inefficiently. Certain pedestrian spaces are underutilized while others are inundated. It is a monotony of pavement.

Amelia Clark, 2023

The singular building within the plaza sits on the southerly pedestrian island in the south-east corner of site. It is oriented not in alignment with the street grid, but in parallel with the elevated that runs beside it. It is affectively a rectangular prism with a glass and metal facade that is slightly too small against the surrounding buildings, but blends unobtrusively with the transit infrastructure. It is unoffensive but uninteresting and non-contributional. Besides providing the illusion of respite – the half of the building designed as a waiting area was locked every time I visited – there is no functional reason for the glass facade.

Amelia Clark, 2023

Sprawling pavement is the dominant material at the site, which has massive implications for short-term user experience and long-term resiliency. This pavement absorbs heat and reflects it back into the environment, making hot days feel even hotter. During extreme weather events, these solid surfaces do nothing to absorb floodwater. The catastrophes of pavement are even further exacerbated by the lack of greenery. Each pedestrian island is planted with a grid of small street trees in tree pits, which, despite their best efforts, get lost in the sprawling scale of the pavement.

Amelia Clark, 2023

Comfort & Usability

Walking the island along Broadway, the elevated defines the user experience. Beyond the shadows cast, it creates an odd diagonal visual corridor toward the vehicle storage at the base of the Williamsburg Bridge. The rest of the space is strangely open, with no protection from the elements beyond the bus shelters that run along each bus boarding island. This openness leaves pedestrians wandering through the space haphazardly, tightly weaving around both stationary and moving vehicles, largely ignoring designated crosswalks. Benches are interspersed within the grids of trees on the pedestrian islands. Although users concentrate around the bus stops, the additional benches are well-used. Both islands act as a continuation of sidewalk, but the extra space offers opportunities for stasis.

Amelia Clark, 2023

Beyond the standard MTA signage for each bus stop, which is only visible from a few feet away, there is no indication of which buses stop where. There are no maps or directional signage anywhere on site. There is no signage indicating the adjacent Marcy Avenue subway station, and there is no indication of the bus terminal from the subway station, either.

Amelia Clark, 2023

Safety

The only bollards within the plaza separate the site's single building from potential bus collision, in a blatant prioritization of property over people. There are no bollards to separate pedestrian spaces from the vehicular traffic coursing along the site's perimeters. The overall layout, as well as the details, indicate a lack of deference to pedestrians, and creates a set of dangerous intersections, some more worrisome than others.

Amelia Clark, 2023

Two of the four borders that separate the plaza from its surroundings are off-ramps from the Williamsburg Bridge. Each offramp meets a hard stop at both the south-west and north-east corners of the site. Vehicles making these stops are reducing speeds from some 50 miles an hour down to zero in mere seconds at intersections swarming with pedestrians. At Roebling and Broadway, vehicles veer southbound around a blind corner and split on either side of a small pedestrian island. Pedestrians traveling through this intersection must cross three different crosswalks in less than 200 feet. Vehicles traveling eastbound off the Williamsburg Bridge via South 5th Street must stop at a light at Havemeyer Street. Planted shrubbery creates a blind intersection for pedestrians traveling north/south on Havemeyer across the South 5th Street offramp. Of the three lanes that comprise the offramp, two are left-turn lanes. The pedestrian walk light across Havemeyer coincides with the green light for vehicles turning left from the offramp. This means vehicles already entering the intersection must be vigilant enough to stop for pedestrians crossing in front of them on their right of way. Despite the lack of bike infrastructure, I witness many bikers riding northbound along Havemeyer, also subject to this intersection.

Amelia Clark, 2023

Recommendations

I propose two separate sets of recommendations. The first group, referred to as the 'Low-hanging Fruit Approach', consider what improvements can be made without completely redesigning the entire plaza. This set of recommendations serves as my addition to the improvements made in the 2017 redesign. Although the plaza hosts an objectively better pedestrian experience after the renovation, there were missed opportunities, and many glaring flaws still exist. Simple additions to the space would greatly improve the user experience.

The second group, referred to as the 'Holistic Approach', posits a complete redesign of the entire plaza, which would allow for more holistic, deeper consideration for the needs and wants of the surrounding community, as well as the intentional integration of electric charging infrastructure.

