MARTA KRAWCZYNSKI

Environmental Urbanist

www.martakrawczynski.com/

PORTFOLIO

EDUCATION

MASTER OF URBAN PLANNING
NYU's Robert F. Wagner Graduate School of Public Service | 2024

- Disaster Risk Analysis
- Climate Economics
- Geopolitics of Energy
- Planning for Emergencies + Disasters

BACHELOR OF ARTS
Fordham University | May 2021

- Major: Economics
- Minor: Environmental Studies

STUDY ABROAD

Freie Universitat | December 2019

- Architecture History
- Energizing Europe
- Europe in Global Economy

Jagiellonian University Summer Culture + Language Course | July 2016

SKILLS

Design: Adobe Suite (InDesign, Photoshop, Illustrator), Google Slides

Data/Mapping: Power BI, Python (Pandas, NumPy, Matplotlib), RStudio, HTML, CSS, Excel, GitHub, Microsoft Dynamics

Geospatial Processing Tools: ESRI, ArcGIS, Google Earth Engine, EM-DAT

Project Management: MS Office, Google Suite, Trello, Notion

Languages: Fluent – Polish, Basic – French, Basic– German

Other: Public Outreach, Public Speaking, Conference Management, Technical Writing, Cost-Benefit Analysis, Risk Management, Customer Service, Search Engine Optimization, Supply Chain Management

about me

I am an environmental planner with a diverse background, holding a Master of Urban Planning from NYU's Robert F. Wagner Graduate School of Public Service (2024) and a Bachelor of Arts in Economics and Environmental Studies from Fordham University (2021). My professional and academic career has spanned topics and fields such as Geopolitics of Energy, Energy Consulting, Disaster Risk Analysis, Emergency Management, and Waste Management.

I am dedicated to developing environmentally safe solutions for areas impacted by disasters and conflict. In the past, my work has primarily focused on the Northeast, particularly New York and Connecticut, as well as Eastern European countries: Ukraine and Poland. Furthermore, my passion extends beyond local projects, emphasizing initiatives with an international impact.

REBUILD BY DESIGN

Research Analyst – Connecticut Chapter Lead

- Overseeing the Connecticut section of the Atlas of Disaster project, analyzing major disaster declaration data since 2011 to develop targeted resilience strategies and legislative maps essential for grassroots campaigning.
- Gathered data on the economic, social, and human costs associated with these disasters, emphasizing the importance of infrastructure investment.
- Acquired a comprehensive understanding of disasters, policies, and programs at the local, state, and federal levels.

RAMBOLL

Junior Consultant Intern

- Executed a business case study to explore trends and opportunities in the data center industry, focusing on renewable energy, workforce, and tax incentives to advocate for environmentally friendly practices in the Great Lakes Region.
- Evaluated and engaged stakeholders, analyzing existing regulations, and identifying incentives and obstacles.

JOHN D. SOLOMON FELLOWSHIP FOR PUBLIC SERVICE

NYC Emergency Management Strategic Partnerships Unit (NYCEM) Fellow

- Conducted a communications exercise to assess the robustness of partnerships with the private sector and evaluating the efficiency of emergency management alerts.
- Designed and implemented a readiness toolkit for John D. Solomon Fellows on maintaining preparedness in the presence of natural disasters.
- Enrolled in the Emergency Management Certificate Program, taught and accredited by the NYCEM Academy and FEMA, primarily focusing on Public-Private Partnerships to enhance response, recovery, and resilience efforts.

NYU RUDIN CENTER FOR TRANSPORTATION

Graduate Research Assistant

- Conducted in-depth research on the benefits of coastal green infrastructure (CGI) in bolstering resilience against climate-related transportation challenges.
- Co-authored and designed a comprehensive report titled "Accelerating Progress: Making Transit Accessible for All New Yorkers," addressing critical issues, including funding challenges, the historical context, and recommendations for enhancing accessibility in New York City's public transportation system

TOWN+GOWN: NYC

Capstone Project Lead Designer

- Directed the data and spatial analysis using extensive land use and geographic datasets from NYC's Open Data resources, including PLUTO, and led the design process, resulting in the final product created in InDesign.
- Conducted stakeholder engagement (interviews, surveys) and data analysis, to assess the feasibility of using Industrial Business Zones for circular construction waste disposal, focusing on waste management, workforce development, economic analysis, and industry analysis.

NYU WAGNER GRADUATE SCHOOL OF PUBLIC SERVICE

Graduate Research Assistant for Dr. Vanessa Deane

- Conducted in-depth literature review on the influence of post-colonial designations within the European Union on climate adaptation planning in French and Dutch Caribbean countries.
- Assisted in developing the research design, proposing a comparative case study analysis between European and Caribbean capitals, utilizing mixed-methods such as quantitative analysis, archival research, content analysis, interviews, and observations.
- Managed and organized research materials collected by the research team.

GALLATIN SCHOOL OF INDIVIDUALIZED STUDY

Independent Study with Dr. Mitchell Joachim

- Performed research under Dr. Mitchell Joachim's supervision with a focus on disaster risk reduction and sustainable urban development, emphasizing nature-inspired solutions.
- Conducted thorough investigations into hydrological systems, with a specific emphasis on the adverse effects of dams, exploring the intricate interplay of political and environmental dimensions.
- Gathered data on the economic, social, and human costs associated with these disasters, emphasizing the importance of infrastructure investment.
- Acquired a comprehensive understanding of disasters, policies, and programs at the local, state, and federal levels.

experience

consulting experience

PROJECTS INCLUDE:

Building Circular Economies in New York City's Industrial Business Zones

Great Lakes: Opportunities and Obstacles for Data Centers With a Renewable Energy Mix

CLIENTS INCLUDE:

Department of Design and Construction | Town+Gown:NYC

Ramboll

SKILLS GAINED

Adobe Indesign

Sketchup

Cadmapper

ArcGiS

RStudio

Workforce Development

Sanitation

Site Analysis

Energy Analysis

Stakeholder Engagement

Data Centers

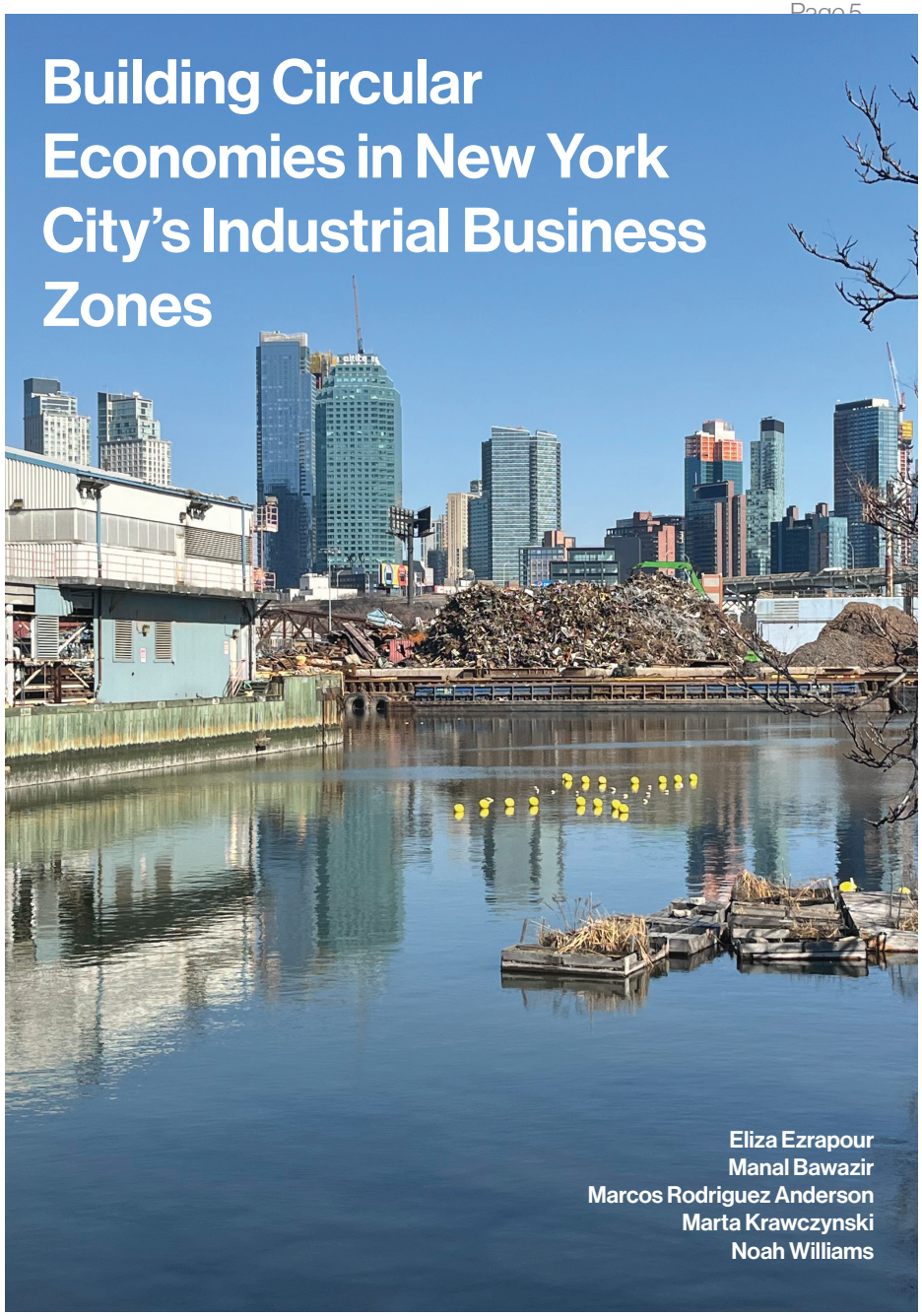
Renewable Energy

Waste Management

During my time at New York University, I gained valuable experience as a Consultant, collaborating with the Department of Design and Construction, New York University, Ramboll, and the Department of Sanitation. In two key projects, I led teams as the Design and Data Lead, managing the entire process from conception to completion. I balanced creativity with precision to meet client expectations, while also working closely with stakeholders to deeply understand their needs and ensure our deliverables were both functional and aligned with their vision. This involved consistent organization, team-building, and effective client communication. I became proficient in Trello, which I used throughout each project to maintain structure and track progress. As the Lead, I was responsible for locating and analyzing data, developing color schemes, and engaging with clients to fully comprehend their requirements. Clear communication, setting realistic timelines, and prioritizing client feedback became core to my work ethic. Additionally, I realized the importance of presenting data in a visually compelling manner, which is where learning Adobe InDesign proved invaluable. By refining my ability to deliver polished and thoughtful solutions, I ensured our work met high standards and achieved project goals, leaving a positive, lasting impact on each client.

