

(RE)DESIGNING LOWER ROXBURY TO COMBAT INCREASING EXTREME HEAT



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EXECUTIVE SUMMARY

PROJECT OVERVIEW

(Re)Designing Lower Roxbury to Combat Extreme Heat is a report based upon a four-week investigation of extreme heat in Lower Roxbury carried out by 27 high school students from four Boston Public Schools under the supervision of students and faculty from the University of Massachusetts Boston's Department of Urban Planning and Community Development, planning and design professionals from BPDA, Department of Environment staff members, public and private planning consultants, and environmental and climate change scientists across the City of Boston.

The high school students who participated in the 2023 Summer Program in Urban Planning, co-sponsored by the Boston Planning and Development Agency, Boston Public Schools, University of Massachusetts Boston, and Madison Park Vocational and Technical High School, sought to first investigate the problem of extreme heat and potential solutions in Lower Roxbury and second, to design cool pocket park to reduce urban heat footprint in Lower Roxbury. Eighteen new students of the program participated in four weeks of extreme heat research, and 9 continuing students (who participated in the 2022 summer program) worked for four weeks to create a design of a cool pocket park to be built in Roxbury Community College (RCC) that reduces the neighborhood's urban heat island footprint.

Working with graduate planning students and faculty from the University of Massachusetts Boston and other planning, environment science, and climate change professionals across the city of Boston, the participating high school students devised a four-part research design to generate reliable and valid data for both projects. The student's extreme heat research methodology included a careful review of the existing scholarly literature on climate change and extreme heat; students' observation and reflection of neighborhood status; a review of recent climate change and extreme heat reports issued by the City of Boston; the collection of ambient air temperatures at 38 public places within Lower Roxbury; 90 "people in the street" interviews with local stakeholders regarding their lived experiences dealing with Boston's rising heat and best practice research to understand what other city and communities are doing to deal with increasing extreme heat.

Our urban design research methodology included observational activities such as photo essays and behavioral observation to examine and critically reflect on the mutual relationship between urban design and people's behavior during summer months; key informant interviews (KII) to gain insights about community perspectives on the RCC Cool Pocket Community Park. The methodology also featured interviews with residents regarding community perceptions regarding the development of a potential park, SWOT analysis to assess the conditions at the proposed site identified for the construction of the Cool Pocket Community Park on the RCC campus and the surrounding areas, and best practice research.



MAJOR FINDINGS: EXTREME HEAT

- Temperature surveys at the 38 public places in Lower Roxbury, where students took 135 ambient air temperature readings, on average, exceeded by 5 to 10 degrees those reported by the National Weather Service (NWS) at Logan International Airport. These temperature data were collected in streets, parks, playgrounds, bus stops, and other important social and cultural locations around Lower Roxbury
- The temperatures recorded at the “warmest locations” within Lower Roxbury exceeded those reported by the NWS by around 15 degrees.
- Major streets and commercial corridors were identified as one of the hottest areas in the neighborhood. Many of Lower Roxbury’s public playgrounds and parks, where individuals and families are encouraged to go for relief when temperatures in their residences and workplaces rise were hotter and often exceeded NWS temperature, preventing these spaces from being safely used.
- The parking lot of RCC, an urban design project for the second cohort of the summer program, recorded 90° F, which is 5 degrees hotter than NWS. This parking lot is going to be transformed into a cool pocket park.
- Out of 90 individuals interviewed at busy hubs such as Roxbury Crossing, Jackson Square, and Nubian Station, more than 70% highlighted their growing concerns regarding rising temperatures. Most residents said they are confident they can care for themselves and their families during heatwaves.
- Interviewees in Boston were from various neighborhoods, but they often spent time in or passing through Roxbury for work, social gatherings, and other activities. More than 70% of the interviewees were from Roxbury and Dorchester, and a few others were from Hyde Park, Jamaica Plain, and Mattapan. Most of the residents interviewed fell into the younger demographic categories.
- Fifty percent of residents said their homes got too hot, and they sought other places like libraries or pools to cool off. Many people did not go to parks or cooling centers to find relief from the heat.
- Residents had many suggestions to prevent overheating, such as: water facilities like misters and free water bottles, offering improved or cheaper air conditioning, and establishing cooling centers. Many residents noted the importance of AC in the summer but also worried about its cost, hoping for the city’s support in making it more affordable.
- Students observed that the park and playground lacked shaded areas and had a higher proportion of heat-trapping surfaces. Most of the gardens were not well maintained, were full of trash, had few trash cans, and had fences or gates, making them ‘unwelcoming.’ Bus stations commonly lacked shelters and were very hot.

PLANNING RECOMMENDATIONS FOR KEEPING ROXBURY COOL

The recommendations to reduce the urban heat island footprint in Lower Roxbury while keeping residents safe during heat events were based upon the student’s review of the existing climate change and extreme heat literature, the recent City of Boston reports on climate change and extreme heat, a curated walking tour of historic Roxbury, briefings by environmental planners, scientists, and landscape architects, briefings by and interviews with residents and civic



leaders and students' experiences and observations during four weeks of intensive research. The participating high school students provided several overarching recommendations, as well as site-specific recommendations for cooler bus stops, streets, parks, and playgrounds.

- Major streets like Columbia Ave. and Washington St. were the hottest. They needed more trees and shade to increase pedestrian comfort and help address sound and air pollution. Adding a tree-lined strip between the street and sidewalk for shade, to serve as a visual boundary, a sound barrier, and aesthetically pleasing walking corridor was recommended.
- Green infrastructure elements such as rainwater collectors that support new green areas should be prioritized. Building owners along these streets should also be encouraged to provide awnings for their buildings to protect building occupants, customers, and passing commuters from the sun and precipitation.
- Bus stations around Lower Roxbury should have more seating for commuters, fans, or misting features for hot days and digital boards with real-time data on bus routes and temperatures.
- The bus stations on Malcolm X Boulevard at King St. and Madison High., used by Madison High students, have no seating nor protection from the weather. Shelter and seating should be provided. Stations should also have real-time bus and weather information.
- Most bus stations around Lower Roxbury need to be constructed of materials that does not trap heat. One of the recommendations is to paint them with materials that reflect heat. White painting should be prioritized wherever possible to reduce the urban heat island footprint on the streets. Solar-powered fans can be added for comfort in the heat.
- Parks and playgrounds need more shade to protect those engaged in active and passive forms of recreation. This can be produced naturally by trees or artificially by canopies. More water features should be added to established parks to reduce their heat footprints. For example, these features could benefit Jeep Jones Park (lower level) and Roxbury Heritage Park. Wooden benches or benches made of less heat-trapping materials are recommended in the playground. Playground equipment should also be made of such/said materials.
- The park and playground need to be well maintained and regularly cleaned and have enough trash cans. Elements like gates and fences may enforce 'unwelcoming' behavior and should be removed.
- Other recommended strategies include improving equitable access to cooling facilities such as: open cooling centers, community pools, sprinklers, and park splash zones.
- The development of an effective strategy for assisting low-resource families with increasing cooling costs is essential - a summer version of HEAP financed through a lifeline-like utility rate reform law can help address residents financial/economic concerns of dealing with extreme heat issues.
- Expand access to information regarding extreme heat risks, available cooling services, and possible mitigation strategies via social media campaign flyers at community centers is critical.



URBAN DESIGN RESEARCH FINDINGS

Among the project's major urban design findings are:

- The proposed children's playground is located on Columbia Avenue close to several major institutions and public transit nodes that will enable it to attract a wide range of potential users.
- The playground's location in an area underserved by public parks should allow it to function as a much needed "third space" for local community building activities.
- Designed and built at the same time the city and the Commonwealth are carrying out major improvements to the Southwest Corridor Park and Columbia Avenue surface transportation system should allow the playground to be integrated into a continuous network of Roxbury greenways.
- The treeless, waterless, and concrete nature of the current site causes it to function as an urban heat island in an environmental justice community where many residents are struggling to cope with extreme heat.
- The application of basic "cool design principles" has the potential to transform this residual open space into an "urban oasis" serving as a refuge from the area's increasingly oppressive summer heat.
- The site, adjacent to the Southwest Corridor Park and soon-to-be redeveloped Columbia Avenue, reimagined as a multi-function public open space, can serve as a model of how other small scale residual open spaces can be transformed through community/school/university/municipal partnerships.
- In a city boasting more than sixty colleges, many with internationally recognized architecture, engineering, environmental sciences, landscape architecture, and urban planning programs, the potential of such partnerships appears to be significant.
- Federal funding for the implementation of such projects under the Biden Administration's infrastructure program and the Markey/Ocasio Green New Deal Legislation appears significant.

URBAN DESIGN RECOMMENDATIONS

Among the urban design team's major physical design recommendations are the following:

- The park must be accessible, welcoming, and attractive for everyone.
- The design of the park must be unique to differentiate this park from the others in the city and to attract more users.
- The park should be built using safe, cooling, and natural materials to reduce the urban heat island effect and to encourage a more energy-efficient mindset.
- The park should be built to be a multifunctional space where several activities can be performed in line with the needs and wants of the surrounding community.
- The park should have a water feature for everyone to play in, cool down, and find relief during hot days.



- Most of the park should be shaded with trees or with small and colorful shading structures that allow the wind to pass through. Shade is a key element to mitigate temperatures and allow users to enjoy the park during hot days.
- The edges of the park should be green barriers that provide shade, filter air and noise pollution, add greenery to the park, and separate park users from the surrounding traffic.
- The park should be designed in connection with the ongoing project of reimagining the Southwest Corridor and the renovation of the Historic Dudley House.



THE ORIGINS AND EVOLUTION OF THE UMASS BOSTON SUMMER PROGRAM IN URBAN PLANNING

INTRODUCTION

In November of 2021, Mr. Barry Reaves, former director of BPDA's Office of Diversity, Equity, and Inclusion invited the Department of Urban Planning and Community Development at the University of Massachusetts at Boston to work with his staff in designing and implementing an experientially based education program to introduce youth of color to the growing number of exciting public service careers in the fields of urban planning, design, and development.



THE BIRTH OF THE SUMMER PROGRAM IN URBAN PLANNING

UMass Boston graduate planning faculty responded to this invitation by designing a summer program for Roxbury and Dorchester youth to expose them to the field of urban planning through a “hands on” research project aimed at determining the nature, scope, and impact of the “extreme heat” threat confronting the most vulnerable residents of their community. This effort was carried out in collaboration with staff from the BPDA, Boston Public Schools, Madison Park Technical and Vocational High School, Boston Water and Sewer Commission, and Roxbury Community College. In the spring of 2022, UMass Boston graduate planning faculty presented their 2022 Summer Program in Urban Planning Proposal to the BPDA Board of Directors for consideration. The overarching goal of this program was to:

Introduce young people of color from Boston to the critical role urban planners and designers are playing in collaboration with residents, civic leaders, and elected officials in transforming Boston into a more sustainable, resilient, and equitable city.

The Summer Program's key educational objectives were to:

- Expose youth of color from Roxbury and Dorchester to public service careers in urban planning and design.
- Showcase emerging civic leaders from BPS high schools in Lower Roxbury and beyond.



- Support resident-led and city-supported initiatives to address extreme heat in Lower Roxbury; and,
- Enhance students' organizing, research and planning knowledge and skills through a "real world" policy-relevant research experience.

With \$55,750 in BPDA funding, UMass Boston recruited fifteen youth of color from Madison Park Vocational and Technical High School, Dearborn STEM Academy, TechBoston Academy and Blue Hills Regional Vocational High School to participate in a four-week summer program featuring classroom and field-based learning opportunities offered by graduate planning students and faculty. Among the topics students explored were the: principles and practice of community planning; the environmental, economic, and social impacts of climate change in Boston; environmental planning data collection and analysis; and citizen participation in urban planning and policymaking.

The 2022 Summer Program in Urban Planning culminated in a public presentation of the students' *Cool Roxbury: Lower Roxbury's Extreme Heat Challenges and Solutions Report* that eighty residents, institutional leaders, and elected officials attended (Available at: www.pauldavidoff.com). At the end of their presentation, Boston City Council President, Ed Flynn, who was in attendance invited the students to share their research findings and planning recommendations with he and his colleagues at City Hall. Shortly thereafter, the students were asked to present their environmental justice work at an agency-wide staff meeting which more than 150 BPDA planners attended. These presentations resulted in the students presenting their "extreme heat" mitigation strategies at a national webinar organized by the Housing and Community Development Division of the American Planning Association. In October of 2022, the Massachusetts Chapter of the American Planning Association recognized the students' *Cool Roxbury Report* with its 2022 Best Student Project Award – the first- and only-time high school students have ever received this award.