The audience for these recommendations are the professionals at NYC DOT and the designers, architects, and contractors responsible for capital projects under DOT jurisdiction, as well as any other City agencies involved in project coordination.

Bus station in Stoke-on-Trent, Staffordshire, UK by Grimshaw architects, Jim Stephenson, 2016

Plaza in NYC, NYC DOT, 2017

Low-Hanging Fruit Approach

Adding the following elements would greatly improve pedestrian **safety** on site:

1. Raised pedestrian walkways based on desire paths from the various decision points across the terminal
2. Bollards, stone blocks, or planters to protect pedestrians at dangerous intersections: South 5th Street at Havemeyer and Roebling Street at Broadway
3. Signage and speed reduction measures for cars descending the Williamsburg Bridge off-ramps

Adding the following elements would greatly improve pedestrian **comfort and usability** on site:

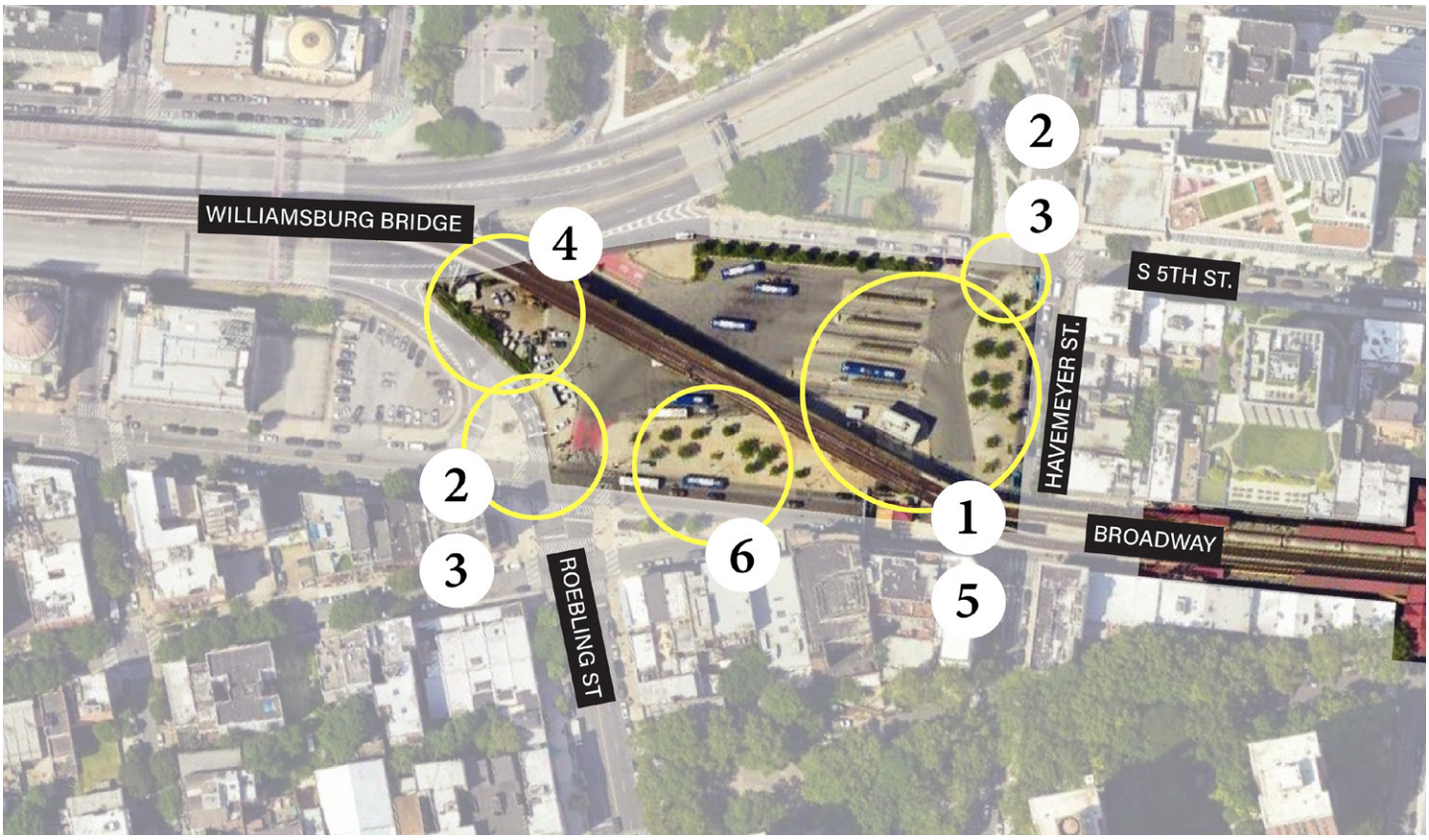
4. Planted barrier that isolates the car storage area (Zone 1) from pedestrian access to reduce visual noise and user confusion and simplify the pedestrian experience
5. Canopy to cover the entirety of the Havemeyer Street pedestrian island and connect over raised crosswalks, covering the bus boarding island in its entirety and providing shade and protection from the elements in key pedestrian areas
6. Street furniture, tables and chairs, to underutilized space: Broadway pedestrian island
7. Crafted signage campaign including a map of the entire plaza and signage indicating each bus stop and Marcy Avenue subway stop