Project Framework

Town+Gown: NYC provides resources for universities and practitioners to support research on infrastructure and the built environment. In order to advance NYC's sustainability and climate goals, Executive Order 23 directs, city construction agencies to reduce their carbon emissions. While the construction sector is a major driver of emissions in NYC, heavy industry remains a vital component of the city's economy. Town+Gown engaged the Wagner team to explore challenges and opportunities associated with creating a circular economy for construction and demolition waste (CDW) sited in the industrial business zones (IBZ). The team identified five IBZs to serve as case studies for this research. The team then conducted site visits, completed analysis of existing conditions, and undertook extensive stakeholder engagement, both through qualitative interviews and a quantitative survey. Based on this research and stakeholder feedback, the team produced a final report highlighting major findings and providing recommendations for strategies to advance circular CDW economies in the IBZs.

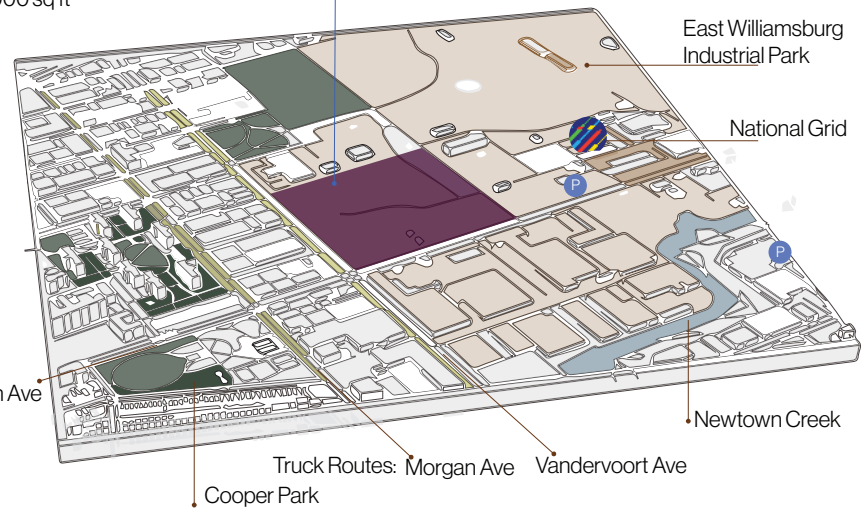


ACCESS HERE

The project tasked our team with designing a site analysis to identify potential locations within five IBZ case studies where NYC industries could expand CDW interim processing facilities. The goal was to find government-owned or vacant land that would be optimal for these facilities, taking into account various environmental and logistical factors. We analyzed multiple existing conditions, including environmental factors, transportation networks, and workforce availability. I created layered maps and buffer zones, while also examining qualitative criteria to identify ideal sites, such as government-owned or tax-exempt land, vacant land over 2 acres, well-connected transportation, and land suitable for redevelopment (parking lots, warehouses, or open fields), as well as contaminated land. Once we selected a site, I used SketchUp and Cadmapper to develop a detailed model that demonstrated the space's advantages.

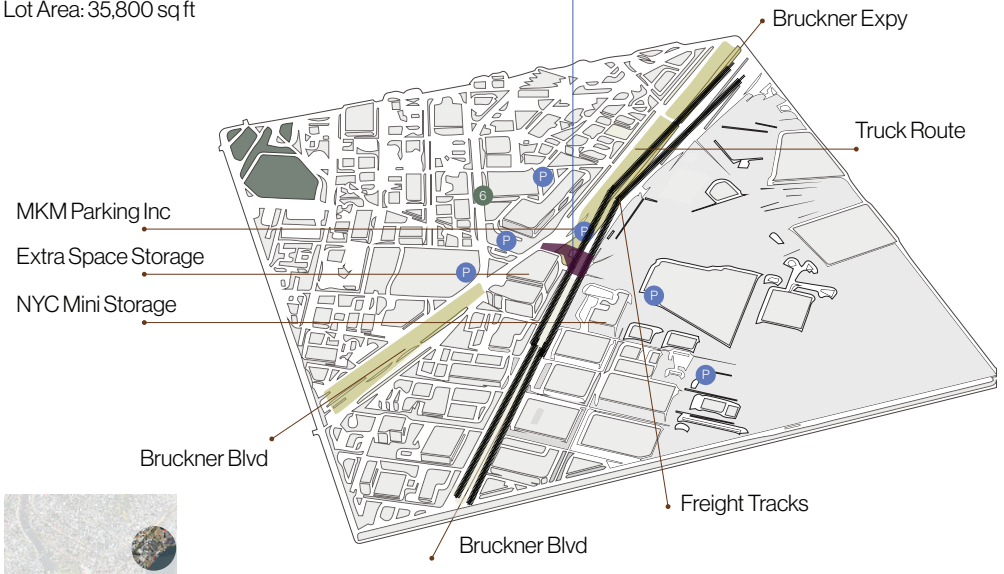
Potential North Brooklyn Facilitiy
Cooper Fields
Brooklyn (Borough 3) | Block 2837 | Lot 1

Owner Type: Mixed
Owner: Brooklyn Union Gas Company
Land Use: Transportation & Utility
Lot Area: 5,137,000 sq ft

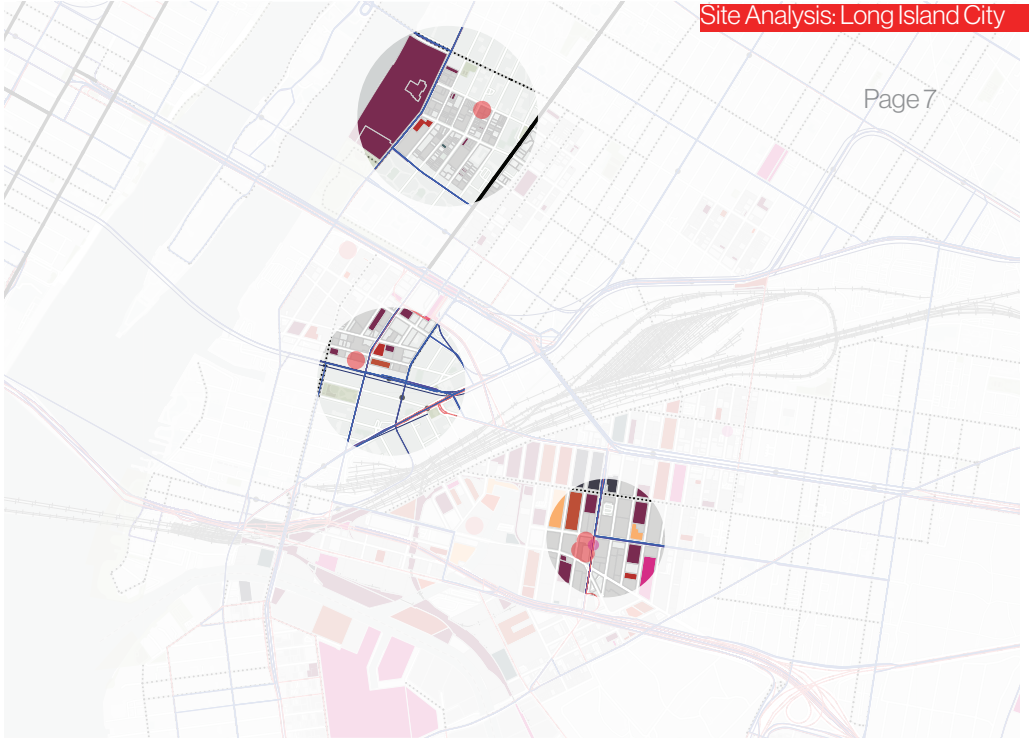


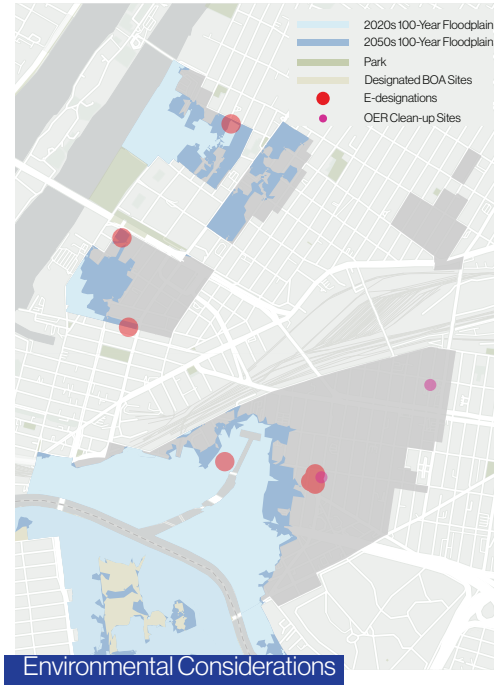
Potential Port Morris Facilitiy
Vacant Site between Port Morris and Hunts Point
Bronx (Borough 2) | Block 2599 | Lot 175