THE 2023 SUMMER PROGRAM IN URBAN PLANNING

Ninety-five percent of the students who participated in the 2022 Summer Program rated their experience as "excellent" or "very good". When asked if they would recommend the program to a family member and/or a friend – all the students said "yes". The transformational experiences these young people had were made possible by a \$100,000 BPDA investment and \$75,000 provided by the Boston Private Industry Council. The positive evaluations, along with the program's significant impact on student retention, achievement, and career aspirations prompted the UMass graduate planning faculty to work with BPDA staff and Boston Public Schools administrators to make several important improvements in the program in 2023. Among these changes were:

- Transform the program from a single to a multi-year program designed to significantly enhance participants' understanding of the ever-evolving field of urban planning during a period of rapid climate change.



- Compliment the Summer Program’s foundational course in community planning for urban resiliency with an advanced class in ecological planning and design for returning students.
- Offer returning students the opportunity to gain new insights into the field of resiliency planning by completing a month-long, paid internship with one of Boston’s leading public, private, and non-profit planning organizations. Whereas the inaugural program engaged students in a month-long community-based research project, the second-year program involved returning students in a month-long community-based research project as well as a month-long paid internship program that extended the duration and intensified the impact of the program.
- Maintain contact with the participants by working with the faculty and administration of Madison Park Vocational and Technical High School to establish an after-school club focused on social justice in the city.
- Provide participating students with no-cost access to a three-credit university class examining the origins, evolution, and current state of urban planning, design, and development in Boston.

This past summer twenty-seven students of color from six different public high schools in Roxbury and Dorchester participated in the 2023 Summer Program in Urban Planning. At the end of July, these students organized a two-part presentation highlighting their ongoing research into Lower Roxbury’s extreme heat crisis as well as their design guidelines for a children’s playground to be built on the Roxbury Community College Campus. These “heat sensitive” design recommendations seek to produce a “prototype” children’s playground that will perform ten to twelve degrees cooler than the “typical” children’s playground.

The following pages describe the library and field-based research the participants in the 2023 Summer Program in Urban Planning carried out to better understand the nature, scope, and impact of climate change-related extreme heat on Lower Roxbury most vulnerable residents. The following pages also describe the library and field-research participating students completed to formulate design guidelines to shape the construction of the soon-to-be-constructed RCC children’s playground. The following report concludes with a summary of the students major extreme heat and “heat sensitive” playground design research findings and recommendation.

The work described in this report was carried out under the supervision of Sajani Kandel PhD and Sara Tornabene PhD of the UMass Boston Department of Urban Planning and Community Development with the assistance of the following six Graduate Teaching Assistants: Will Cecio, Cami Donadio, Natacia Flick, Adam Forrester, Jia Hung, and Ania-Nabi Ruiz. This talented team was assisted by climate scientists, environmental planners and public policy experts from the City of Boston, Commonwealth of Massachusetts, Edward M. Institute for the US Senate, Massachusetts Chapter and National Office of the American Planning Association, Museum of Science, Planners of Color in Environmental Sciences, Roxbury Community College and the 100 Resilient Cities Network.



It was also supported by teachers, staff and administrators from the Program's BPS partners schools which included: Boston Community Leadership Academy, Dearborn STEM Academy, TechBoston Academy, Madison Park Technical and Vocational High School as well as Blue Hills Regional Vocational High School. Most importantly, this community-based research project would have been impossible to complete without the encouragement and support of the residents, business owners, and civic leaders from the Greater Roxbury community, especially the: Frugal Bookstore, Highland Park Neighborhood Association, RCC Community Garden, Roxbury Branch of the Boston Public Library, Twelfth Avenue Baptist Church, Wakullah Dale Community Garden and Neighborhood Association.



2023 SUMMER PROGRAM IN URBAN PLANNING AND DESIGN



PROGRAM OVERVIEW

After a successful ‘pilot’ summer program in urban planning, the University of Massachusetts Boston, in partnership with Boston Planning and Development Agency, Boston Public Schools, and Madison Park Technical Vocational School designed a year two program to reinforce Boston youths’ emerging interest in urban planning, design, and development. Year II or 2023 Summer Program in Urban Planning expanded to include two cohorts, one cohort of continuing students and another cohort of new students in applied community-based research in Lower Roxbury. Below is the snapshot of the 2023 Summer Program in Urban Planning:

- 1. Summer Program for New Students (Cohort II):** Eighteen new students from Madison Park Technical and Vocational High School, Dearborn STEM Academy, Boston Tech, BCLA, and Blue Hills Regional Vocational School were enrolled in a four-week ‘exploration’ program to learn the principles and practice of contemporary urban planning and design through an experientially based education program focused on increasing extreme heat issues confronting Lower Roxbury. The extreme heat research of the ‘pilot’ summer program was extended by the new students to provide an in-depth understanding of extreme heat challenges and potential solutions to minimize urban heat footprint and safeguard most vulnerable residents from heat impacts.
- 2. Summer School 2.0 for Continuing Students (Cohort I):** Nine students who participated in the ‘pilot’ (2022) summer program came back for second four-week educational program that exposed continuing students to the basics of urban design and planning implementation by giving them the opportunity to work with local stakeholders, Roxbury Community College (RCC) and the City of Boston Parks Department to “reimagine” and “redesign” a parking lot of RCC as a cool pocket park that minimizes its urban heat island footprint in the neighborhood.

The summer program experience shifts from an “exposure” experience during which students are introduced to urban planning principles and practices to an “immersion” experience during which they developed and mastered key planning concepts, methods, and skills. They acquired new planning knowledge and skills by conducting a detailed physical survey of three existing open spaces (i.e., playgrounds, parks, and natural areas), user experience/satisfaction surveys of these public facilities with an emphasis on the role extreme heat plays in limited use and enjoyment, and prepared preliminary designs for mitigating extreme heat conditions that affect resident use.

- 3. Urban Planning Internships for Continuing students (Cohort I):** Following this four-week “immersive” program, the continuing students had the opportunity to work for four weeks in urban planning and design organizing under the supervision of a skilled



planner/designer, who served as the students' mentor. The students were offered full-time paid internship positions at these agencies based upon learning plans, cover letters, and resumes which were completed with the assistance of their UMass Boston urban planning staff and mentors and the mutual interest of students and hiring agencies. The organizations where students worked are the Boston Planning and Development Agency (BPDA), Boston Water and Sewer Commission, Massachusetts Association of Planning Commissions (MAPC), Roxbury Community College (RCC), ARROWSTREET, A Better City UMass Boston UPCD Department and Campus Planning Office. Students worked 37.5 hours a week and received \$15 an hour in compensation.

PROGRAM STRUCTURE

The 2023 Summer Program began on Wednesday, July 5th and ended on Tuesday, July 31st. Students were engaged in campus lectures, classroom demonstrations and exercises, field trips, and field research activities, Mondays through Fridays, 9 a.m. to 2 p.m. The students were engaged in an intensive four-week educational program designed and implemented by the UMass Boston urban planning faculty and students. The broader topics to be covered during this program are the following:

Urban Design Cohort II

Week #1: The Role of Public Parks in Promoting Health and Wellness

Week #2: Urban Design 101: Place-Making for Human Development

Week #3: Field Research Methods: Surveying Places and Interviewing Residents

Week #4: Amplifying Residents' Voice in Open Space Planning

Extreme Heat Cohort II

Week #1: Introduction to Urban Planning; Field Research: Emancipatory History

Week #2: Extreme Heat 101; Field Research: Interviewing Residents/Stakeholders

Week #3: Extreme Heat and Urban Design; Field Research: Temperature Survey

Week #4: Amplifying Residents' Voice in Extreme Heat Planning

The basic pedagogy and structure for each week for both Cohort I (park design) and Cohort II (Extreme Heat) were organized as follows:

- Mondays: Introduction of basic concepts, generation of student questions, preliminary preparation for field-based learning activities



- Tuesdays: Inspiring field trips to issue relevant sites in and around Boston. Some field trips include Emerald Necklace, Rose Kennedy Greenway, Boston Public Park, Museum of Science, etc. Details of field trips are provided in the research protocol section below.
- Wednesdays: Student-led fieldwork, including physical surveys of the park, temperature sensing, and interviews with residents or a wide range of park users and non-users. Details of field research work are provided in the research protocol section of each research project provided below.
- Thursdays: Compilation, analysis, and visual display of data; preparation of research report and planning and practice for final presentation.

After four weeks of exploratory and immersive research, students' research findings of both extreme heat and urban design research were presented in public meeting at Roxbury Community College (RCC) on July 27th, 2023, to which we invited parents and family members, local stakeholders, funders, learning partners and institutional leaders from the community, and elected and appointed officials.

Participating high school students (Cohort I and II) received approximately \$1,200 in compensation for contributing to the community-based research project. Upon completing the program, they will also receive a certificate of completion, two letters of recommendation (For future education and employment) and several issue-relevant books.

PEDOLOGICAL APPROACH

The summer program's pedagogy is distinctive due to its experiential "hands-on" nature, peer-led small groups in which much of its learning takes place, and several of Boston's pre-identified field trips. Students are allowed to learn about key elements of urban planning by undertaking, in collaboration with UMass Boston planning students and faculty, by engaging in a "real world" research and planning project focused on a critical issue confronting their community. They are not treated as passive recipients of canned lessons in what Illich called the "banking methods" of education. Instead, they are allowed to function as self-directed learners designing their strategies, with guidance, to understand and address a significant issue affecting the quality of life in their community.

A second unique feature of the Summer Program is the extent to which much of the learning takes place in 4-6 person teams facilitated by graduate urban planning students who develop close relationships with each student and provide critical guidance to team learning activities. These individuals commit to supporting each student's educational journey by noting their attendance. If a student is late, they text and call them to see if they have run into a problem. They greet the students at the entrance to the classroom building each day; they work



hard to encourage every students' participation in each class; as they get to know the students, they identify unique talents and insights they can bring to the work. Over time, they come to know the students' passions, aspirations, and goals, which enable them to structure unique learning opportunities for each student during the summer. Finally, they eat with their students daily and escort them to the shuttle to commute home.

On these days, students learn about the specific research problem (heat and park design) and the role planners and designers are playing in addressing this issue through formal lectures, short films, assigned readings, classroom demonstrations and exercises, small group exercises, discussions, and debates, field trips, community-based research, and structured reflection. Following each class, the mentors (aka teaching assistants) provide critical feedback to the faculty leading each week's lessons regarding what appears to be working and what could be more effectively taught. During these post-class debriefing/planning sessions, the teaching assistants also identify ways in which individual students may be given opportunities to share their observations, insights, and suggestions with the full class enabling them, over time, to gain their own voice, an enhanced sense of agency and critical consciousness as described by Paulo Freire and other popular educators committed to student empowerment.

Another important element of the Summer Programs tech program has been the contributions that other Boston arts, civic, and planning institutions, and agencies have made to our instructional efforts. The research, curatorial, and educational staff of the Wakullah Dale Neighborhood Association, Museum of Science, Edward M. Kennedy Institute for the US Senate, Department of Environment and Department of Parks and Recreation from City of Boston, Roxbury Community College, the Boston Planning and Development Agency, Professional of Colors in Environment Science and Massachusetts Coalition for Occupational Safety and Health recommended multi-media materials to prepare the students for their work, provided guest speakers to share critical concepts, methods, and policy insights, hosted field trips to their headquarters, prepared out student speakers for their public presentation and supported the young students by attending and actively participating in the program.

The summer program included inspirational and educational field trips to expose students to various experiences that were instrumental in developing the final projects. During these six field trips, students from both cohorts learned about general topics, such as the history and development of the city of Boston, the Roxbury neighborhood, and the Emerald Necklace. They also acquired technical skills, including researching the field, interviewing community members, reading, and comparing maps, evaluating design solutions, selecting strategies for climate action, and developing climate policies. These educational and inspirational field trips provided "hands-on" and engaging learning experiences for students participating in the summer program. They also provided opportunities for students to collect data for their final projects through a series of ad hoc research activities for each field trip. Finally, field trips allowed students to visit areas and



places they had never saw before and extend their knowledge of the city of Boston. The section below provides a summary of the field trips:

Emerald Necklace Conservancy: During the first week of the program, students participated in an inspirational field trip to learn about the history of the Emerald Necklace system of parks, its evolution over time, and current and future projects. The field trip was led by two members of the Emerald Necklace Conservancy, Declan Battles and Erin Baker. It included a walk from the Back Bay Fens section of the parks system to the Charlesgate portion, where the two guides illustrated ongoing and future projects. These projects included extending the bridge on the I-90 Turnpike to include vegetation and a larger and safer path for pedestrians and bike riders, as well as a dog park in the portion of the Charlesgate section under the bridge. These projects are developed within the broader vision of reconnecting the Emerald Necklace system to the Charles River Esplanade, as it was originally designed by Frederick L. Olmsted's landscape architecture firm. This field trip exposed students to challenges in designing parks, their evolution over time in response to users' needs, and elements that contribute to improving user experiences at the park.

Roxbury Emancipatory History Walking Tour - Wakullah Street Dale: During the program's first week, students participated in an educational field trip that exposed them to the emancipatory history of the Roxbury neighborhood. Specifically, students were led by Derek Evans through the evolution of the Wakullah Street Dale and its rich interracial and Black history. During the field trip, students learned about the evolution of this community, the important historical figures that resided there, including Malcom X and Dr. Martin Luther King Jr., and the challenges that this community faces in the 21st century. Students also had the opportunity to interview a member, activist, and business owner from the community and collect data to expand their knowledge on the rich history of the Roxbury neighborhood.