Adding the following elements would greatly improve **resiliency** on site:

8. Increase tree canopy wherever possible
9. Permeable pavors or pervious pavement to replace hard surfaces across the entire site or select areas

Protective granite blocks in Manhattan, NYC DOT via Twitter, 2023

Bus terminal in Aarau, Switzerland, Mensur Zulji, 2014


WILLIAMSBURG BRIDGE
4
2
3
S 5TH ST.
HAVEMEYER ST.
2
3
6
1
5
BROADWAY
ROEBLING ST

Holistic Approach

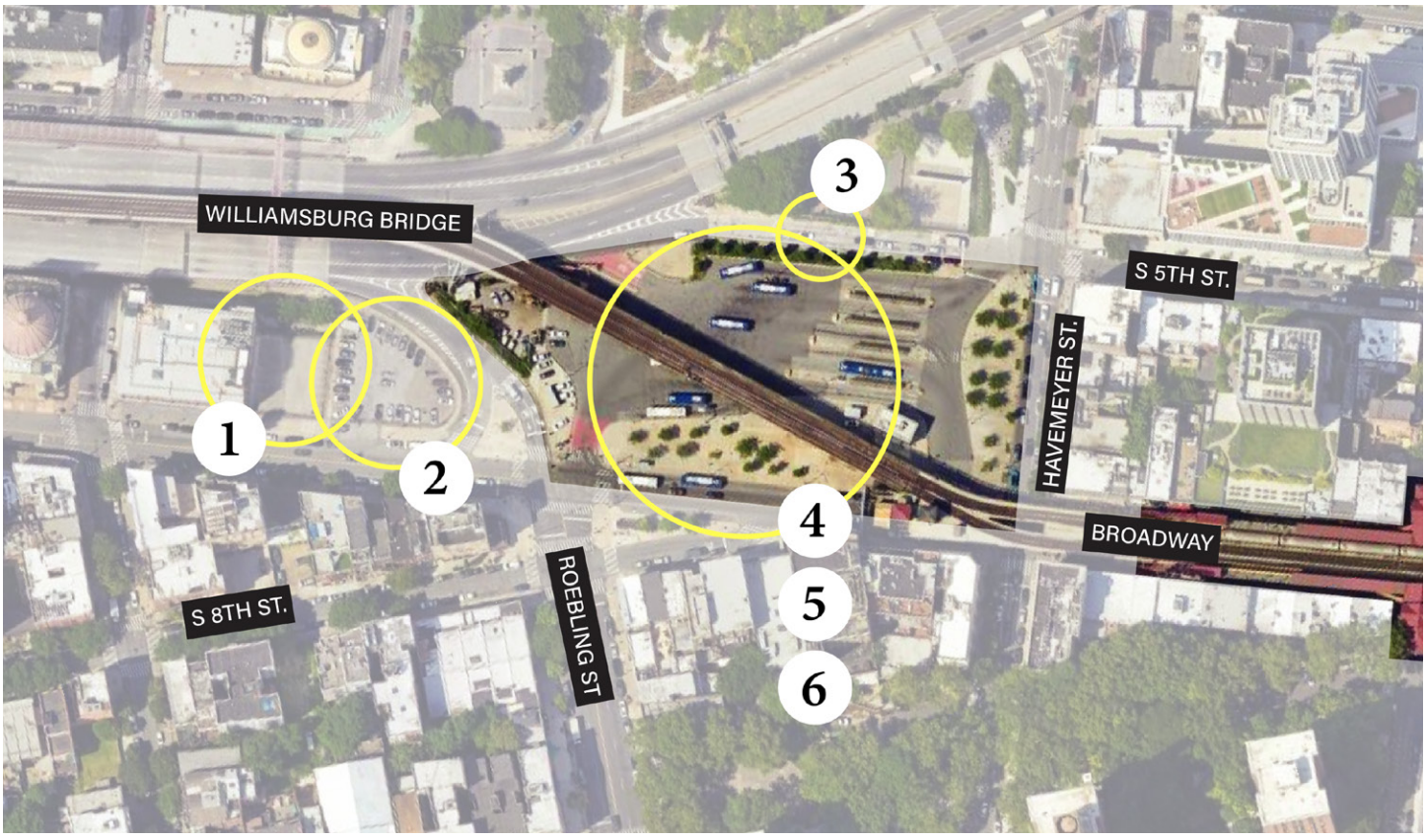
This approach involves a complete, holistic redesign of the entire plaza. My analysis as presented serves as the initial set of insights that act as the inception of a robust, participatory design process.