Owner: 980 BLC Owner LLC
Land Use: Vacant Land
Lot Area: 35,800 sq ft

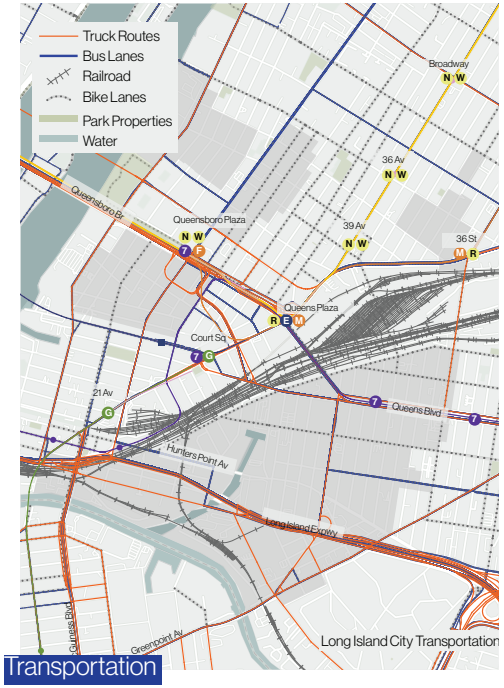


*Owned by either a public authority or the state or federal government





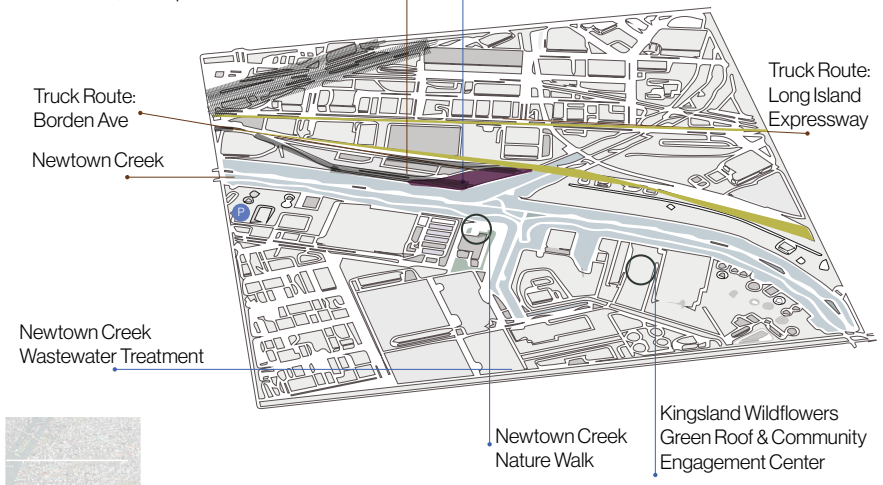
Environmental Considerations



Transportation

Potential Long Island City Facility
Underutilized MTA property in Long Island City
Queens (Borough 4) | Block 68 | Lot 150

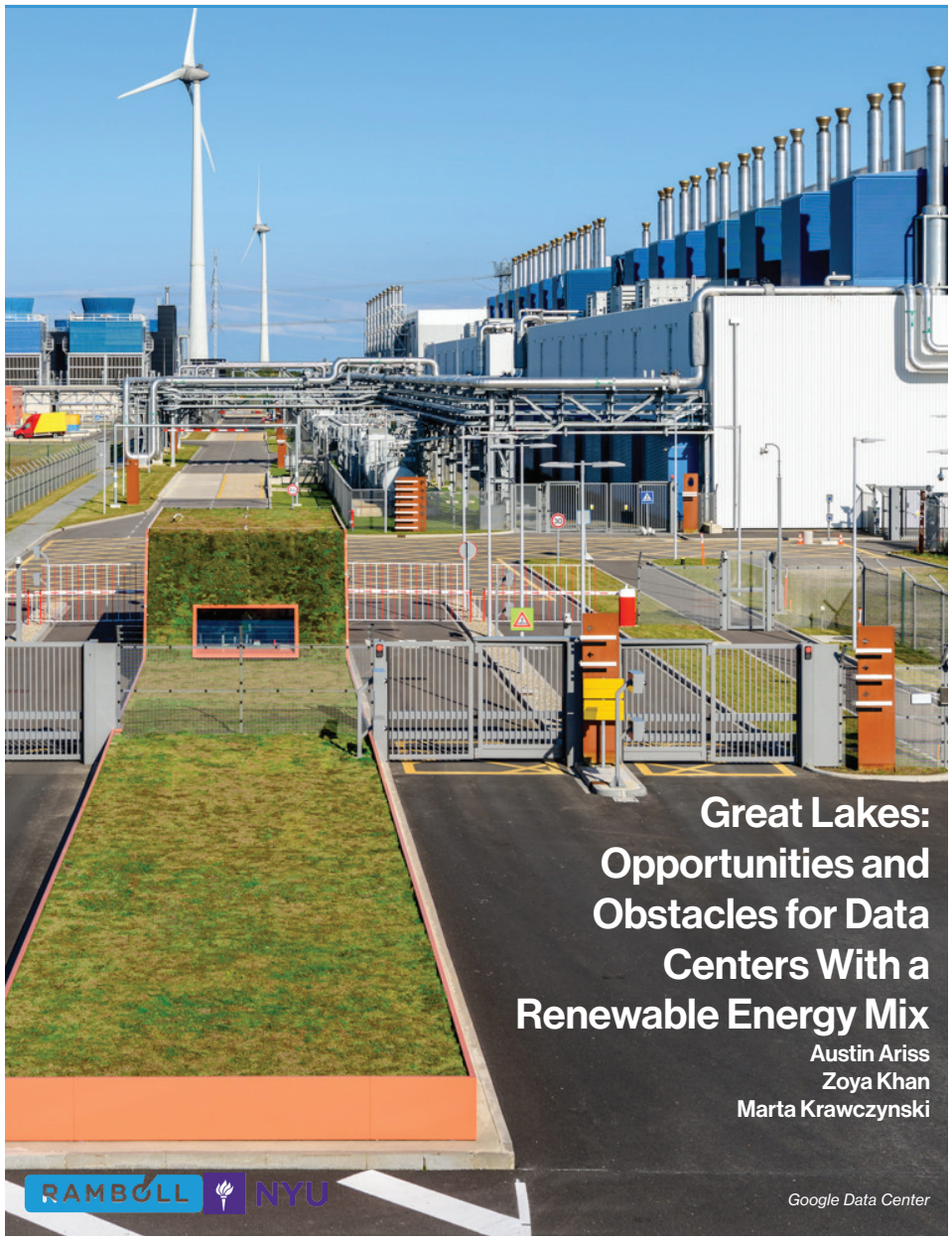
Owner Type: Mixed
Owner: MTA - LIRR
Lot Area: 290,000 sq ft



DATA USED: American Community Survey (ACS); New York City Employer Household Dynamics Census; City Owned and Leased Property (COLP); MapPLUTO; Facilities Database; Subway Stations; NYC Bike Lanes; New York City Truck Routes; Freight Data; Industrial Business Zones (IBZs); Federal Emergency Management Agency (FEMA); Environmental Remediation; Office of Environmental Remediation (OER) Clean-Up Sites; E-designated Sites; Designated Brownfield Opportunity Sites

Project Framework

Our project aims to assess the Great Lakes region—specifically Ohio, Minnesota, and Illinois—as potential locations for data centers, focusing on the unique combination of opportunities and challenges that renewable energy integration presents for data center operations. The region boasts a diverse array of renewable energy sources such as wind, solar, and hydroelectric power, which are conducive to sustainable data center development. A major advantage is the region's ample fresh water supply, crucial for the water-intensive cooling processes of data centers. However, the region also faces substantial challenges, including regulatory constraints, extreme weather conditions, and grid stability issues. Our research will explore these factors in depth, with the goal of determining the Great Lakes region's suitability for hosting efficient and environmentally friendly data centers powered by renewable energy.



Great Lakes: Opportunities and Obstacles for Data Centers With a Renewable Energy Mix

Austin Ariss
Zoya Khan
Marta Krawczynski

RAMBOLL NYU

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emergency management

EMERGENCY MANAGEMENT CERTIFICATE

Strategic Partnerships Unit Curriculum

Fundamentals of Emergency Management

introduction to Public-Private Partnerships

Improving Preparedness and Resilience through Public-Private Partnerships

NYCEM Warehouse Tour

EOC Orientation

Watch Command Orientation

Coastal Storm Activation Training

Incident Command System

National Response Framework

NYCEM TableTop 101

A key responsibility during my time within the Strategic Partnerships Unit at NYC Emergency Management (NYCEM) was ensuring effective communication during crises. I contributed to two main projects that highlighted different aspects of emergency communication.

The first project involved organizing a communications drill to evaluate the private sector's preparedness to receive direct communications from NYCEM and its partners during emergencies. I designed a survey to assess the connections between NYCEM, its Private Sector ESF partners, and their member organizations, which deepened my understanding of the collective coordination required during emergencies.

The second project involved conducting preliminary research on renters insurance, with the goal of creating a comprehensive guidebook for New Yorkers accessible through the NYCEM website. This project underscored the importance of explaining complex concepts in an accessible way, particularly topics like insurance that might otherwise be overlooked.

In addition, I enrolled in the Emergency Management Certificate Program, accredited by the NYCEM Academy and FEMA, to further my knowledge in Strategic Public-Private Partnerships, enhancing response, recovery, and resilience efforts.

John D. Solomon Fellowship for Public Service

JOHN D. SOLOMON FELLOWSHIP FOR PUBLIC SERVICE

WHAT IS THE FELLOWSHIP?