Rose Kennedy Greenway & BPDA Offices: During the second week of the program, students visited the Rose Kennedy Greenway and the BPDA offices to learn more about the functioning of the Boston Planning and Development Agency, as well as the design of the Greenway as a major infrastructure project. During the field trip, students walked from the City Hall Plaza to the Rose Kennedy Greenway and the Long Wharf Pier. The walk was led by Richard McGuinness, BPDA Deputy Director for Climate Change and Environmental Planning. During their walk students learned about the design of the City Hall Plaza, the Big Dig project that resulted in the construction of the Rose Kennedy Greenway, and the water-rising challenges affecting the functioning of infrastructure in the downtown area of Boston. During their visit to the Greenway, students also evaluated design solutions adopted in the Greenway project and identified design strategies and materials contributing to mitigating or amplifying urban heat effects. The field trip was concluded in the BPDA model room, where students learned about the power of city models as a visualization tool to track city change.



Leventhal Map and Education Center & Boston Public Garden: During the third week of the program, students visited the Leventhal Map and Education Center at the Central Public Library in Copley Square. During their educational visit led by Lynn Brown, K-12 Education Manager, and Michelle LeBlanc, Director of Education, students learned about the evolution of the city of Boston from its original aspect, a combination of land in the form of islands and peninsulas, water, and marsh, to the current state of densely populated city. They also learned about maps as a tool of representation for planners and designers, reflected on the different stories maps convey and realities they represent, and compared an extreme heat map with several others - i.e., race and ethnicity distribution in the city of Boston, tree canopy coverage, asthma rates, etc. Through the comparison exercise, students critically reflected on the interconnection between the impact of extreme heat and socioeconomic, health-related, and racial dynamics in the city of Boston. After visiting the Leventhal Map and Education Center, students walked to the Boston Public Garden to collect data through a behavioral observation activity.

Museum of Science: During the fourth week of the program, students visited the Museum of Science to learn about extreme heat and its impact. After a brief introduction and explanation of extreme heat effects, students engaged in a collaborative group-based activity to develop a Heat Resilience Plan. This multi-step strategic activity was led by David Sittenfeld, PhD, Director of Center for Environment, Energy, and Biodiversity at the Museum of Science. The activity encouraged students to think about impacts and tradeoffs of potential heat resilient strategies included in the Boston Heat Resilience plan, as well as to consider different stakeholders' perspectives. The ultimate goal of the activity was to choose three strategies to prioritize in the implementation of a heat resilience plan. Each group shared and motivated their choices at the end of the activity. At the end of this session, students visited the exhibits at the Museum of Science.

Edward Kennedy Institute: During the fourth week of the program, in preparation for their final presentation, students visited the Edward Kennedy Institute and participated in their Senate Immersion Module, which is a program designed for grades 8-12 that employs role-play and a simulated Senate session to expose students to the legislative process, key legislative issues, and necessary skills for effective law making. During this activity, students were paired with students from the MassCOSH's youth program, to maximize their learning experience.



SOCIAL HISTORY OF ROXBURY

Roxbury is one of Boston's oldest and most historically significant neighborhoods. Established as one of the original six settlements within the Massachusetts Bay Colony in 1630, the community grew quickly as a farming, timbering, trading, and transportation center during the 17th and 18th centuries. Its location close to the narrow isthmus connecting Boston's historic town center with other nearby settlements in the Commonwealth and the New England region contributed to Roxbury's rapid growth. Its accelerated development prompted scholars to identify Roxbury as the region's first suburb in the early decades of the 18th century, by 1846 it was designated a city by the State Legislature. Seeking access to improved infrastructure, Roxbury agreed to be annexed by the City of Boston by 1868. Today, Roxbury is one of the most vibrant and diverse of Boston's twenty-three residential neighborhoods with a total population approaching 60,000.

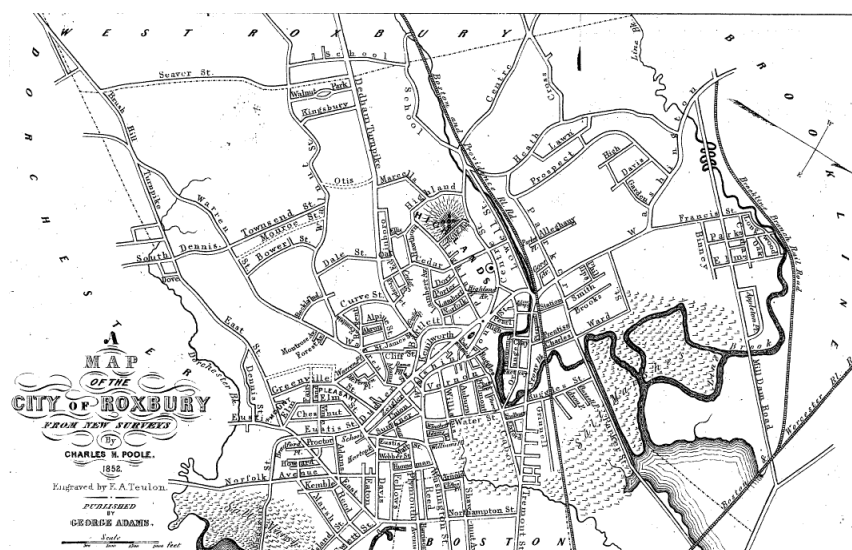


Figure 1: Historic Map of Roxbury, 1852

The early center of community, civic, and religious life in the community was the First Church of Roxbury which was pastored by Reverend John Elliot, a missionary-minded, Puritan Minister who was unusual in his commitment to evangelizing among Roxbury's Indigenous People and African American populations. Reverend Elliot's work translating the Holy Bible and other religious texts into the Algonquin language, establishing Indian Prayer Villages and engaging in respectful outreach among Roxbury's African American slaves and freedman helped establish a local tradition, rare in the Americas, of respectful interracial and intercultural engagement involving European Settlers, Indigenous People, and African Americans that has persisted for more than 400 years.



The City of Boston's steady growth as a maritime, transportation, manufacturing, educational, and cultural center attracted significant numbers of Irish, French, German, and Italian workers throughout the 1800s and early 1900s. As the city's poor and working-class population grew, many of its' middle and upper-class residents moved to Roxbury where they built substantial homes along Massachusetts, Washington and Blue Hills Avenues. This movement to suburban Roxbury was boosted in 1901 when the city built a major transportation hub for commuter trains and subways at Dudley Square. Over time, textile, apparel, and brewing firms forced from Boston where vacant land was scarce relocated to Roxbury, attracting substantial numbers of white ethnic workers from Europe who were soon housed in multi-family structures. Beginning in the early decades of the 20th century, Roxbury's small but long-standing African American community began to grow as the mechanization of Southern agricultural encouraged Black farms workers to migrate to northern cities, such as Boston, where industrial jobs were plentiful, and a degree of racial tolerance existed. As the home of both Reverend Elliot and William Lloyd Garrison, the founder of the American Anti-Slavery Society, Roxbury attracted a disproportionate share of African American migrants participating in "The Great Migration" between 1920 and 1940. As the number of African Americans continued to expand businesses, schools, and churches focused on their needs were established. Noteworthy among these was the 12th Avenue Baptist Church which was an early voice for Civil Rights in Boston.



Figure 2: Dudley Street Station, 1909



In the early 1940s, Boston began to experience the movement of many of its manufacturing firms to the suburbs where they could improve their efficiency and productivity by shifting their production activities from multi-story buildings to single-story structure and reduce the likelihood of their firms being unionized. As more manufacturing facilities moved to the suburbs prior to WWII, mobile households seeking larger homes at lower costs followed. The suburbanization of manufacturing in the Boston region accelerated during the War, as the Department of Defense encouraged war-related industries to relocate to suburban campuses where they would be less likely to be targeted by enemy bombing and/or artillery. The housing subsidies provided to returning veterans under the GI Bill, which were only available for new homes, most often found in the rapidly growing suburbs, further encouraged the mass movement of young families from Boston to its suburbs.

As a result of this industry led and residentially supported suburbanization process, many of Boston's older neighborhoods, including Roxbury, began to experience declining populations, falling rents, and collapsing property values causing many building owners to default on their loans. As the city took ownership of properties through tax foreclosures and banks assumed ownership of growing numbers of residential and commercial properties through mortgage foreclosures, Boston's municipal government and real estate, banking, and insurance companies sought to relieve themselves of building portfolios that were rapidly losing value. Towards this end, they encouraged the city to take full advantage of the Housing Act of 1940 which created the Urban Renewal Program designed to acquire vacant property and deteriorated structures in older areas of the city, demolish the targeted buildings, install "state of the art" public infrastructure, write-down the cost of the vacant land, and insure the profitability of future development in so-called "urban renewal districts". Under the leadership of Ed Logue, founding Director, of the Boston Redevelopment Agency, hundreds of parcels and their structures in the Downtown, West End, South End and Roxbury neighborhoods were purchased by the BRA, demolished, and prepared for redevelopment.





Figure 3: Post World War II Roxbury Housing

Needing to provide alternative housing for the thousands of residents displaced under its urban renewal program, the BRA, in collaboration with the Boston Housing Authority constructed thousands of new units of deeply subsidized public housing units. Due to the opposition of working class and middle-income residents of the city, these units were not evenly distributed across the city – they tended to be concentrated in neighborhoods, such as Roxbury, which already had a high concentration of poor and working-class families. The further concentration of the poor caused by the placement of public housing complexes in already struggling neighborhoods further encouraged white and black “middle class” flight from these communities. With more and more of its workers residing in distant suburbs – a long distance from the central city or inner ring suburbs jobs – state and Federal transportation planners decided to take advantage of provisions of the recently approved 1956 National Defense Highway Act to design and build an inner loop, limited access highway in Boston that would reduce the commuting times for workers living south of the city. The Southwest Corridor Project was designed to connect suburban workers living beyond the soon-to-be completed Route 128 corridor into Boston via an eight-lane that would result in massive displacement in Brookline, Central Cambridge, Jamaica Plain, Mattapan, Roxbury, and the South End.





Figure 4: Anti-Southwest Corridor Mural, Roxbury

With the BRA and MA/US Departments of Transportation officials acquiring lots and buildings throughout the Roxbury, long-time residents, institutional leaders, and elected officials began to challenge the activities of the City's Urban Renewal Agency and State Transportation Agency. As they did so, area banks concerned by plummeting occupancy rates and property values in the area, became reluctant to provide either home improvement or home mortgages in the area, regardless of the creditworthiness of the would-be borrowers. These "redlining" practices had a disproportionate impact on Roxbury's African American residents and small business owners who were unable to purchase properties at a time when prices were quite low. Karilyn Crockett, an Assistant Professor in Urban Studies and Planning at MIT, painstakingly documents the highly sophisticated and unusually successful resident-led campaign to oppose the clearance oriented urban renewal and highway construction efforts of centralized planning agencies led by Melnea Cass, Mel King, Chuck Turner, Byron Rushing, Randy Foote and others.



Figure 5: Rendering of the Proposed Southwest Corridor Project.

Following the defeat of the Southwest Highway Project, a number of progressive and counter-culture communities developed in Roxbury, two of the more interesting of these was the

Lyman Family Collective which promoted economic development through the arts, cooperative housing and business and opposed the war. A second group of African American educators and activists, living in the area, focused their efforts on building an “intentional community” focused on environmental and economic justice issues on Wakullah Street which is where Malcolm X lived as a young boy following his parents’ death and where Dr. Martin Luther King Jr. often visited friends after either attending or leading services at the 12th Avenue Baptist Church while he was completing his Doctor of Divinity degree at Boston University.

These organizations, in partnership with other grassroots organizations in Roxbury were instrumental in reclaiming the “right of way” that had been fully acquired and partially cleared for use as a linear park and sites for the Roxbury Community College, Salvation Army KROC Community Center, Madison Park Technical and Vocational High School and a number of affordable housing complex. As Roxbury was struggling to revitalize in 1986, the Boston Redevelopment Agency, in collaboration with the MBTA, announced plans to improve service along the Orange Line while redeveloping a significant section of Roxbury adjacent to Dudley Station. When residents learned of the BRA’s latest “top down” plan for community renewal they sprung into action. They took over programming at the neighborhood’s largest community radio station urging local residents, business owners, and institutional leaders to support the Greater Roxbury Neighborhood Initiative’s proposal to create a new 12 square mile municipality, called Mandela Village, by succeeding from the city.

The effectiveness of their organizing efforts caused city officials to transfer authority for planning, including the power of eminent domain, to a newly established, resident-controlled community development corporation in 1986. In the early 1990s, this CDC used the eminent domain powers which the city had delegated to them to assemble a large track of mostly vacant land at the heart of Roxbury where they established a community land trust for the purpose of building affordable housing, legacy business establishments, and a large urban farm. The community land trust established by the Dudley Street Neighborhood Initiative, under the leadership of Gus Newport and John Barrows, ultimately constructed more than 500 permanently affordable single-family homes at the heart of Roxbury protecting these residents from displacement during a period of skyrocketing rents and property values in the early 2000s.