Land acquisition and street closures are recommended to reclaim additional, adjacent space formally designated for cars.

1. Public acquisition of adjacent parking lots: Block 2446, Lots 91 and 93
2. Reallocation of use of adjacent Parks Dept parking lot at Broadway and Roebling Street
3. Close South 5th Street Williamsburg Bridge offramp (This would require comprehensive traffic study)

An **elevated, public park** should include these elements:

4. Pedestrian bridges that link neighbors south of the Williamsburg Bridge with those to the north and physically elevate the pedestrian
5. Integrated electric bus charging
6. Indoor community facilities and extensive programming as determined by community need

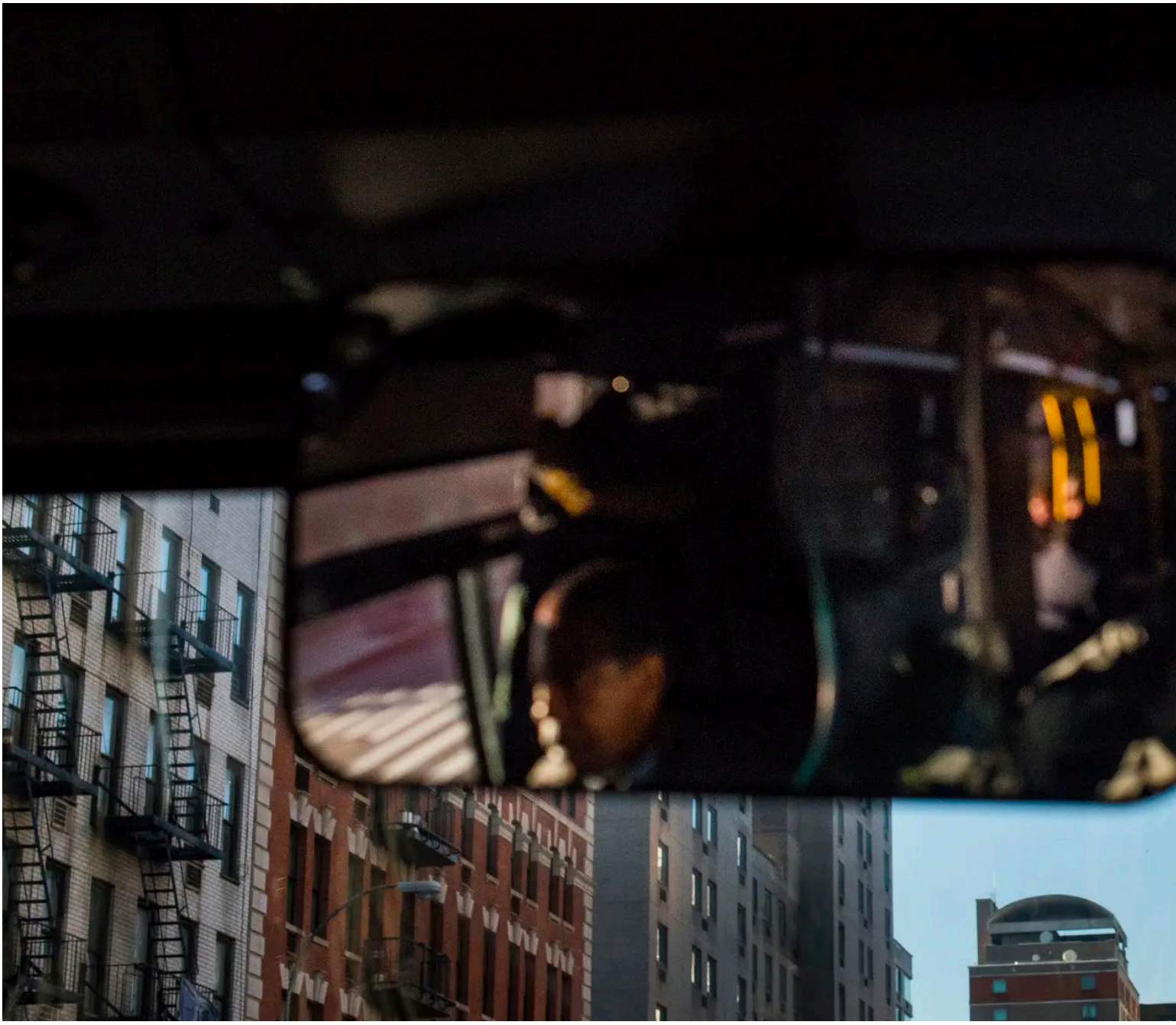


Seoullo 7017, Seoul, South Korea, Sagase48 via Shutterstock, n.d.

Metropol Parasol by J.MAYER.H, Sevilla, Spain, architizer.com, n.d.

Chapter 5

Conclusion



5.1 Applications for Future Use

5.2 Other Considerations

Joshua Bright for The New York Times, 2018

Applications for Future Use

In hindsight, this project is a criticism of design standards applied by City agencies. It does not, however, go so far as to criticize the processes through which substandard design is applied, which is equally crucial. This study fails to answer a vital question: Beyond providing a safe, pleasant, efficient user experience, do features and qualities of the bus terminal comport with the needs and desires of the surrounding community?

The typical process for a NYC DOT Capital Street Reconstruction begins with an insight garnered from a DOT study or an entra-agency or community request. If funding is available, DOT and relevant collaborators develop a project scope and conceptual design. Once project scope is finalized and a cost estimate is determined, the project is transferred to the Department of Design and Construction (DDC). DDC is responsible for developing preliminary findings and final designs to be approved by DOT. At this point, the project is presented to the relevant Community Board. After receiving final budget approval from the Office of Management and Budget (OMB), a bid is put out and construction begins. The