Started in 2012, the John D. Solomon Fellowship for Public Service is the first graduate fellowship in New York City devoted specifically to emergency management. The fellowship was established and is funded by the family and friends of the late John D. Solomon and is administered by NYC Emergency Management. The competitive paid program attracts applicants from a wide variety of prestigious graduate programs.

John was an accomplished journalist on homeland security and a devoted public servant. An active member of his local NYC Community Emergency Respone Team (CERT), John was a passionate advocate of emergency preparedness and resilience and originated **"In Case of Emergency, Read Blog - A Citizen's Eye View of Preparedness."**

THE PROGRAM

10 Fellows placed at 8 organizations over 9 months

- American Red Cross Greater NY
- NYC Emergency Management
- NYC Fire Department
- NYC Police Department
- NYC Dept. of Health and Mental Hygiene
- NYC Housing Authority
- NYC Dept. of Correction

ALUMNI NETWORK

105 ALUMNI

Alumni stay connected to the program via events, shared experiences, and offering guidance to current fellows.

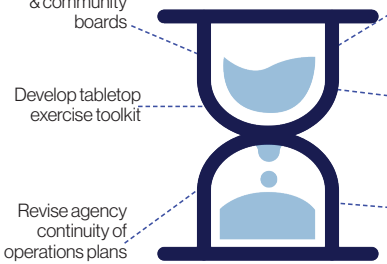
CAREERS IN:

42%	PUBLIC SECTOR	NYC GOV; NYS; NJ; CA; DC; TX; PORT AUTHORITY NY NJ; FEDERAL AGENCIES; UNITED NATIONS
26%	NONPROFIT SECTOR	AMERICAN RED CROSS; HEALTH CARE INDUSTRY
32%	PRIVATE SECTOR	BRENNAN CENTER FOR JUSTICE; HIGHER EDUCATION

SKILLS & PROJECTS

- PROGRAM MANAGEMENT
- STRATEGIC COMMUNICATION
- PUBLIC SPEAKING
- PROBLEM SOLVING

45,000 HOURS



Visit us at NYC.gov/johndsolomonfellowship and follow us on LinkedIn at John D. Solomon Fellowship for Public Service.

Earthquakes and Coordination – A Real Day in the Life of an Emergency Manager

ACCESS HERE

transportation planning

PROJECTS INCLUDE:

Accelerating Progress: Making Transit Accessible for All New Yorkers

Balancing Social and Medical Models in NYC's Subway System

What has been the role and impact of railways in the Russian war on Ukrainian soil?

Rising Waters, Sinking Systems: NYC's Journey to Finding the Perfect Solutions for Transportation Amid Climate Change

COLLABORATORS:

Rudin Center for Transportation POlicy and Management

Metropolitan Transportation Authority

C2SMARTER

SKILLS GAINED

Adobe Indesign

ArcGiS

RStudio

Accessibility Policies

Accessible Transit Planning

Transportation Planning

Stakeholder Engagement

As a Graduate Research Assistant at the Rudin Center for Transportation Policy and Management, under the mentorship of Sarah Kaufman, I gained invaluable experience in transportation systems and urban planning in New York City. I co-authored the report Accelerating Progress: Making Transit Accessible for All New Yorkers, conducting both quantitative and qualitative analysis. This report addressed significant issues such as funding challenges, historical context, and strategies to improve accessibility in the city's public transportation network. Working alongside other research assistants, I developed facilitator guides for interviews with disability-focused nonprofits and individuals affected by MTA services, while maintaining regular updates with the MTA.

This experience underscored the importance of creating inclusive urban environments and inspired me to take courses like Disability, Policy, and Leadership, where I focused on becoming a leader in disability advocacy. It also broadened my perspective on transportation, helping me see it as the lifeblood of a city. I began to explore transportation from multiple angles, including emergency management, environmental design, and the vital need to build systems that are accessible to all.

Project Framework

The journey to make New York's public transportation system accessible to people with disabilities and other mobility challenges is at a critical juncture. As this report shows, despite the MTA's progress, significant obstacles to achieving these ambitious accessibility goals remain, including aging infrastructure, limited physical space, and the high cost of construction in New York City. As a matter of first priority, the MTA and political leaders must ensure adequate capital funding levels commensurate with the increased pace of required ADA upgrades for current and future capital programs. Most urgently, the MTA's ability to deliver the remaining accessible stations it has committed to hinges on the $15 billion in capital funding to be made available by the implementation of Congestion Pricing.

The report also strongly recommends that the MTA:

- Implement additional cost containment measures;
- Bolster infrastructure monitoring;
- Improve the geographic distribution of accessible stations;
- Broaden public engagement, and
- Leverage existing and emerging technologies for real-time data.

Overcoming historic underinvestment, the MTA has begun delivering more rapidly on its commitment to transit accessibility. Increasing this momentum is imperative: the pace of progress directly impacts the lives and futures of millions of New Yorkers.

Accelerating Progress: Making Transit Accessible for All New Yorkers

An assessment of the Metropolitan Transportation Authority's work to build an accessible transit system in New York

January 2024

Rudin Center for Transportation Policy and Management
Robert F. Wagner School of Public Service
New York University

Supported by the Metropolitan Transportation Authority and NYU C2SMARTER

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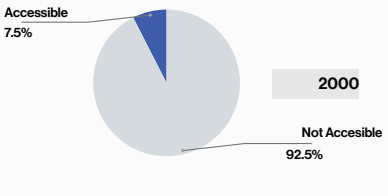
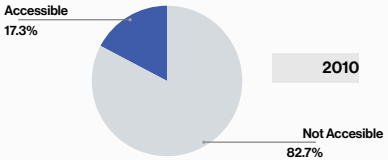
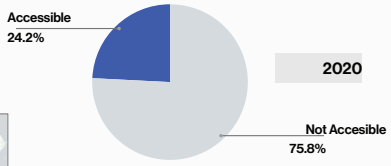
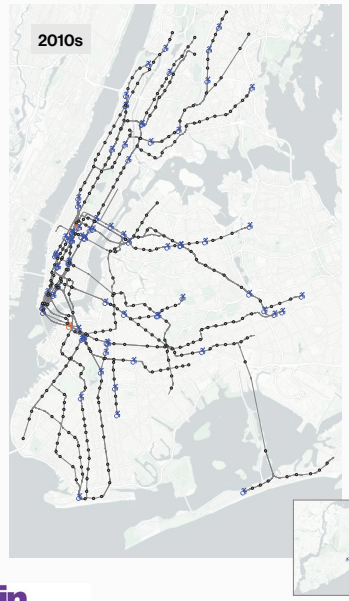
Accessibility Through The Years

Not Accessibile
Partial ADA Accessibility
Full ADA Accessibility



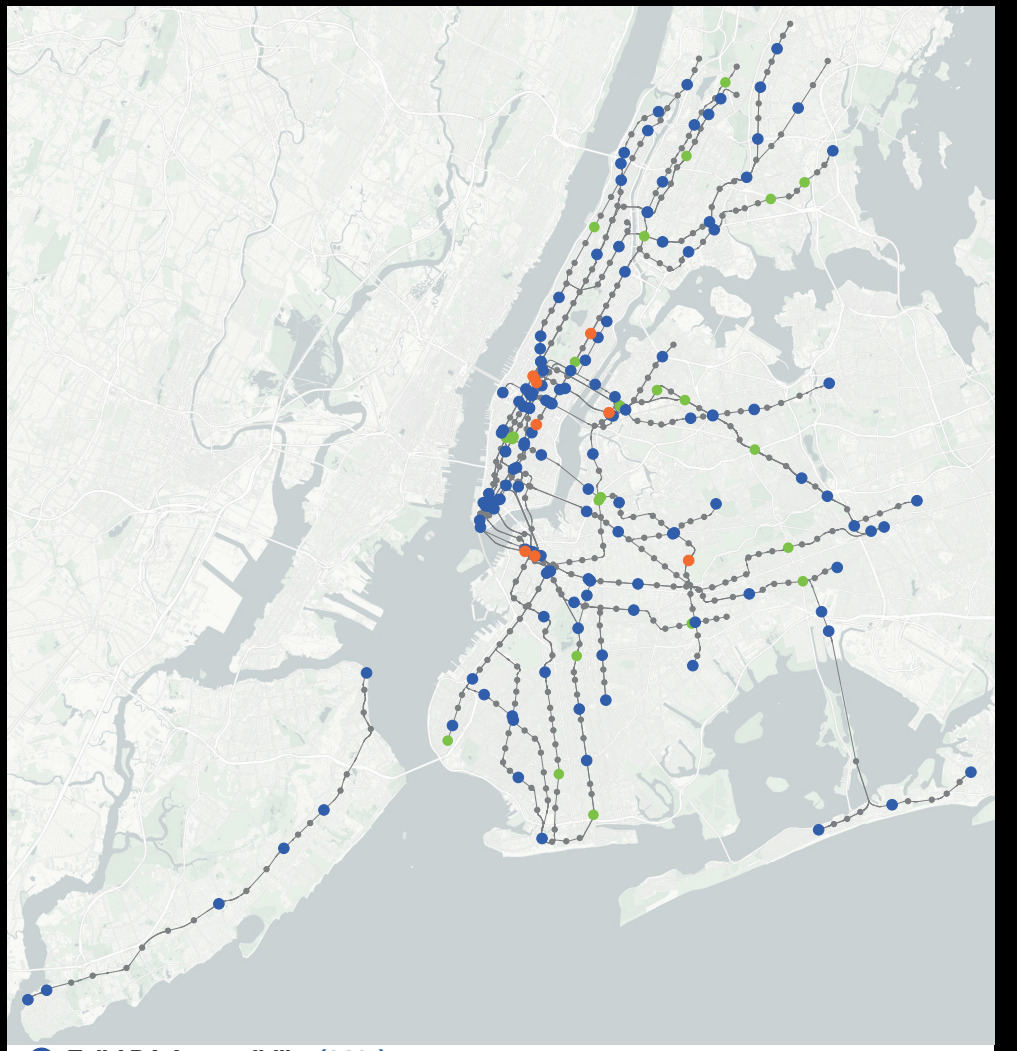






rudin center for transportation policy & management

ADA Access Status 2024



Full ADA Accessibility (28%)
Partial ADA Accessibility (2%)
In Construction (8%)
Inaccessible (62%)

Note: There are 493 stations total, inclusive of 472 subway stations and 21 Staten Island Railway stations.
Sources: Metropolitan Transportation Authority website, MTA Open Data and personal communication, January 2024.

rudin center for transportation policy & management


key interests:
disaster risk analysis,
post-conflict studies,
climate change,
geopolitics of energy,
environmental planning

key interests: disaster risk analysis, post-conflict studies, climate change, geopolitics of energy, environmental planning

PROJECTS INCLUDE:

Controlling Nature: An Analysis of the Dark Side of Dams

War on Ukrainian Railways: What has been the role and impact of railways in the Russian war on Ukrainian soil?