Figure 6: Dudley Street Triangle

More recently grassroots leaders from Roxbury, led by former Councilman Tito Jackson, with the support of MIT planning students working under the direction of Caesar McDowell, the former Director of MIT's Mel King Institute and Collaboratory, assisted local residents in challenging the Boston Planning and Development Agency's Plan: Dudley Square for the redevelopment of 1 million square feet of publicly owned land in the heart of Roxbury. They did so, by formulating an elegantly development oppositional plan aimed at encouraging more environmentally sustainable and balanced forms of growth in the community. While their Reclaim Roxbury Plan was rejected by the Boston Planning and Development Agency many of its major community economic development, affordable housing, and place-making proposals have been incorporated into the city's updated Roxbury Master Plan.



Figure 7: Reclaim Roxbury Meeting

The strength of Roxbury's community-based planning and development organizations was recently highlighted by the city's decision to change the name of Roxbury's major transportation, commercial, and civic center from Dudley to Nubian Square and Roxbury Community College's plan to transform the Historic Dudley House, once home to an important

local slave owning family, into the RCC Center for Economic and Social Justice. The groundbreaking and rededication of this building will take place this month as part of the celebration of Roxbury Community College's 50th Anniversary.



Figure 8: Public Announcement of Federal Funding for Dudley House Restoration Featuring President Jackie Jenkins-Scott of Roxbury Community College and U.S. Senator Joseph Markey

The high school students participating in the 2023 Summer Program in Urban Planning were introduced to this history by Derrick C. Evans, a highly respected teacher of African American history, who serves as the convenor of the Wakullah Dale Neighborhood Association. Derrick and his neighbors described Roxbury's rich emancipatory history, over breakfast at their community garden. Among the other contributors to this morning history discussion were Bill Singleton of United Neighbors of Roxbury who was a contributor to the award-winning PBS "Eyes on the Prize" film. Mr. Evans concluded his presentation with a review of the neighborhood's most important ongoing equity planning efforts which included campaigns to save trees along Melnea Cass Boulevard, encourage needed reinvestment in Malcolm X Park and a research and education initiative to advance a Roxbury Reparations Project.



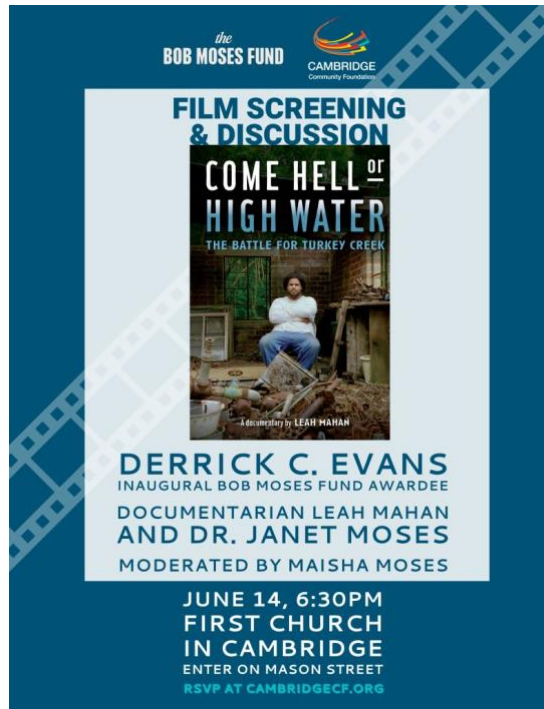
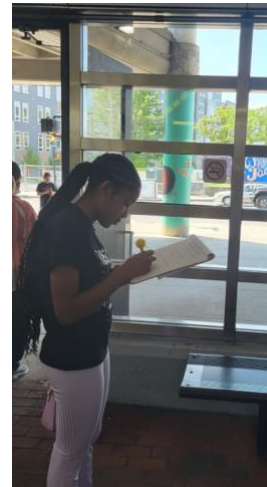


Figure 9: Recent Public Announcement of the Leah Mahan and Dr. Janet Moses's New Documentary COME HELL OR HIGH WATER: THE BATTLE FOR TURKEY CREEK featuring Derrick C. Evans, Inaugural Bob Moses Fund Awardee.



ROXBURY EXTREME HEAT CHALLENGES AND SOLUTIONS



STUDENTS

Angelica Tejada	Niza Jacinto
Anthony Cintron	Noendika H. Comeau
Bao Duy Nguyen	Sheila Mendes
Brianna Napier	Shnaida Sylvaince
Destenie Rodriguez	Tavitae Williams
Jermal Britt	Winders Arias
Jonathan Thames	Xianaja Jones
Junise Rosilme	Yoshua Tevare
Neicka Mathias	Zariya Buffong

MENTORS

Adam D Forrester
Cami Donadio
Natacia Flick
Madeline S Sovie
Meshell Whyte

LEAD INSTRUCTOR

Sajani Kandel PhD, School for the Environment, University of Massachusetts Boston



PROJECT OVERVIEW

The 2023 Summer Program in Urban Planning builds on the 2022 summer program in Urban Planning (pilot). The “Cool Roxbury: Lower Roxbury’s Extreme Heat Challenges and Solutions” report of 2022 summer program in urban planning identified severe extreme heat challenges in Lower Roxbury neighborhood and provided preliminary planning recommendations to address increasing heat issues. The 2023 summer program extends this research and provides in-depth examination of urban heat island and extreme heat issues in Roxbury. Eighteen students from four Boston Public Schools under the supervision of students and faculty from the University of Massachusetts Boston’s Department of Urban Planning and Community Development along officials from City of Boston, environmental planners, environment scientists, social scientists, landscape architects, residents, and civic leader investigated the extent of extreme heat issues in the neighborhood.

PROJECT OBJECTIVES

The broader objective of understanding the extent of urban heat island and extreme heat are guided by the following research questions:

Research Question 1: *In what ways is extreme heat a problem for Roxbury?*

Research Question 1: *What specific heat adaptation and mitigation strategies should be taken to reduce the urban heat island footprint in Roxbury and protect the most vulnerable residents in Roxbury?*

EXTREME HEAT RESEARCH PROTOCOL

Eighteen new cohorts of students in the extreme heat program participated in a collaborative research project with Roxbury residents, civic leaders, RCC, and City of Boston to determine the nature, extent, and impact of extreme heat on this historic, predominantly African American community. Students were involved in the following research activities for four weeks.

- In-depth exposure to the emancipatory history of Lower Roxbury through a guided historical tour and engagement by Derek C Evans of Wakullah Street Group.
- Introduction to urban planning, urban design, and park design with a focus on community planning concepts. Field trips to the Emerald Necklace Conservatory Rose Kennedy Greenway and Boston Public Park to view the application of urban greening and sustainable design concepts. A visit to Boston Planning and Development Agency.



- Introduction to climate change AND its varied impacts in the globe, the United States, and Boston. Introduction to climate change's silent yet deadly effects: extreme heat, different heat metrics, weather, microclimatic variations, heat waves, and urban heat islands and their disproportionate exposure within and impacts among neighborhood-based communities.
- A lecture by the City of Boston, Climate Ready Boston, Project Manager Zoe Davis, of the recent heat resiliency study of the City of Boston and preliminary strategies identified by the study. A field visit to Leventhal Map and Education Center to engage in critical conversation on how our planning practices have shaped Boston's heat island landscape and its relationship with other health issues.
- Introduction to research methods and civic engagement skills. Interceptor interviews people on the streets in Roxbury to understand the perceptions and experiences of increasing incidents of extreme heat among residents.
- Temperature surveying and mapping within areas of community significance in Lower Roxbury to identify high-temperature spots in the neighborhood. These surveys involved the students in collecting ambient temperature, surface temperature, humidity, and heat index data at important public places within the neighborhood.
- A visit to the Edward Kennedy Institute for the US Senate to introduce the students to the Green New Deal legislation debated in the US Congress and to highlight the importance of federal, state, and local political leaders working together to address climate change.
- Field trip to the Museum of Science to learn current research trends and findings around extreme heat in Boston. David Sittenfeld, Ph.D., engaged students, the Director of the Center for Environment, Energy, and Biodiversity, in a deliberative Extreme Heat Forum created to engage people in thinking about the tradeoffs of potential strategies in the Boston Heat Resilience plan.
- Engaging local stakeholders in exploring alternative urban planning, policy, and design strategies to mitigate the most severe effects of extreme heat in Lower Roxbury.
- Presented the results of their field-based research efforts to local officials responsible for shaping the next iteration of the Climate Ready Boston Plan and Boston's Heat Resiliency Study.

1. Observation, guided visualization, and reflection

Students engaged in different observation activities during the program's first three weeks. The observation activities were designed to help students examine and critically reflect on the urban heat, neighborhood conditions, and people's behavior during high summer temperature days. Hands-on outdoor field-based research coupled with classroom-based activities during July offered an excellent opportunity for students to gain first-hand experience on the extent of the increasing heat issues in the Boston area, their experiences walking around



the neighborhood, and critically reflect on neighborhood conditions, urban heat, and its impacts on people's behaviors.

Building their ideal neighborhood: During the first week of the program, students worked with mentors to develop their 'ideal neighborhood' using random objects (like pen, paper, or anything available). Students assign meanings to objects and arrange objects within the neighborhood, and each object represents an important aspect/place that needs to be part of the ideal neighborhood. This activity introduces the students to place-making, promotes their creativity, and asks them to consider the most important elements of a neighborhood. Working in a group, students identified the ideal location of transit stations, parks, schools, residential buildings, commercial buildings, religious institutions, medical services, and other land uses. They discussed the reason they chose that specific location. For example, why did they place transit stations or parks in that location, and why would it be useful or important for this neighborhood?



Figure 10: Students working on building their ideal neighborhood activity.

The elements students considered were affordable housing for all income levels, access to reliable and efficient public transit options, blue and green spaces, local businesses, and areas for socialization like community centers, churches, community gardens, and athletic fields alongside parks and playgrounds as crucial social gathering places for the neighborhood. Public transportation was featured heavily in the discussion, and their ideal neighborhood should have reliable, efficient, and accessible bus and subway access for its residents. Additionally, the students felt their neighborhood should include a vibrant commercial district with local businesses such as restaurants, beauty stores, and grocery stores. They added basic infrastructure such as roads for cars and sidewalks for pedestrians. The students felt this ideal community would be safe, clean, accessible, vibrant, and social.

While discussing elements of green spaces, students hit many main features connected to their larger park redesign project. Students added a water feature, such as a fountain pond, and



identified areas for parks with abundant trees and plants. Both these elements are meant to serve multiple purposes, such as to address extreme heat, but they are also placed where people can easily access and come together. Overall, the students emphasized the importance of blue and green spaces for people’s well-being and community facilitation. This hands-on exercise encouraged students to be critical of the elements which are most important to create a healthy and livable environment.



Figure 11: Students working on building their ideal neighborhood.

2. People in the Street Interviews (aka Interceptor Interviews)

During the second week of the Summer Program, on a scorching morning, students and mentors proceeded through various parts of Roxbury to gather survey-based data from residents and commuters. Students were divided into three groups, each accompanied by a mentor. Students were stationed at Nubian Square, Roxbury Crossing, and Jackson Square. They approached individuals at each station and asked a series of questions, recording participants' answers along the way. Mentors provided support and guidance, but students located survey subjects approached them, asked for their consent to answer a brief survey, and then carried out that survey if the answer was yes. Most students worked in pairs, with one student being the “talker” who asked questions and attentively listened to the interviewee, while the other was the “recorder” who wrote down the replies on the survey form.

Table 1: Sites students were stationed for interceptors' interviews.

Sites	Description
Nubian Station	The ground-level bus station is located at Nubian Square, formerly Dudley Square. It is the hub of bus routes with 2 Silver Lines, 14 local MBTA bus routers, and transfer points of 16 MBTA bus routes.
Jackson Square Station	The station connects Jamacia Plain and Roxbury at the intersection of Center Street and Columbus Ave. The location caters to transit



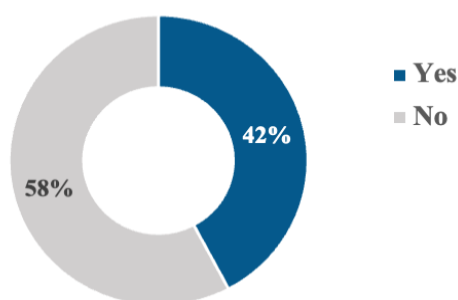
	passengers and residents connecting the Roxbury neighborhood to other parts of the city.
Roxbury Crossing Station	MBTA Orange line station has many bus connections to different areas in Roxbury and the city.