Factors Framework devised in this study could easily be plugged into the existing process as both a guideline for analysis and a confirmation of insights in post. In a perfect world, this would produce streetscapes that better prioritize the pedestrian experience. It would not solve the ubiquitous criticism of the work of City agencies: The public is engaged too late in the process, or not at all.

Other Considerations

Over the course of this process, I have had a set of core beliefs crystallize. These are things that both drove me to this study and guided how I went about my research.

The first point is that features and qualities of the built environment have large impacts on public health. Areas of concentrated poverty and communities of color are historically disinvested due to their lack of political power, and are thus more likely to live within built environments that cause social, mental, and physical harm.

The second belief is that even in New York City, cars dominate the public realm. We're at the early stage of a massive shift toward electric vehicles. However, if we design electric cars to be used and stored in the same manner as gas-powered cars, we're doomed to have our cityscapes forever beholden to the personal automobile. Those who design and build cities have a fleeting opportunity to shake the antiquated hierarchy of our public realm and create rights-of-way that encourage micro-mobility, biking, vehicle sharing, mass transit, and most importantly, a human-scale pedestrian experience.

Thirdly, the bus rocks! Buses in New York City provide a vital, supplemental connection for folks who live in neighborhoods without access to the subway and for those with mobility challenges. The bus is a beautiful, democratic microcosm of New York City. It's a place to sit quietly amongst one's neighbors, in the pursuit of a common goal. That said, the MTA is equally complicit in, and reliant on, the personal automobile culture that dictates the wide, paved streets of our city that put pedestrians at the bottom of the user hierarchy.

I believe we can and should do better.

Amelia Clark, 2023

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