Mapping Environmental Justice: A GIS Analysis of Optimal Sites for Wood Reuse Centers

Decarbonization of Data Centers

Ukraine: Energy Security, Elections, and Role of International Actors in the War

The Silenced River: The Nile River Water Dispute

Can Defunding the Police and Reallocating Resources during COVID-19 Protect Tenants?

Is the EU's Growth Theory approach sustainable?

Energizing Europe Between Borders (Analysis of Energy Politics)

An Environmental and Political Analysis on Poland's Dependency on Coal and the Effects of Smog on Krakow

Environmental Effects of Fur

SKILLS GAINED

Op-Ed Writing

Market Analysis

Energy Politics

Geopolitics of Energy

Oil + Gas Markets

Supply Trade

Search Engine Optimization

Growth Theory

Renewable Energy Systems

Energy Efficiency + Sustainability

Carbon Trading + Emissions Markets

Policy Advocacy

Technical Writing

Risk Assessment + Management

Regulatory Compliance

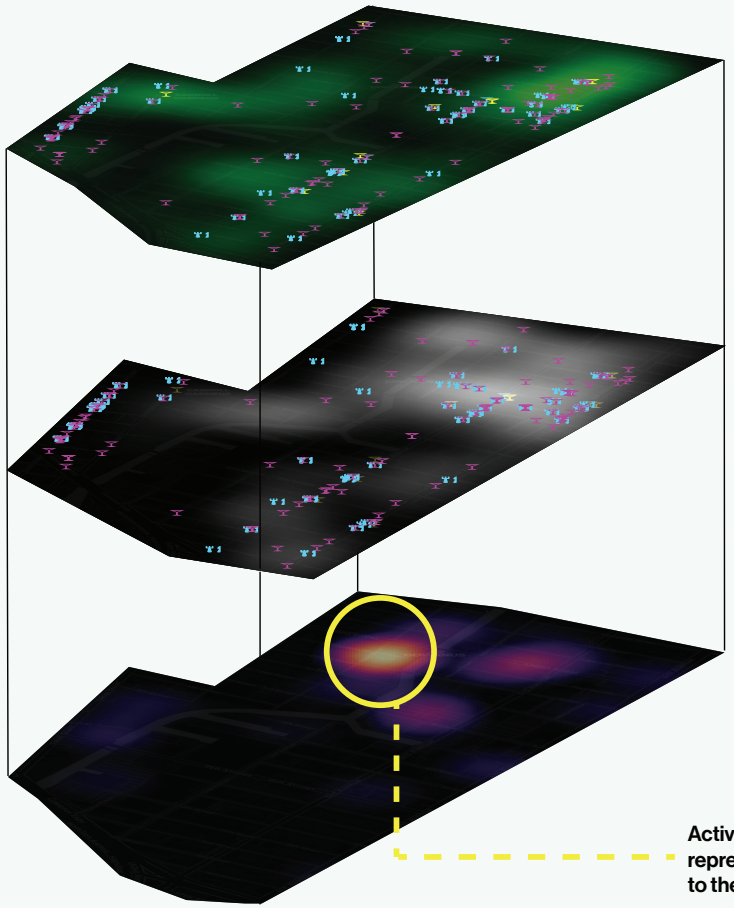
During my time at Fordham, I initiated research on climate migration and the displacement of communities due to conflict and disasters. This research deepened when I joined New York University, where I developed a more comprehensive understanding of how migration and climate change impact communities. In my first semester at NYU, I focused on mapping the migration of refugees and individuals affected by the war in Ukraine. This project highlighted the interconnectedness of environmental issues, urban planning, and conflict. It also underscored the importance of data analysis, research, and visually presenting the movement of people and disasters. This experience sparked my interest in the topic, leading me to take courses like Disaster Risk Analysis, Planning for Emergencies and Disasters, Geopolitics of Energy, and Climate Economics. I also had the privilege of studying and collaborating with experts such as Dr. Vanessa Deane, Carolyn Kissane, Luis Cerefino, Louise Harpman, and Mitchell Joachim, gaining invaluable insights and skills.

Topics of Urban Design

In Spring 2023, I took a course on Topics in Urban Design, studying under Louise Harpman and Joanna Simon. My focus was on the Gowanus area, where I analyzed issues related to noise and air pollution. This course highlighted the significance of digital tools, data analysis, and graphic design in urban studies, teaching me how to effectively present large volumes of data in a visually engaging way.

Not so much Superfund Gowanus: Toxic Partying

Due to the legacy of industrial waste, the Gowanus Canal became heavily contaminated with pollutants. Despite efforts to clean up, it remains one of the most contaminated waterways in the country. In recent years, Gowanus has transformed into an entertainment hub with numerous bars, restaurants, and performance venues popping up. However, the area's history of contamination is still a concern, and efforts to remediate the toxic legacy of the past are ongoing.



Restaurant Establishments
Active Liquor Licenses
Pending Liquor Licenses
Temp. Liquor Licenses

Concentration of Indoor Environmental Complaints

Concentration of E-Designations

A property with an E-designation means that, as a consequence of a zoning action, a property has environmental requirements relating to air, noise or hazardous materials that must be investigated and addressed before an owner can obtain a building permit for the property's redevelopment.

55 e-designations reported by the NYC Department of City Planning.

Active Contamination that represents a significant threat to the environment or to health.

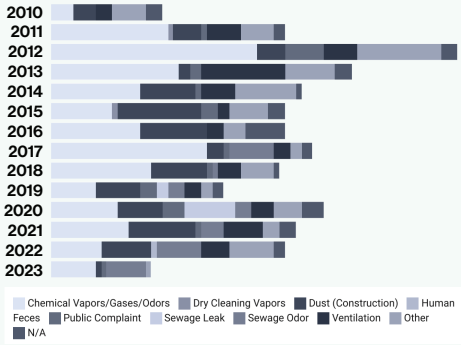
Case Study:
Royal Palms Shuffleboard Club

20 times more underground pollution than the state's allowable limit.

21,000 micrograms per cubic meter of trichloroethylene (TCE) compared to the normal range of 1,000-2,000 micrograms per cubic meter.

Higher chance of cancer, liver disease, headaches, and possible death.

Anyone in the mood for toxic cocktails?
Indoor Environmental Complaints

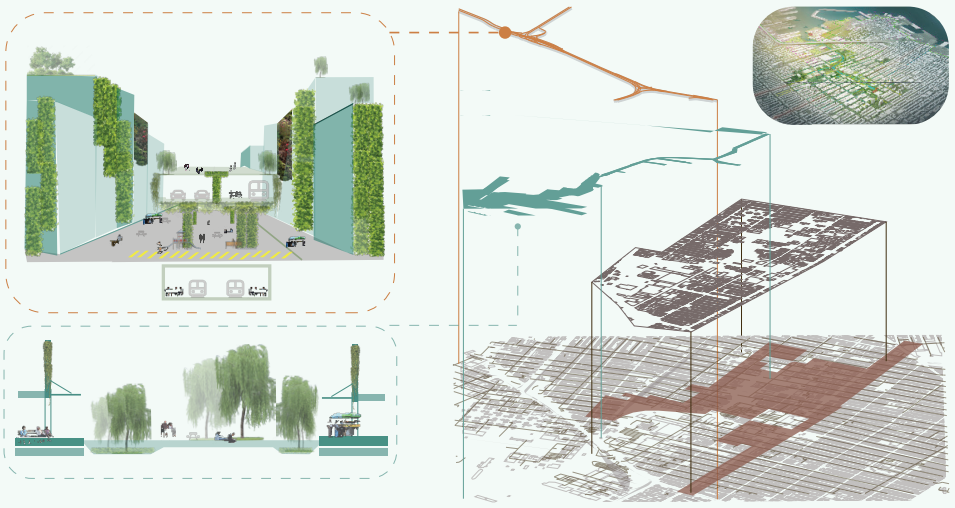


66% of the 311 calls are complaints on Loud Music/Party

open data e-designations, 311 calls, environmental remediation

Marta Krawczynski

the sound of silence: creative approaches to combat daytime & nighttime noise pollution during the Gowanus-rezoning



Topics of Urban Design Spring 2023

Marta Krawczynski

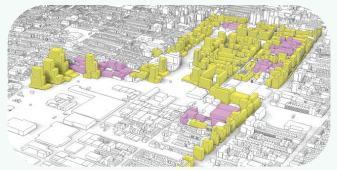
construction chaos

In 2021, the Gowanus rezoning was approved by the New York City Council, paving the way for a significant increase in new housing units and commercial spaces.