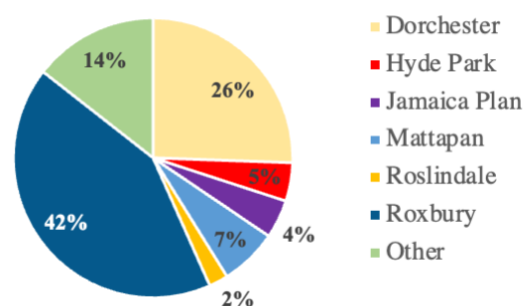
Figure 12: Extreme Heat students interviewing residents in the streets.

Question 1: Our interviewees came from multiple neighborhoods in Boston. While many survey respondents did not come from Roxbury itself, many noted they spent much time in or passing through Roxbury for work, social gatherings, and anything in between. Students noted almost half of the people surveyed were from Roxbury, with a few from Dorchester, Hyde Park, Jamaica Plain, and Mattapan. 70% of residents were from Roxbury and Dorchester. The survey group outside of Nubian Square concluded their site is a commuter hub used by Roxbury residents. Their experience living in or passing through Roxbury is valuable data on temperature trends in the greater Boston area.

"Do you live in Roxbury?"



Where are Interviewees From?



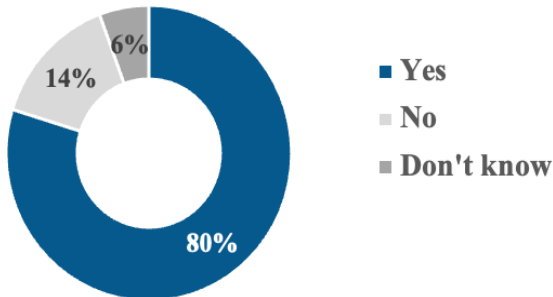
Questions 2 & 3: Students began the survey by asking this question to understand the broader scale of individuals' heat experiences in Boston. Students found more than 80% of participants agreed that they had sensed an increase in the number of hot days in Boston. The few who said otherwise had lived in places with extreme temperatures and were accustomed to the heat. Others



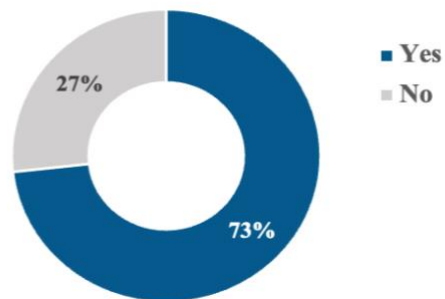
didn't like the cold at all. One subject said there was an increase in the number of rainy days, while another said other summers were hotter overall and had more hot days.

We then dialed in on Roxbury, our focus community for this project. The next question was if they considered extreme heat a serious problem within Roxbury. The majority said yes. Health issues and global warming were the most common replies for why it is serious. Interviewees also cited concerns for older adults, heat exhaustion, not enough resources, the lack of trees, and discomfort from walking in the dense air of the heat. The 27% of individuals who did not find extreme heat a serious problem for Roxbury either didn't mind the heat or were young, healthy individuals whom the heat affected less. Still, the majority of those surveyed, 73%, found it a serious problem.

"In your opinion, is there a increase of hot days in Boston?"

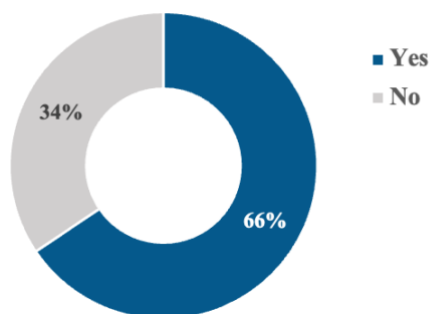


"In your opinion, is extreme heat issue a serious problem in Roxbury?"



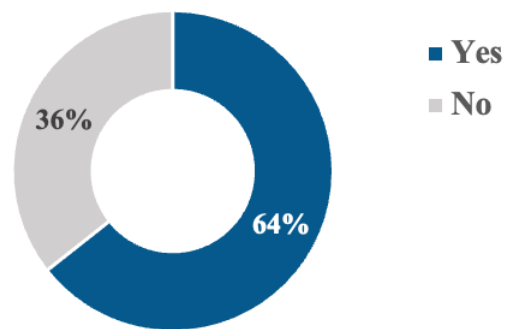
Question 4: This question was meant to investigate the interviewee's perception of extreme heat and their emotions towards it. Again, there was a trend of heightened awareness and concern with the heat, as shown by the 66% who answered yes to this question. Many individuals demonstrated concern that went beyond themselves and extended to members of their community they recognized as vulnerable, such as the elderly population, people with underlying health concerns like asthma, and children.

"Does extreme heat concern you?"



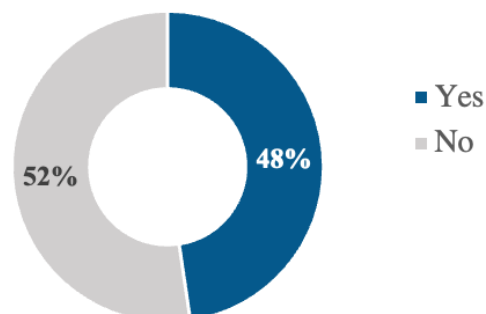
Question 5: Students found that 64% of individuals interviewed agreed that their living space did get uncomfortably hot over the summer months—people who said no quoted using a lot of AC to keep their house comfortable. Even people with AC or adequate fans said their apartments and homes were uncomfortable on sweltering days.

"Does your apartment or house get uncomfortably hot during summer?"



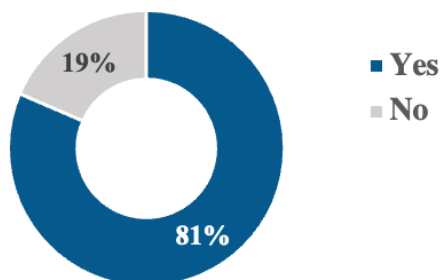
Question 5: After asking whether people were comfortable in their residences, students asked if they ventured out to other places to cool off. More than half said no and claimed their residence is where they best escape the heat by cranking up the AC and staying in their coolest room. Those who answered yes visited the library, beach, coffee shop, pool, park, YMCA, work, or a restaurant.

"Do you go to other locations to cool off during extremely hot days?"



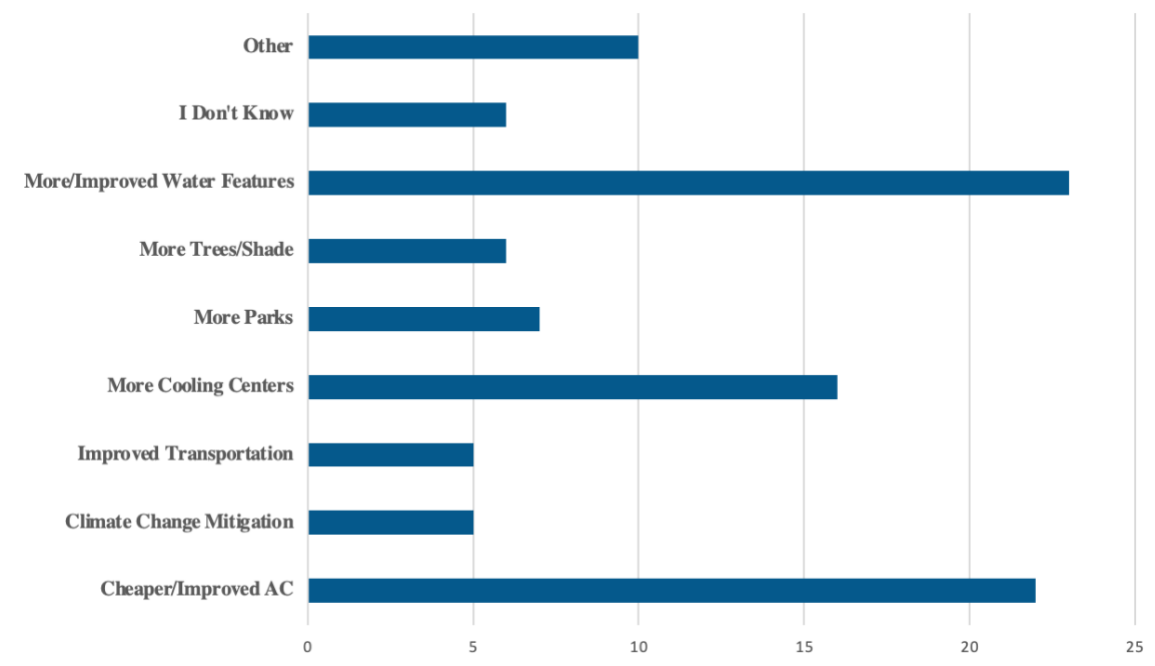
Question 6: Even with the majority of participants agreeing there has been an increase in heat in Roxbury that also makes their residences increasingly uncomfortable, most said they can keep themselves and their families comfortable during extreme heat events. Many referenced their management techniques, such as applying extra sunscreen on kids, using more AC, and visiting other locations like the ones listed above. The individuals who said AC was their primary way of maintaining comfort often noted the financial burden of increasing utility costs.

"With increasing heat waves, are you able to keep your family comfortable during extreme heat events?"



Question 7:

"What recommendation do you have for the city to address the issue?"



As presented above, interviewees had a wide range of advice for the city to provide residents with higher quality and ease of life in the heat. Students found more water accommodations, whether misters, free water bottles, or cleaner public swimming spaces, to be big hits. Improved or subsidized AC and utilities came next, with many residents making it very clear that AC is their saving grace in the summer, but that comes with a hefty price tag that they would like to see the city help out with. Some referenced a preexisting free AC system, which students hadn't heard of but found interesting. Cooling centers were the third most referenced request for the city. While many stated parks were a nice public escape from the heat, many still believed an indoor, free, cooled space would benefit their community and beyond.

3. Temperature Survey

During the third week of the summer program, students and mentor staff collected ambient air temperature data in different parts of Roxbury. Five major areas with a mix of street segments, major intersections, playgrounds, parks, areas adjacent to community buildings, and transit stations (bus stops, train stations) were identified for temperature survey. Students were divided into five groups, with one mentor accompanying each team. The group division and major areas temperature were mapped and presented in the tables below. Thirty-eight locations in Lower Roxbury were identified for a temperature survey on Wednesday, June 19, 2023. The students used the 'Pocket Lab Weather' sensor to survey each location's ambient temperature, humidity, and heat index.

Table 4: Temperature survey locations in Roxbury.

Group1: Nubian Station and surrounding area	
Street Segments	Washington Street, Warren Street, Dudley Street, St James St
Park	St James Street Park
Playground	-
Train/Bus Station	Surrounding areas in Nubian Station
Social and cultural spaces	Roxbury Branch of Public Library, Yawkey Boys & Girls Club
Group 2: Wakullah Street and Surrounding Area	
Street Segments	Dale Street, Washington Street, Circuit St, Walnut Ave, Dale St, and MLK Jr Blvd
Park	Different corners of Malcolm X Park, Warren Garden
Playground	Playground section of Malcolm X Park
Train/Bus Station	Each bus-stopping points
Social and cultural spaces	Shelburne Community Center, Elliot church of Roxbury, City on a Hill school, Davis funeral home.



Group 3: Jackson Square & Pocket Park vicinity	
Street Segments	Bickfold Street, Parker Street, Heath Street, Center Street, Columbus Ave, Richie Street, Marcella Street, and highland street,
Park	Pocket Park site, Jackson Square Park, Southwest Corridor Park & Highland Park
Playground	Marchella Playground (including basketball court), Jackson Square basketball court
Train Station	Jackson Square station
Social and cultural spaces	Outside of the Ann M community center (which is under construction), the Martha Elliot Health Center
Group 4: RCC and Roxbury Crossing	
Street Segments	Columbus Ave, Malcolm X Blvd., Roxbury St., Highland St. and Cedar St
Park	Jeep Jones Park, Roxbury Heritage Park, Highland Avenue Community Garden, John Eliot Square Urban Wild, Alline Crite Community Garden
Playground	Center place playground
Train/Bus Station	Roxbury Crossing (Terrace St), Bus stations across Cedar S
Social, cultural, and community spaces	Islamic Society of Boston Cultural Center, St John & St. James Church, youth build
Group 5: Around Washington St. and Malcolm X Boulevard	
Street Segments	Washington St, Cedar St, Highland St, Roxbury St, Malcolm X Blv Dudley St
Park	Cedar Square Park
Playground	Lambert Avenue Park, Rockledge Street Wild, Cedar Juniper Natural Area
Train/Bus Station	Please take measurements if there are any stations
Social and cultural spaces	Timothy Baptist Church, Nathan Hale School

The study area for the temperature survey was defined, in large part, by the traditional boundaries of Lower Roxbury and was delineated by significant street segments, including Columbus Ave. Malcolm X Blvd, Warren St, and MLK Jr. Blvd. Below is a map of the study area for reference.



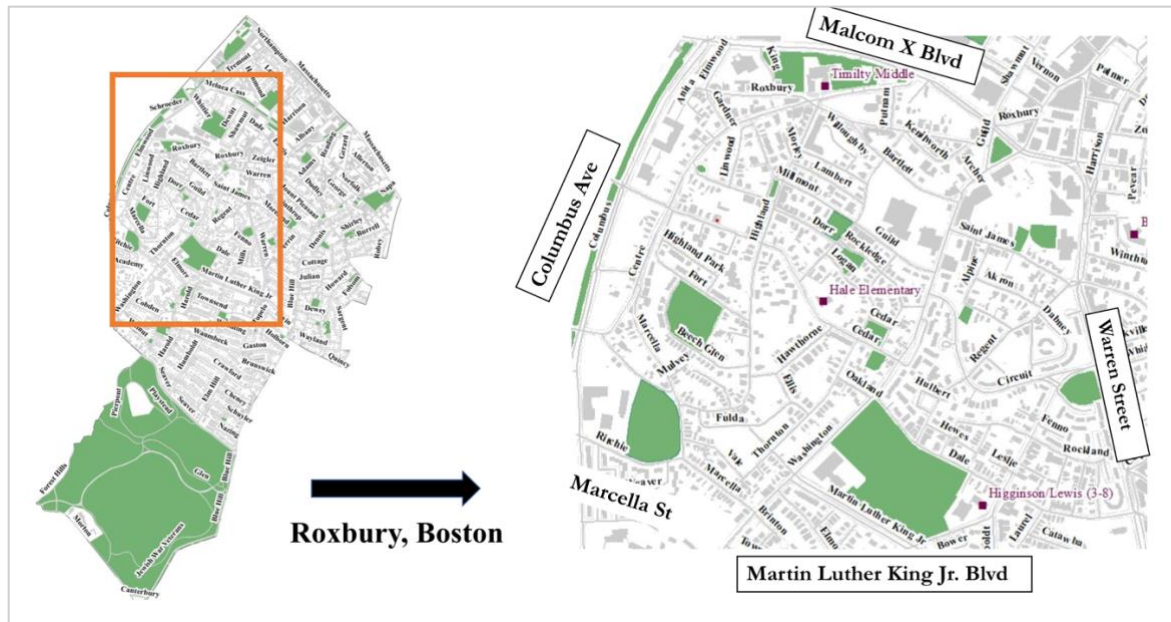


Figure 13: Temperature Survey Boundary in Roxbury.

The temperature survey was done on Wednesday, July 19th, 2023, from 10 AM to 12:30 PM. During our field research, we collected 135 temperature data points at 38 locations in our study area. We used the ‘Pocket Lab Weather’ Sensor for the survey’s temperature, humidity, and heat index data. Pocket Lab Weather uses a temperature probe to record the data, and a Bluetooth-based mobile application displays the measurements. Collected temperature points were visualized spatially via an ESRI Arc Map. The ‘Interpolation’ tool was used to estimate and visualize the study area’s temperature profile using the data collected in the field. The interpolation tool was just used as a visualization tool for the process. Further statistical analysis determining possible spatial autocorrelations needed to study temperature patterns was not analyzed and is not within the Summer Program in Urban Planning research design.



Figure 14: Extreme heat students taking temperature measurements (left and right) and Pocket Lab Sensor (Center)

According to the [National Weather Service](#) measurement site at Boston's Logan International Airport, the temperature for the day of our survey was 88⁰ F, and the temperature at the time we started data collection was 85⁰ F, according to temperature data collected using Pocket Lab Weather Sensor, the minimum temperature 83⁰F and maximum temperature 101⁰F. On average, most of the areas were 5 to 6 degrees hotter and the 'hottest' location were up to 15 degrees hotter than NWS temperature data. location points were hot. Major street segments were hottest. For example, major street segments like Warren Street, Columbus Avenue, and MLK Jr. Boulevard were hottest due to the prevalence of high heat-trapping surfaces and heat exhaust from regular traffic. Bus stations, playgrounds, and parks near these major streets were also significantly hotter because of the high heat-trapping surfaces.

Location Type	Mean (°F)	Max (°F)	Min (°F)
Park	87	90	83
Playground	84	93	87
Streets	88	101	83
Bus station	89.6	95	87.5

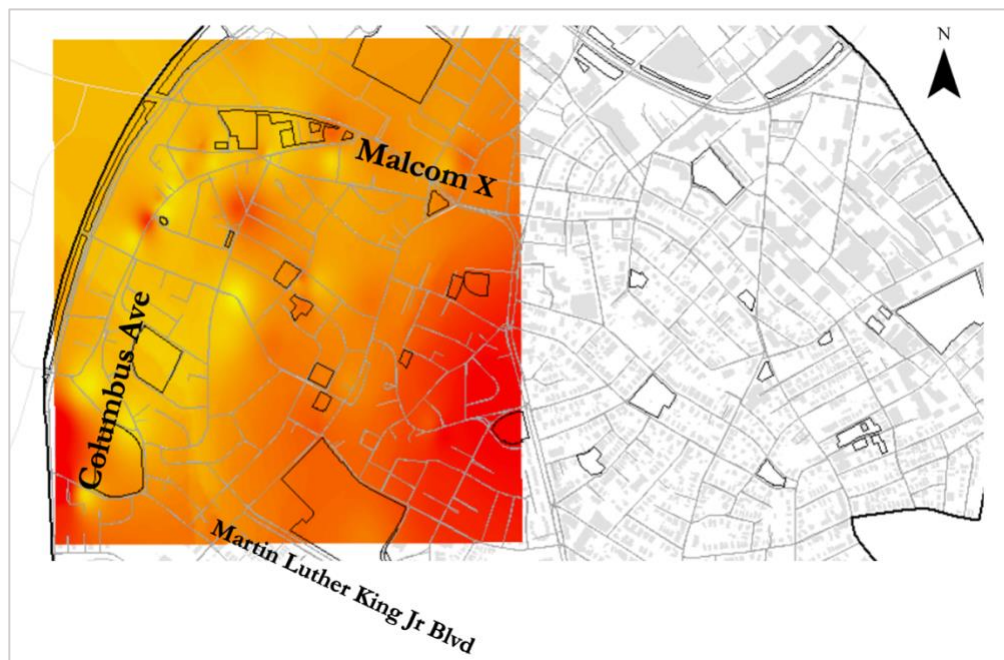


Figure 15: Heat Map Visualization of the Temperature Points in Roxbury on July 19, 2023.

Our temperature data validates the findings and extends to the 2022 summer program extreme heat research. Parks and playgrounds were also significantly hotter depending on the location of the park (whether it is near major street segments or in residential streets), the proportion of the sites shaded by trees, the presence or absence of structures providing shade,

and availability water features. Most of Roxbury's playgrounds and parks appear to have been designed without considering extreme heat events. Not all playgrounds have water features, nor do they always have enough natural shade or shade canopies. Elements like rubber surfaces, dark-colored playing equipment or seating elements, and synthetic grass turf in the playground worsened temperature conditions. Basketball or tennis courts in the park and playgrounds were also significantly hotter.

Similarly, bus stations located in major street segments were much hotter. Additionally, those stations with shade structures were much cooler than those that did not have any protected places providing refuge from the sun. Students collected temperature data at many bus stops, including those that serve multiple bus routes. The students had many questions about why these bus stops had drastically different designs and levels of comfort, accessibility, and safety for the community.



PLANNING STRATEGIES TO MANAGE EXTREME HEAT IN ROXBURY

Based on four weeks of intensive, hands-on research, students identified specific design strategies to cool off these locations around Lower Roxbury. These strategies are grounded in temperature data, students' observation and reflection, residents' interviews, and local knowledge from the residents and community leaders, and are complemented by worldwide best practices in resiliency planning identified by the students.

Creating Cooler Bus Stations:

Throughout their research, students observed and reflected drastic differences in the design and features of different bus stops. For example, some stops had more seating, protection from the elements, and temperature differences. However, bus stops varied widely in design, leading to differences in accessibility, thermal comfort, cleanliness, and safety. Although the students believed some of the stops had few features like seating that aids riders' comfort and shelter (cover) that protects residents from extreme weather events, they emphasized that most bus stops visited should be upgraded to improve accessibility, efficiency, and comfort. Most bus stops were unprotected from the sun and sitting on the benches for any length of time in the heat was uncomfortable. Bus stops were not clean and had no trash can for waste collection. Since observation and temperature data collection were done during the daytime, students couldn't comment on whether there was enough lighting regarding safety concerns.

The students had many questions about why these bus stops had drastically different designs and levels of comfort, accessibility, and safety for the community. They wondered if the MBTA factors the level of use in the design of these bus stops. One team reflected: *Are more heavily used bus stops well designed and maintained? Why are some bus stops covered and more protected from the elements? How does the MBTA decide which bus stops have specific design features?* Due to their insightful observations, the students were left with many questions about why these bus stops in the same area had drastically different designs. One of the research team reflected:

"Bus stations can either be a place to escape the sun and general heat of the day or a place that magnifies those factors. Station design should seek to make them a comfortable and accessible oasis rather than an oven."

Students suggested a range of design strategies to upgrade bus stations around Roxbury. Some common themes include enough seating, overhead lights, installing green roofs, adding



cooling devices or misting features, some shade (trees or artificial), and smart boards that display real-time data on the bus routes. In addition to these upgrades, for the bus stations, which are busier and are located on major streets, students recommended a reflective paint design on the bus stop enclosure along with weather-treated wooden benches on a metal frame, a design that increases airflow or ventilation (open sides), and an overhead misting station along with a unique water feature behind the bench that was constantly flowing to keep your back cool as you sit and wait for the bus or solar powered fans. Site-specific design modifications for all bus stops are listed below:

Malcolm X Blvd @ King St.



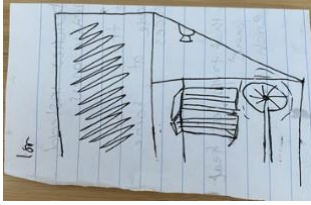
- This bus stop should be redesigned in a way that includes more seating and different materials for the roof. Currently, the roof is glass and provides a minimal reduction in exposure to sunlight and heat.
- The students focused on making the bus stop more accessible and comfortable.
- A digital board with real-time data on bus routes should be installed here.

Malcolm X Blvd @ Madison Park HS



- Our students know this bus stop well. Most of them attend Madison Park High School.
- They recommended this bus stop be fully upgraded. Due to it being directly outside Madison Park, this stop is especially busy at the beginning and end of the school day.
- There is currently one bench that seats two to three people and offers no protection from extreme weather events.
- This bus stop should be upgraded to become more accessible and comfortable.





Sheila (extreme heat research student) drew a bus stop with wooden benches, a fan, and an overhead light



Cooling and misting feature in bus stops



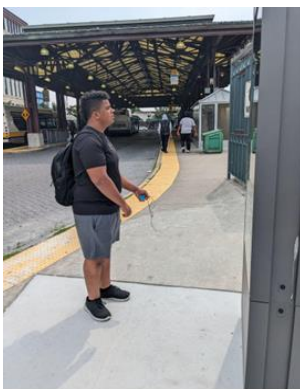
Green roof at bus stops

Malcolm X Blvd @ Shawmut Ave



- The students focused on the lack of seating and protection from the elements here.
- This bus stop had nothing besides a sign indicating which routes stopped there.
- This bus stop should be fully upgraded to be more accessible and comfortable.

Nubian Square Bus Station



- Nubian Square is a busy station with numerous bus routes. The temperature is high, and the air quality is poor. This station has the most seating and protection from the elements out of all bus stops visited.
- Although this station is the most accessible and comfortable out of the stations, the students still felt the accommodations were lacking.
- More seating, the canopy to be extended, cooling or misting features be installed, and more environmental regulations be enforced to improve air quality.



Smart Boards That Display Real-Time Data

Fostering Cooler and Safer Streets:

Major streets like Washington Street were much hotter, more exposed to the sun, and uncomfortable to walk due to the traffic coming through. The high traffic and the exhaust of cars that populate roads create not only unpleasant heat and smells, but the emissions speed up climate change's progression and warm the planet faster. As a result, sidewalks place to close to the street will only magnify these discomforts.

Noticeably cooler residential streets had more tree lining and a significant amount of green space than major streets like Malcolm X Blvd and Washington Street. The residential streets closer to Nubian Square (another section of Roxbury St., Shawmut Ave, Marvin St.) had some trees lining the streets. Some areas of these streets lacked trees or green spaces and were noticeably hotter. Many of the streets on residential streets were narrow but often incorporated some green elements such as grass strips nearby or sidewalk-planted trees.

The students primarily focused on improving accessibility, safety, and overall beauty of the streets. At specific points, the sidewalks on both major and residential streets were not wide enough or in poor shape. The students recommended improvements to sidewalks, crosswalks, and areas adjacent to major streets like Malcolm X Blvd. They recommended more trees and green spaces; Malcolm X Blvd needs more trees to help with cooling. According to the students' findings, Malcon X Blvd is drastically hotter and contained less green space than the neighboring residential streets. The student highlighted the need for placing the pedestrians' needs first in major busy streets, while not sacrificing drivers' efficiency. The streets were clean, however, didn't seem safe due to the closeness of incoming traffic to the sidewalk. This separation could be made by adding a tree-lined strip between the street and sidewalk. This would provide shade, a visual boundary, a sound barrier, and an aesthetically pleasing walking experience.