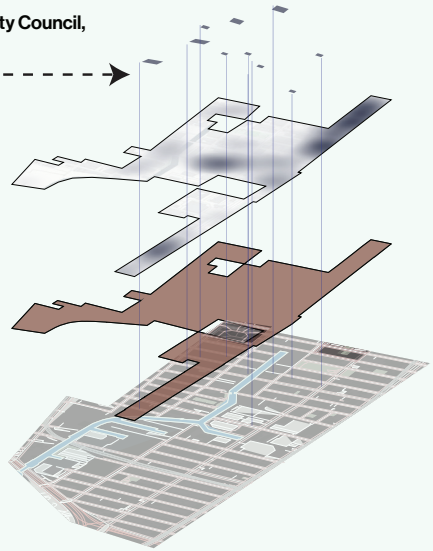
Estimated New Residents: 18,700

Estimated Increase in Apartment Buildings: 8,500+

Under the plan, developers will be permitted to construct 22 to 30 story high-rise buildings on both sides of the Gowanus Canal, as well as along 4th Avenue between 9th Street and Atlantic Avenue, among other areas designated for new construction.

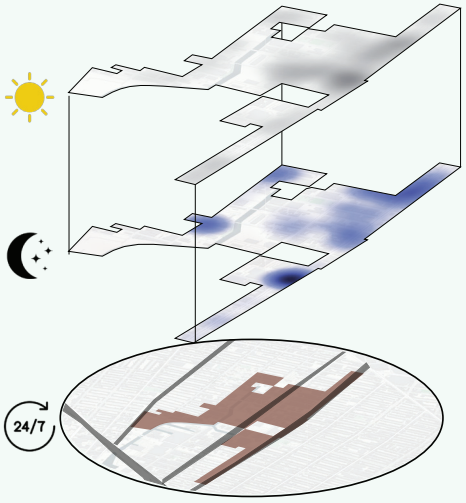


New Luxury Towers Proposed

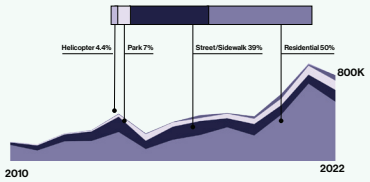


The "Gowanus Rezone" will increase construction activities such as excavation, pile driving, and heavy equipment operation.

where is the noise currently located?

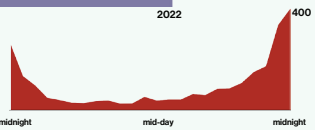


Current residents of Gowanus are accustomed to the constant noise of the neighborhood, as the existing noise pollution is a persistent issue that affects them 24/7. Over the past decade, there has been an increase in construction activity, noise complaints, and increase in traffic.



66% of the 311 calls are complaints on Loud Music/Party

50% of the 311 calls are residential



Traffic in Gowanus can be heavy and congested, particularly during rush hour and on weekends.

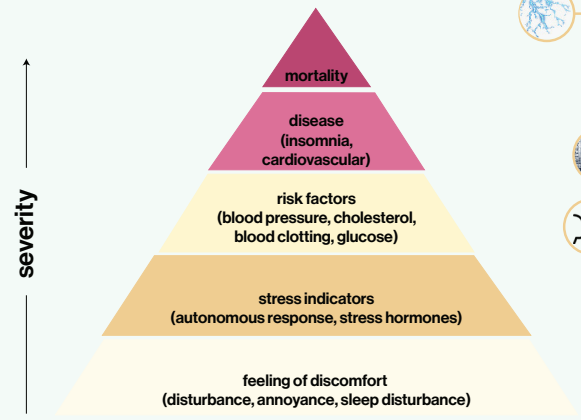
Major Roads Include:

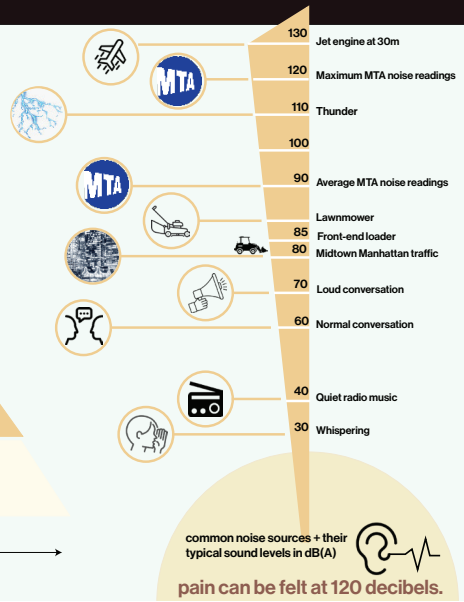
Brooklyn-Queens Expressway (BQE), the Gowanus Expressway, Fourth Ave.

Current Population: 20,800+

noise hazards and threats on the Gowanus community

9/10 adult New Yorkers are regulary exposed to noise levels higher than the 70 decibels that the Environmental Protection Agency considers to be harmful.





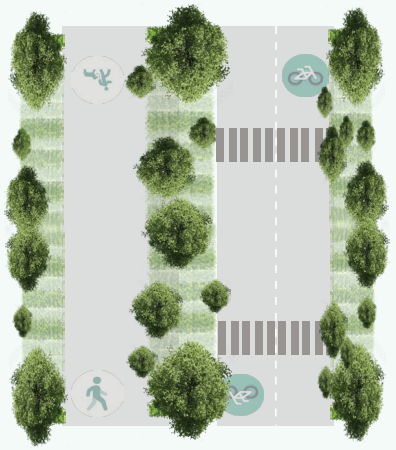
soundscaping with green design: harnessing nature to combat noise pollution

The incorporation of vertical gardens and trees can create a natural sound barrier that helps reduce noise pollution. In addition to their acoustic benefits, these green elements also provide numerous other environmental and aesthetic benefits.

side view

front view

Bukit Timah-Rochor Green Corridor Singapore



short-term solutions for construction without noise

Yanko Design

AUS Group Alliance

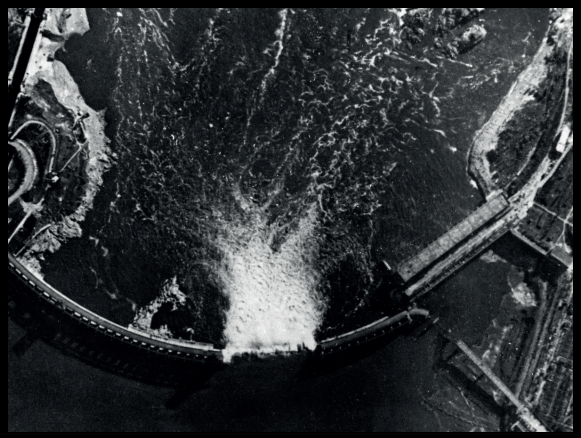
Key Partners:
MTA, NYC Parks, US EPA, NYC DCP, DOT, DEP, OSHA, Nightlife Mayor
Voice of Gowanus, Sounds of New York CIty (SONYC)

Independent Study:
Urban Ecology

In this independent project, I explored the environmental history of hydropower in the United States, China, and Ukraine, concentrating on the damage caused by hydropower in these regions. This individual research project will serve as a foundation for future studies on the intersection of ecology, biophysical design, and the future of dams.

Fall 2023

CONTROLLING NATURE



Marta Krawczynski

ACCESS HERE

from hydro-terrorism to ecocide: weaponising water in war

Kirov Reservoir with Lenin figure in Kyrgyzstan (Senses Atlas)

Gustav Klutsis' 1932 poster for the Dneprostroi Dam in Russia (Heritage Image Partnership/Alamy)

In a free flowing river, fish can swim up and downstream at will. Groundwater and aquifers naturally refresh the water, silt and other natural materials move along freely. The water moves out onto the floodplain in harmony with the seasons. The free flow of water is governed by the connectivity of pathways that enable the movement and exchange of water and of the organisms, sediments, organic matter, nutrients and energy that it conveys throughout the riverine environment. River connectivity extends in four dimensions: longitudinally (up- and downstream in the river channel), laterally (between the main channel, the floodplain and riparian areas), vertically (between the groundwater, the river and the atmosphere) and temporally (seasonality of flows). River connectivity is also spatially and temporally dynamic, driven by the natural flow regime, enabling and regulating hydrological, geomorphic and ecological processes in river networks and providing the aquatic medium for matter and species to move along the river and into adjacent habitats. Rivers constitute vital fountains of environmental vitality, economic prosperity, and human welfare. However, a recent investigation has unveiled a concerning reality: about two-thirds of the planet's 242 longest rivers have lost their natural free-flowing state, primarily attributed to human interventions, with the detrimental impact of dams standing out as a significant contributor.

Historically, humans have viewed water as a threat, seeking methods to manipulate nature, promising the creation of a world that would better serve humanity's needs. Dams emerged as the means by which humans could exert control and engineer nature, imparting the belief that they could effectively store vast quantities of water, wastewater, or liquid-borne materials for various purposes. These purposes include flood control, the provision of human water supply, irrigation, livestock water supply, energy generation, containment of mine tailings, recreation, and pollution control.

Dams have been around for all of history, with construction increases during the introduction of concrete. Among the myriad characteristics of concrete that could be deemed revolutionary, its most crucial attribute has arguably been its role in facilitating rapid change. This research paper delves into this revolutionary moment in history that demanded swift or urgent transformations – be it the implementation of five-year plans in the Soviet Union, the New Deal in the USA, or the Great Leap Forward in China, – dams emerged as the go-to solution. Each of these ambitious political programs envisioned infrastructural developments on an unprecedented scale, surpassing existing industrial and labor capacities. Concrete, owing to the accessibility and relative affordability of its raw materials, coupled with the notion that a significant portion of the work could be carried out by unskilled labor, held the promise of turning the otherwise implausible into reality.