For residential streets, walkability next to and crossing roads should be a priority. Students encouraged planting large trees that provide shade, making commuting next to the street much more comfortable. Specific recommendations included planting Norway spruce trees, weeping willow trees, having green roofs, and painting the streets with thermoplastic to keep them more relaxed.

Some vacant lots in Malcolm X Blvd had no indication of ownership in Google Maps. The students wondered if the city could turn these spaces along Malcolm X Blvd into something useful for the community.

Washington Street



- Adding a tree-lined strip between the street and sidewalk for shade, a visual boundary, a sound barrier, and an aesthetically pleasing walking experience.
- White painting or thermoplastic will keep it cooler.

Columbia Avenue @ Cedar St.



- Heavily travelled artery, which is the site of many automobile accidents
- The subject of Mass DOT, MBTA, and city plans focused on moving the traffic more quickly and safely.
- Attention must be given to improving the pedestrian experience and creating local destinations (third spaces) such as the RCC "cooling playground."

Promoting Cooler Parks and Playgrounds:

During field trips, we found parks that ranged from intentionally 'unkept' to far too manicured. Most of the parks in Roxbury were unkept, gated, and full of trash. Students struggled to find a place to sit down to eat their food and had no trash cans in any of the parks we visited around Lower Roxbury. Though some of the parks had shade and water features, most spaces were exposed to the sun leaving park users little refuge from extreme heat impacts. For these, visiting the park during peak sun hours would not be an enjoyable experience. One team reflected:



A lack of trees at Cedar Park, for example, made it blazing hot, and more trees would make it much more usable.



Figure 16: Exposed section (left) and Shaded area (right) of Cedar Park.

Playgrounds are designed and made for children, who happen to be one of the most heat-vulnerable population groups. That means extra care should be taken to design kid-friendly heat-resilient spaces that are fun and, most importantly safe. Kids need a lot of shade, water, places to sit, places to play, and much more. Keeping these places as cool as possible allows kids to play better and longer. Touch is important for children, so putting care into any materials within reach is important. Summer program students were pleased with the overall playgrounds as they had synthetic, lightweight rubber flooring, which was much preferred to cement, which traps less heat and is less painful to fall on. Students, however recommended cutting down the proportion of metal used around the playground, as it collects and retains heat, making it painful to the touch. Most playgrounds we saw. These playgrounds should also position play objects in the shade of nearby trees. One of the team assigned to Jeep Jones Park reflected:

We went to Jeep Jones Park's lower and upper level. The upper lever was much hotter than the lower level and completely exposed to the sun. When the students touched the book statue, it was over 100 degrees. This park had a water feature, and as soon as we used it, the area cooled down by 2 degrees. So, we recommended a water feature that would keep the entire playground cool by implementing a duct system on the floor that would flow along the base and recycle into many water features throughout the park to keep everyone calm.



Upper Level of Jeep Jones Park and Playground



- We need more natural shading to cool down the upper level.
- Water system: A duct system on the floor that would flow along the base and recycle into many water features throughout the park.
- More seating, wooden benches, and swinging benches
- Add arbors with an artificial canopy or umbrella for shade and comfort along.
- Explore removing some heat-absorbing impervious surfaces.
- Light color coatings on necessary hard surfaces to reduce heat absorption.

Roxbury Heritage Park



- Grassy but need shading (trees or artificial canopies)
- Strategize spacing of trees or other elements from safety perspective.
- Water feature (e.g. sprinklers and splash zones).
- Use heat-trapping material for seating and any other aesthetic elements.



Figure 17: Shaded Lambert Park/Playground with rubber ground

Social, cultural, and religious spaces:

Students also visited some social, cultural, and religious spaces such as churches and mosque which are essential to community-building, as they often serve as local hubs for events and social gatherings. Therefore, their entrances, outdoor spaces, and general areas should be comfortable and welcoming. One church we visited boasted a large plot of land that housed their large green patch of grass and trees. The shade provided by the trees extended beyond the church's fence and made the sidewalk nearby noticeably cooler. The mosque was concrete, hot, and exposed from the street to the entrance. The church was under construction but had a cooler feel. The mosque felt safer than the church because the church was secluded, where the mosque was on a main road, and it was spotless. Students recommend more trees and benches. for both locations.



Figure 18: Unitarian Universalist Urban Ministry (left.)



IMPLEMENTING “COOL ROXBURY NEIGHBORHOOD PLAN”

The City of Boston is to be applauded for its aggressive and thoughtful efforts to anticipate and mitigate the impacts of climate change on the city. Its Imagine Boston 2030, Climate Ready Boston and Heat Resiliency Plan uses innovative approach to assess the likely effects of climate change on residents and our city. The current effort to advance equitable and just heat adaptation and mitigation strategies is noteworthy.

While these actions are showing significant impacts, conditions in our city’s environmental justice communities, such as Lower Roxbury, remain challenging in terms of the extreme heat crisis and other climate-related crisis. This report extends the findings of the 2022 Cool Roxbury plan, validates 'heat' as a severe problem in Lower Roxbury that will be increasingly challenging to manage given Climate Change trends, and re-emphasizes the severity of heat impacts to the most vulnerable residents in our city. The results of intensive four-week research revealed that many areas of Lower Roxbury are uncomfortable and unsafe during extreme heat events, and residents seeking relief from overheated apartments and workspaces during heat waves cannot use these overheated spots around neighborhoods. The resident interviews highlight the extent to which people are aware of and concerned about our increasingly hot weather conditions. In addition, many residents and institutional leaders have practical and workable suggestions for mitigating the more dangerous health threats caused by climate change.

This report highlights site-specific cooling strategies based upon data collaboratively collected and analyzed by the youth of the neighborhood, residents, institutional leaders, urban planners, and climate scientists that see to address the most health-threatening urban heat islands. In addition to specific design strategies to combat heat in different areas in the Lower Roxbury neighborhood, we recommend improving strategies like access to information regarding heat threats, cooling services, and ways to safeguard health during extreme heat events. Further, we need to improve equitable access to cooling facilities while expanding the supply of affordable housing featuring individual and communal "cooling rooms." Finally, we must develop an effective strategy for assisting low-resource families with increasing cooling costs - a summer version of HEAP financed through a lifeline-like utility rate reform law.



We are eager to see various household, street, and neighborhood-level adaptation and mitigation strategies implemented and evaluated. We strongly encourage the City of Boston to develop, in cooperation with local institutions and the University of Massachusetts Boston, a district cooling plan for Roxbury that applies, in a context-sensitive manner, the most effective extreme heat mitigation strategies so these can be rigorously evaluated and replicated, over time, in Boston's other environmental justice communities where extreme heat is already a significant concern.



URBAN DESIGN PROJECT

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PROJECT OVERVIEW

This section presents the second applied project developed during the 2023 edition of the Summer School in Urban Planning and Community Development. This consists of Urban Design project recommendations for a new Pocket Community Park that will be developed on the Roxbury Community College (RCC) campus. These recommendations were developed by a cohort of 9 returning students who attended the 2022 edition of the Summer Program in Urban Planning. During this year's edition of the program, these students applied the extreme heat knowledge acquired last year to develop an attractive design for a community pocket park to serve the surrounding communities' needs while reducing the extreme heat island effect characterizing the area. The sites identified for this project is located in the southern portion of the RCC campus – parking lot #3 – and is currently an underutilized parking lot that traps heat and contributes to the urban heat island effect characterizing the surrounding area (Figure #).

Following the invitation from RCC President Jackie Jenkins-Scott to collaborate with RCC students, faculty, staff, and neighbors to transform the parking lot into an attractive pocket park for the community, the students engaged in a complex research design process from data collection to best practice research and design recommendations development. This Cool Pocket Community Park Project takes place in the broader context of a major re-imagination and modernization of the Southwest Corridor Park aimed at serving communities while adapting to climate change issues and the restoration of the adjacent Historic Dudley House aimed at transforming the historic property into a Center for Racial and Social Justice hosted on the RCC campus.





Figure 19: From the top: RCC Map and location of Cool Pocket Community Park; pictures of the status of the site from Columbus Avenue and the entrance of the parking lot.

PROJECT OBJECTIVES

The Urban Design cohort of students engaged in research activities informed by two primary objectives:

1. Develop a unique urban design project able to address the needs of the surrounding communities while attracting and welcoming people from different backgrounds and age groups.



2. Incorporate design strategies able to address extreme heat issues and transform the pocket park into a cool gathering area during hot days.

These two primary objectives informed the overarching research question and research design for the Urban Design project.

Research Question: How can Urban Design strategies address extreme heat issues and serve the needs of vulnerable communities?

URBAN DESIGN RESEARCH PROTOCOL

In addition to the activities designed to achieve the primary objectives of the 2023 Summer Program in Urban Planning and Design, students in the Urban Design cohort engaged in specific research activities that led them to develop design strategies for the Cool Community Pocket Park at RCC. These research activities include (1) a set of observation activities conducted at different parks in the city, (2) key informant interviews conducted with students, faculty, staff, and administrators at the RCC college, and (3) a SWOT analysis to identify strengths, weaknesses, opportunities, and threats of the site selected for the development of the Pocket Park and its surrounding areas.

The next section provides a brief overview of the activities carried out by urban design students during the program alongside students' major findings. A more in-depth explanation of the research methods employed during the summer program is provided in the first section of this report.

OBSERVATION ACTIVITIES

Students engaged in different observation activities during the first three weeks of the program. The observation activities were designed to help students examine and critically reflect on the mutual relationship between urban design and people's behavior during summer months when temperatures increase. Specifically, the heat wave that affected Boston during the month of July offered a great opportunity for students to gain first-hand experience and critically reflect on the efficacy of specific design solutions, as well as their impact on people's behaviors under extreme heat conditions.

Photo Essay

In the first week of the program, students completed a photo essay activity – a form of visual storytelling – during their educational field trip at the Emerald Necklace Conservancy. Students walked through the Back Bay Fens Park and reached the Charlesgate Park, currently



targeted for a major revitalization project to restore the public accessibility of the last stretch of the Emerald Necklace system and reconnect it to the Charles River Esplanade. While walking, students were asked to take pictures and create a narrative around four key prompts designed to encourage them to reflect on what they saw and experienced at the park. After visiting key sites, such as the Kelleher Rose Garden, the community gardens, and the areas targeted to increase pedestrian safety, students' interest in parks began to develop as they reflected on the elements that make a "good" park, especially during the summer months. The four prompts directed their attention to elements in the park that surprised them, elements in the park they were expecting to see but were not present, activities people were performing, and the overall impact of parks on people's well-being.

Students were surprised to see what it looked like polluted water in an otherwise well-maintained park; the Japanese Temple Bell, as a great example of park elements with cultural and historical significance; and the Kelleher Rose Garden, as a surprising example of an additional component that can be added to parks. Students were also surprised to see some key elements missing, such as shade, benches, water fountains, and trash cans. These elements stood out for students especially because of the record-hot temperatures registered that week and their experience under these extreme conditions. They reflected on some of these missing features as key elements that would provide park users with some relief during extremely hot days – e.g., shade, water fountains, and shaded seating areas – and as key elements that would improve people's experience in a park – e.g., benches and trash cans.



Figure 20: Students' pictures of the Japanese Temple Bell and different areas of the Fens Park and Charlesgate Park - (Photo credits: Aidan Luciano and Cristopher Cruz).

Students mostly noticed people engaged in activities such as walking, biking, jogging, or relaxing at the park. Yet, they also observed that users of the park were sweaty because of the high temperatures. The students concluded that parks contribute to people's well-being because they serve as a place to exercise, socialize, rest, and grow food. However, students also

recognized that some parts of the park did not provide adequate shade, seating options, or water fountains and trash cans. Therefore, parks might also negatively impact people's well-being and, when not adequately maintained, parks cannot be used to their fullest potential. Students also noticed that other parts of the park such as the Rose Garden were extravagant and beautiful, but also felt less accessible to the public.



Figure 21: Students' pictures of community gardens and other relaxing areas of the Fens Park (Photo credits: Cristopher Cruz and Jeremiah Ray).

Sketches of Key Design Elements

In the second week of the program, students completed a sketching activity at the Rose Kennedy Greenway, a public park whose construction resulted from the “Big Dig” project that removed elevated highways and created room to reconnect the city to its waterfront through a public space with a contemporary design. The activity encouraged students to critically reflect on key design elements at the Greenway and how these might contribute to or help mitigate urban heat island effects. Students conducted the activity during another unusually hot day that provided them with first-hand experience on the intersection between design solutions and extreme heat issues. Specifically, students were asked to identify and sketch elements in the park they liked and did not like, as well as elements that reduced or contributed to the urban heat island effect.