As a planner and environmentalist, dams are my greatest enemy. This research serves as a response to the ongoing global struggle against water, which poses a continuous threat to its natural flow. The study commences with a section dedicated to hydropower and provides a concise overview of the historical context of dams. Following this, the paper delves into the examination of three countries pivotal to the proliferation of dams: the U.S., China, and Ukraine (formerly part of the USSR). These case studies were selected for their interconnected relevance. Dams, beyond being environmental hazards, also function as tools of political strategy, shaping how communities engage with their environment. As an environmental planner, it is imperative for me to understand the impact of dams on global transformations. The question that guides my exploration is: How will dams shape the trajectory of change in the world?

Disaster Risk Analysis + Resilience of Urban Systems

Project Framework

The impact of global climate change is reshaping our world, influencing an increased frequency and severity of climate-induced hazards and multifaceted challenges. As a result, the threat of the Great Climate Migration is becoming a reality. According to the think tank the Institute for Economics & Peace (IEP), there are an estimated 1.2 billion people that could be displaced globally by 2050 due to climate change and natural disasters (Zurich). While each country is impacted differently, Bangladesh, often referred to as "ground zero for climate change," is particularly vulnerable due to its low sea level, high population density, and inadequate infrastructure (Natural Resources Defense Council). Despite being responsible for less than 0.35 percent of global greenhouse gas emissions, Bangladesh faces ongoing catastrophic natural hazards such as tropical cyclones, storm surges, river and coastal flooding, landslides and droughts (International Monetary Fund. Asia and Pacific Dept). As a result, communities are frequently undergoing change with a significant impact on their economic, social, and environmental landscapes. The constant displacement, in particular, has contributed to a range of economic and social challenges, making it a critical issue to address in the context of climate migration. Many existing migration studies have examined the migration effects after major climate hazards and/ or have focused on communities that are highly exposed. In our study, we observe historical flood patterns in relation to socioeconomic factors while unveiling Bangladesh's readiness on becoming a climate migration hub. Using the same dataset from the preliminary climate hazard analysis, we predict population changes in 2020-2025 using a geographically weighted regression model, a local model that allows the relationship between variables to vary across space by estimating separate regression models for each location in the study area. The final part of this study is a readiness assessment of the top five locations with the highest predicted inflow. Using this information, we can better identify opportunities to approach the country's ability to become a migration hub in the future years.

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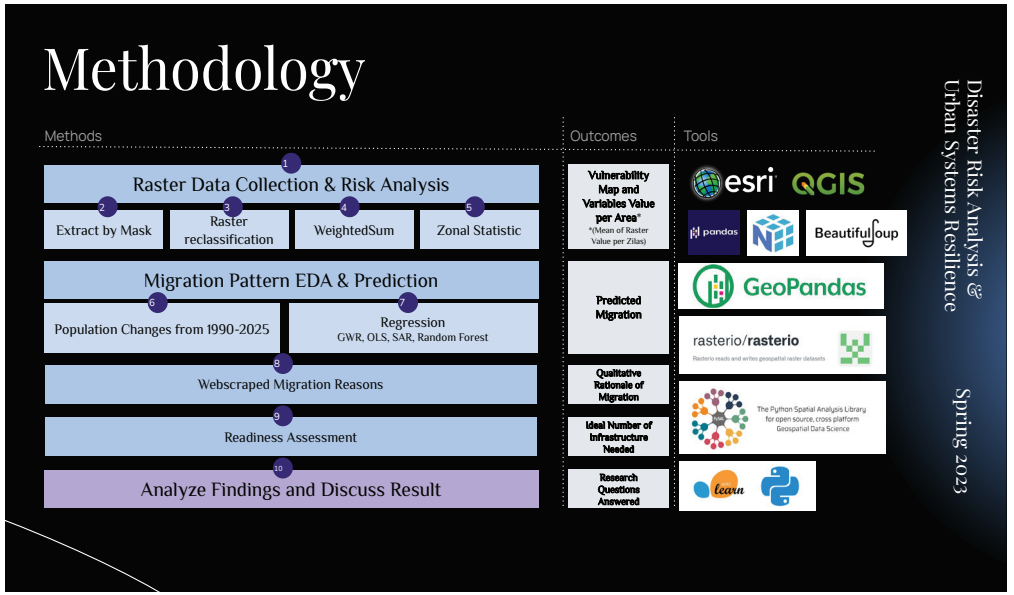


Literature Review

Title

Climate Change and Internal Migration Patterns in Bangladesh: An Agent-based Model

Disaster-induced migration types and patterns, drivers, and impact: A union-level study in Bangladesh

Hazards and 'forced' migration in Bangladesh

A Country Made for Disasters: Environmental Vulnerability and Forced Migration in Bangladesh

Modeling Human Migration Under Environmental Change: A Case Study of the Effect of Sea Level Rise in Bangladesh

Some Important Takeaways

"The poor in the city hardly cherish the dream to return to their place of origin except for short term visits. They plan to stay permanently in the city and move from slum to slum only when forced to do so. Quite a significant proportion among the migrant urban poor have been successful and made some economic mobility."

Table 2f. Main reasons for moving to Dhaka.

Reason	No. of households	%
Lack of income opportunities	311	35.8
Debt	18	1.8
Low income	158	17.5
Environmental hazards	158	17.5
Drought	139	16.0
River erosion	55	6.0
Cyclone	52	9.3
Floods	14	2.5

Source: Field survey 1998 (n = 557).

Three Groups of factors in Migration

push factors – climate change scenarios and their possible impacts, & the socioeconomic conditions of each district such as poverty level, local government development expenditures and unemployment rate;

pull factors – socioeconomic conditions of the potential destinations; &

intervening factors – land or house ownership and employment conditions.

People are currently trying to adapt to the first impacts of disasters, but there could come a time when local adaptation will no longer be possible. Bangladesh might then become a theatre of vast population movements, triggered by climate change, which could pose a threat to regional security.

Additional research taken from:

ipcc

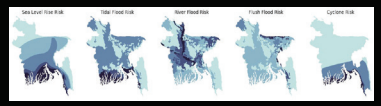
Data Collection

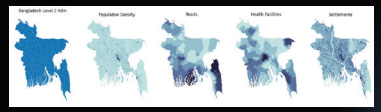
Disaster Risk Analysis & Urban Systems Resilience

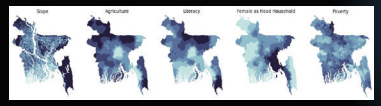
Spring 2023

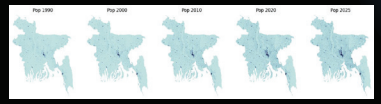
Hazard Raster	Tidal Flood, River Flood, Sea Level Rise, Cyclone, and Flush Flood
Exposure Raster	Population Density, Roads, Health Facilities, School, Settlement
Vulnerability Raster	Agriculture Area, Slope, Literacy, Poverty, Female as Head Household
Migration Reason	2011 data gathered from Bangladesh Statistics Bureau
Population Changes	Global Human Settlement Layer (GHSL) Population Data From 1990-2025
Employment	2011 data gathered from Bangladesh Statistics Bureau

Materials Gathered From :

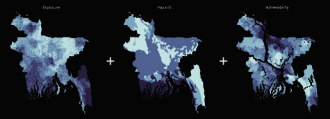








Climate Hazard Risk Map

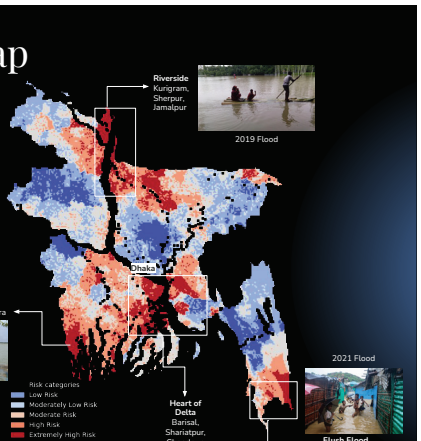


We integrate the variables using **Sum Weighted tools in ArcMap**. However, due to limitation, we use **weight = 1** for all variables.

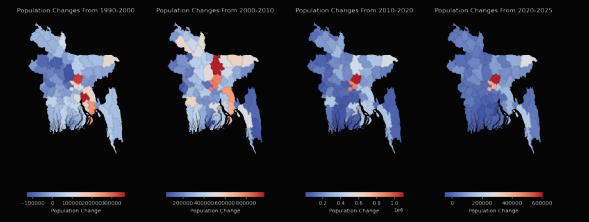
Some areas categorized as Extremely High Risk are: **Kurigram, Sherpur, Jamalpur, Sylhet, Mymensingh, Satkhira, Barisal, Shariatpur, Chandpur, Lakhsmipur, Bandarban, and Cox's Bazaar.**

Northern areas categorized as extremely high risk are among the most vulnerable across the country **due to poverty and their main occupation – agriculture** (mainly rice and jute). About 48% of Bangladesh population are employed in agriculture and shares about 17.5% of the national GDP)

2022 Flood



Population Changes and Migration Prediction



Using population changes derived from GHSL population raster as the target variable, we are able to predict future migration (population changes 2020-2025) with 14 risk variables as predictors

We are trying to use 4 methods to predict migration: **Geographically Weighted Regression, Spatial Autoregressive Regression, OLS, and Random Forest**

Evaluation Metrics	GWR	SAR	OLS	RF
IS R2	0.782	0.427	0.609	0.881
OS R2	0.650	0.264	-6.33	0.299

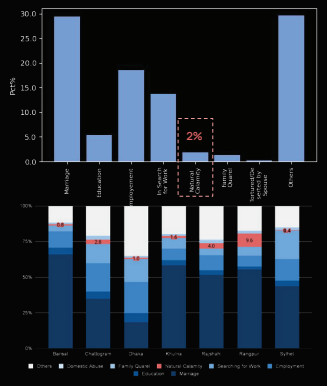
Y = 70539.371 - 1109.555X1 - 383.572X2 - 8305.915X3 + 2.359X4 - 1214.691X5 + 153.826X6 - 65.553X7 - 3.792X8 + 47.657X9 - 1017.381X10 - 200.762X11 + 744.260X12 + 141.555X13 + 895.603X14

Disaster Risk Analysis & Urban Systems Resilience

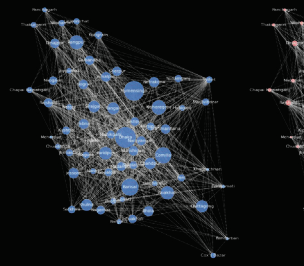
Spring 2023

Past Migration Pattern and Reasons

Past Migration Reason and Push-Pull Factors

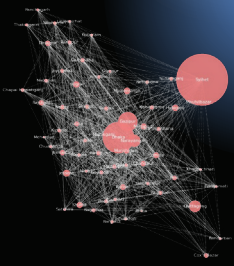


Migration Network Node Size = Origin



Dhaka, **Mymensingh, Barisal,** Comilla, Kishoregonj, and **Rangpur** are the top migration origins. Three of which are categorized as level 5 (extremely high risk) in the previous analysis.

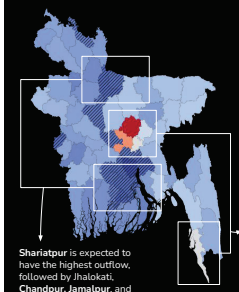
Migration Network Node Size = Destination



Dhaka, its neighboring Zilas (Gazipur, Narayanganj, and Sylhet are the top migration destinations. **These areas have high scores in pull factors** such as employment, education, and marriage.

Readiness Assessment

GWR Y-Pred (Pop Changes 2020-2025)



Shariatpur is expected to have the highest outflow, followed by Jhalokati, **Chandpur, Jamalpur**, and Meherpur.

Ghazipur predicted to have the highest inflow, followed by its neighboring area Dhaka, Narayanganj, and Narsingdi. Cox's Bazaar is also among the top 5 with highest inflow.

Why? Jobs

Socio-Economic & Infrastructure Needs Based on Predicted Population Changes

District	%Pop Growth 2010-2025	ΔSetlm* 2010-2025	ΔHealth 2010-2025	ΔSchool 2010-2025	ΔJobs 2010-2025
Ghazipur	72.7	27,810	2384	872	42,407
Dhaka	30.6	73,927	8077	1089	201,620
Narayanganj	40.3	26,302	1270	597	39,882
Narsingdi	35.97	5,548	925	702	22,272
Cox's Bazaar	14.1	18,417	4359	1749	90,423

**Assuming 1 settlement is for 4 person household*

Conclusion

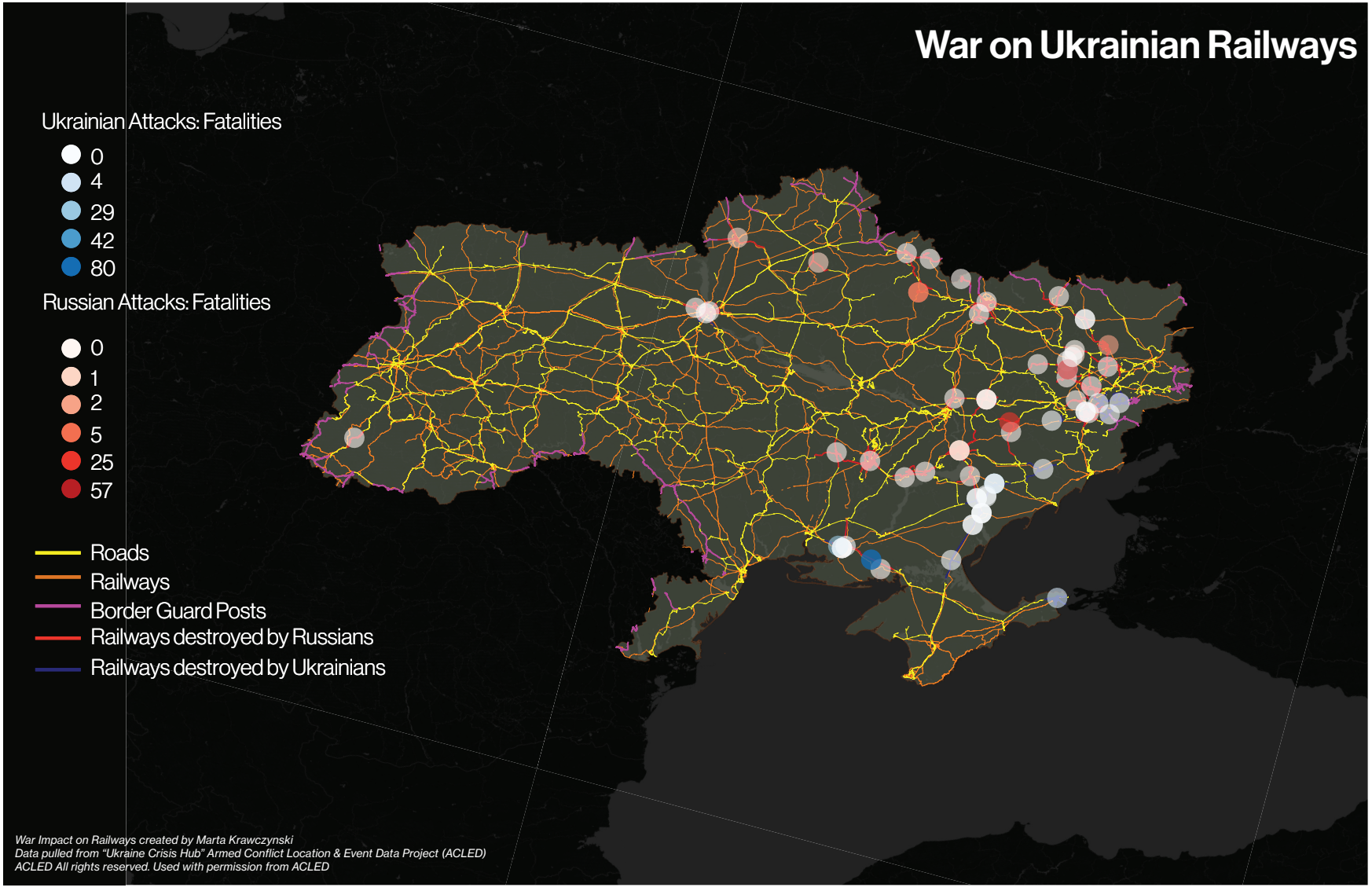
We are able to estimate **361,092** outflow in **2025.** Most of which are from high risk area.

With the climate challenge ahead, **Bangladesh needs to invest more on the socioeconomic and infrastructure development** to become 'The Climate Hub', especially in urban areas with high inflow prediction such as **Dhaka and Cox's Bazaar.**

War on Ukranian Railways

Project Framework

In this independent project, I investigated the crucial role and impact of railways during the Russian war on Ukrainian soil. The study involved extensive data collection on the destruction of railway infrastructure and the movement of citizens across the border facilitated by Ukrainian railways. Using Excel and QGiS, I analyzed data sourced from ACLED, UNHCR, OCHA, and Open Data (gov.pl) to understand the operational challenges and strategic significance of rail transport in wartime. The findings, illustrated through graphics created in Adobe Illustrator, highlight how railways have been pivotal in both civilian evacuation and the logistics of war, despite facing significant damage and operational disruptions.




Ukrainian Attacks on Ukrainian Railways
Fatalities
0
4
29
42
80
Roads
Railways
Railways destroyed by Ukrainians
Data pulled from "Ukraine Crisis Hub" Armed Conflict Location & Event Data Project (ACLED)
ACLED All rights reserved. Used with permission from ACLED


Russian Attacks on Ukrainian Railways
Fatalities
0
1
2
5
25
57
Roads
Railways
Railways destroyed by Russians
Data pulled from "Ukraine Crisis Hub" Armed Conflict Location & Event Data Project (ACLED)
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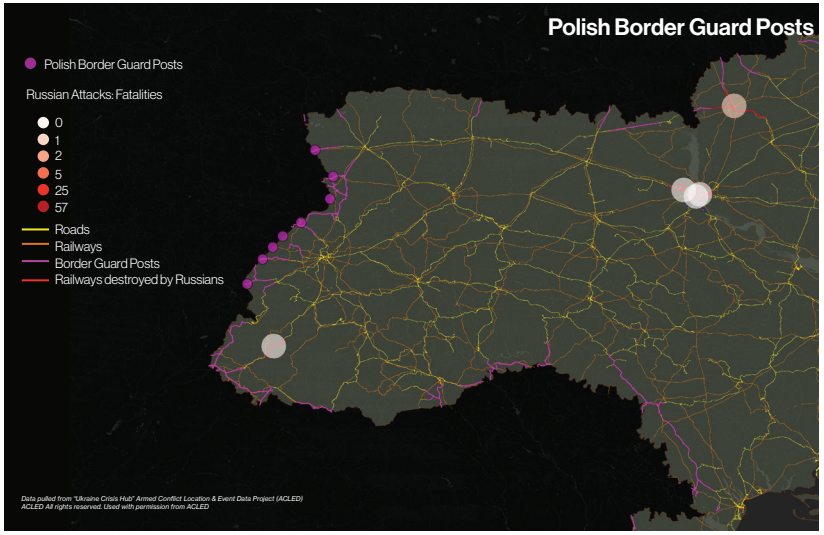
Polish Border Guard Posts
Polish Border Guard Posts
Russian Attacks: Fatalities
0
1
2
5
25
57
Roads
Railways
Border Guard Posts
Railways destroyed by Russians
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