Some elements students liked as they walked through the Greenway include the water fountains and splash pads, trees, and tall buildings nearby. The water features and trees provided park users with relief from the high temperatures and added greatly to the beauty of the park. The tall buildings of the city were noted by a few students as design elements characterizing the neighborhoods near the Greenway. Elements students did not like included the Armenian Heritage Park because, even though this section included a water feature, it provided no shade and no relief from the sun. Students also noticed that darker surfaces, such as some benches and



pavement materials, work as heat multipliers and did not contribute to the well-being of park users during extremely hot days.



Figure 22: Rose Kennedy Greenway - From the left: Armenian Heritage Park, water fountain in front of Haymarket, seating area in front of Haymarket - (Photo credits: Sara Tornabene and William Cecio).

Students identified some of the elements that help mitigate extreme heat, such as plants and water features located in different areas of the park. They recognized that close to the trees, flowers, and plants the air felt cooler. The vegetation added beauty to the park's design with pops of colors and hosted different types of insects. Additionally, the water features were identified as key design elements at the Greenway for their ability to provide relief from high temperatures. Students noticed several children, adults, and families relaxing at the water features or in shaded areas in close proximity. Also, water features provided play areas for children who enjoyed running through sprinklers.

Students also identified elements that, in their opinion, contribute to extreme urban heat, such as the pavement and sun-exposed areas where there is a lack of shade (e.g., the seating area in front of the water fountains). The pavement area of the park exacerbated the intensity of the heat during hot days such as the one the students experienced and, even though the Greenway has a variety of plants, the students noticed that trees are not tall enough to provide adequate shade. This is mostly due to a technical design challenge that prevents designers from installing trees with a deep root system.

Behavioral Observations

In the third week of the program, students completed a behavioral observation at the Boston Public Garden, which was America's first public botanical garden and was built to be decorative and flowery and to feature meandering pathways for strolling. Students were asked to carefully observe their surroundings and complete a questionnaire focused on three main aspects: perceived temperature, users and their behavior, and elements in the park. Students were encouraged to critically reflect on various elements present in the park and people's behavior and how they influence or are influenced by the temperature of the space.



From students' observations, it became clear that the Boston Public Garden is a well-designed park that people thoroughly enjoy even during hot days. The students conducted the activity during another unusually hot day when the temperature was peaking, yet despite the temperature, the park was crowded with people hanging out, enjoying themselves, and relaxing at the park. Therefore, through the activity, students critically reflected on the reasons that attracted people to this park, rather than others, and on the elements contributing to providing a pleasant experience for people.

Students noticed the abundance of shade trees and shaded seating areas. They counted over 20 benches and 50 trees within their immediate view. This aspect immediately stood out as students noticed a significant difference from other parks visited in the previous two weeks. To many students, the park felt relaxing, quiet, and safe. They pointed to the openness of the park, the large pond, the number of people, and the excellent maintenance status of the space. The park appeared to be very welcoming to people of all ages and backgrounds due to the diversity of people who were enjoying the space. Many families with young children were strolling through the park and others were lying under trees or sitting by the pond.

Other important elements that students noticed included a significant number of trash cans, various elements such as drinking fountains and flower gardens, and duck tours in the pond. Some of the other parks visited did not have enough trash cans and were covered in litter. Students counted over 10 trash cans within their immediate view, which helped keep the park clean. Many of the students really appreciated the flower gardens, which pushed them to think about the aesthetics of a space while also understanding how this feature can help mitigate extreme heat. Students also mentioned that duck tours in the pond added a uniqueness to the park and can attract tourists as well as residents, especially those with young children. The only negative observation students made related to the lack of drinking fountains and the positioning of some of them under direct sunlight.

This set of observation activities provided students with crucial insights into design aspects that contribute to creating a unique park and enhancing people's experience, especially during hot days. Students leveraged these insights and incorporated their observations in their design process for the RCC Cool Pocket Community Park. Specifically, this set of activities encouraged students to think about elements that contribute to creating a unique park design able to attract people from different areas of the city and provide them with a comfortable experience.

KEY INFORMANT INTERVIEWS

During the second week of the summer program, students conducted key informant interviews with Roxbury Community College students, faculty, and staff. These interviews were



conducted to gain further insights into key informants' perspectives on the RCC Cool Pocket Community Park. The students were divided into four groups of 2-3 students each and assigned specific roles: one or two note-takers and one interviewer. They asked 9 open-ended questions, and some follow-up questions, to interviewees regarding the importance of a pocket park on the RCC campus, potential pros and cons related to the location of the park, users, activities, and design elements. The students conducted 9 interviews with 5 staff members, 3 current or former faculty, and 1 current student. Five informants were women and four were men.

Students incorporated the themes and perspectives emerging from the interviews in their design process. Specifically, four major themes emerged from the conversations with key informants: 1) park users, 2) safety and security, 3) the creation of a multifunctional space, and 4) park accessibility. This section provides a brief outline of the emerging themes.

Park Users

Many interviewees emphasized the importance of having a cooling space serving not only RCC students, staff, and faculty, but also the broader community surrounding the campus. The identified location of the park is currently an underutilized parking lot that contributes to retaining heat. The space could be transformed into a park for people of all ages and backgrounds, serving the needs of the residents in the area. The space could also be utilized to increase the synergy between RCC and various community organizations by establishing and running programs in the park. One faculty explained “[...] *it should be a community [park] so that we can have young people, but [also] we can have young families come down. Different nationalities, different ethnicities come and visit you, visit the college, have a series of programs.*” A staff member emphasized

[...] this institution is like a community institution, and it's foundational to the community. And so, if we were to create something that's based on our campus, I think it would be counter intuitive to close it off to the surrounding community.

These quotes illustrate how members of RCC view this park as an opportunity to build a stronger connection with the surrounding communities and provide needed space for all.

However, it is important to note that two of the interviewees felt the park was not as important for the community as others were stating. One faculty argued that the park would easily become a dog park due to the wave of gentrification affecting the area and the increased number of young professionals with dogs as opposed to young families with children:



This is Foothill of Roxbury. It's been gentrified completely. The people that live here have no children. They come in with two and three dogs. So, if you build the park, it is going to be a dog park. So, we the people need a dog park, but nobody wants to say that.

This quote illustrates the importance of designing the park by paying specific attention to the needs of the surrounding communities to attract different groups. In fact, as the informant claimed, unless the park is going to be oriented towards serving multiple groups in the community, its value can be diminished. Another interviewee felt the funding for the park could be used in a more effective way to directly benefit RCC and its students. In general, their thoughts around the lack of value of the Pocket Park seemed to stem from a fear that the park will not be used and just become a wasted effort.

Safety and Security

Another theme that emerged centered around safety and security concerns. All interviewees alluded to or directly stated the need for some form of security measures to keep the park a safe space. Many of the unwanted activities in the park that interviewees listed, such as smoking, drinking, drug use, hanging out late, and more, were then followed by a discussion about how to actively prevent people from engaging in these activities. Solutions suggested by interviewees included having a gate and establishing an open and closing time for the park, adding security cameras, placing an officer to patrol the area, and establishing community norms and rules for everyone to follow while at the park. These responses encouraged students to think critically about the impact of security measures on users' engagement with the park and, specifically, how to ensure the creation of a welcoming space while trying to address safety concerns. Another key safety concern centered around the park's proximity to Columbus Avenue, which is a trafficked and dangerous road. This concern encouraged students to identify design solutions, manmade and/or natural, that could serve as barriers for the park to increase users' safety and reduce the noise pollution deriving from the traffic on Columbus Avenue.

Multifunctional Cooling Space

The interviewees shared many ideas about potential activities and functions they wanted to see in the Pocket Park. As mentioned above, a community space where people can gather, meet each other, and possibly participate in different programs and/or activities was one of the recurring themes emerging from the interviews. This theme is strictly interconnected with another frequently mentioned essential function for the park: the ability to offer a cool space where people can find relief during hot days and, more broadly, the ability to mitigate the urban heat island effect impacting the area. A staff member stated, *"Well, there's a lot of heat zones, the hot zones throughout the city where there's intense heat right now. We need more green [spaces], trees... it is better for the environment."* This quote alongside many other interviewees'



comments made clear the need to incorporate cooling elements into the park design, such as shading trees and other forms of vegetation, shading structures, drinking water fountains, water features, etc.

Interviewees also mentioned the park could become an event space and host seasonal activities such as holiday events. One interviewee mentioned the possibility of using the space during election season for candidate forums, voting registration, and more. In addition, the park could serve as a connecting space to the other parks in the area. While some interviewees mentioned the competing interests of the other parks nearby, a staff member mentioned the opportunity for this park to serve as a prototype for other parks *“to have more parks, you know, like brother or sister, cousins of parks come into play...”* A network of parks, if designed and maintained well, can provide a variety of services to the community while amplifying the cooling effect at the scale of the neighborhood. Considering existing parks nearby also encouraged students to critically reflect on how to develop a unique design for the Cool Community Pocket Park to diversify it from existing parks and provide additional functions that the surrounding parks do not offer. The idea of creating a system of small parks becomes more valuable when considering existing assets in the surrounding area of the Pocket Park site - i.e., the Southwest Corridor, the Marcella Playground, the Highland Park, the Historic Dudley House, and the RCC Community Garden.

Park Accessibility

The possibilities to access the Pocket Park site and a potential system of parks increase exponentially when considering the two orange line stations of Roxbury Crossing and Jackson Square, the already existing bus stops, and the bikeable and walkable paths offered by the Southwest Corridor. A staff member mentioned, *“So one of the benefits is that it's quite close to the Jackson Square T-stop, which makes it accessible by both public, you know, by all forms, public transit.”* The accessibility of the pocket park site constitutes an asset that the student’s design could amplify by finding ways to attract more people from different areas of the city. Students considered adding a bike rack so bikers can stop and cool off during their trip on the Southwest Corridor and facilitating park access for bus riders. They also reflected on the ways design could increase or reduce accessibility for different groups, including people with disabilities. If designed well the park could become highly utilized and a prime space for community engagement.

The key informant interviews allowed students to collect additional information, ideas, and concerns that guided their design process and encouraged them to critically reflect on the ways design can address community needs and influence the use of a given space. Additionally, students learned the importance of involving potential users' experiences and perspectives in the design of a space.



SWOT ANALYSIS

The SWOT (Strength, Weakness, Opportunities, and Threats) analysis, pioneered by the Harvard Business School and Stanford Research International, is a strategic planning tool used to assess the strengths, weaknesses, opportunities, and threats of a context or a given situation. In the third week of the program, the students conducted a SWOT analysis to assess the conditions of the site identified to develop the Cool Pocket Community Park on the RCC campus and the surrounding areas, including the Marcella Playground, the Southwest Corridor Park, and the Jackson Square Playground. Strengths and weaknesses were used to identify positive and negative internal factors, such as the status and accessibility of the park site, while opportunities and threats were used to examine external factors, such as nearby traffic and existing parks. This analysis was instrumental in revising the first draft of a concept map students developed using findings from their observation activities and key informants' interviews. By assessing the area surrounding the site for the Pocket Park, students improved their design by adding, removing, and identifying key design elements, programs, and activities to make the park unique and attractive to different groups. This section introduces key findings from the SWOT analysis.

Strengths

The students noted that the location of the park constitutes a strength, especially as it relates to the surrounding area. The park site is close to public transit, residential areas, and local businesses. These aspects enhance opportunities for connections between the park and other existing assets in the surrounding area, as well as park accessibility for people coming from other areas of the city. Among the existing assets students noted during their walk, there were the RCC garden and the Historic Dudley House, which can be connected to the Pocket Park to implement programs aimed at bringing together the RCC community and surrounding residents, and the Marcella Playground, which offers sport facilities that can nicely complement the activities students proposed for the Pocket Park. Lastly, the students noticed that the park site has existing vegetation that already provides shade in some areas and that the existing trees looked healthy. Both aspects constitute strengths for the development of the Pocket Park.

Weaknesses

While the students believed the proximity to public transportation, residential areas, and local businesses were a strength for the location of the Pocket Park, they also identified some weaknesses, such as noise pollution, traffic, and the exposure of most of the site to direct sunlight. These conditions were a concern for the students as they considered the safety of park users and the accessibility to the park. Another weakness students observed includes that parking



lot #3, which is the site proposed to be redesigned as Pocket Park, is far from the main buildings on campus. This aspect may make it harder for students, faculty, and staff to access the park.

Opportunities

The opportunities students observed during the SWOT analysis mainly related to the connections that could be facilitated between the park and surrounding communities. By attracting residents in the area and/or people from other areas in the city who can use public transportation or the Southwest Corridor to reach the site, the park could become a resource for social gatherings and/or an important component in a network of parks like the Emerald Necklace system. Additionally, some students noted that because the site will be entirely redesigned, there is an opportunity to design and build it by using an energy-efficient mindset that includes solar-paneled fueled facilities and trash, recycling, and composting bins.

Threats

The current threats that students identified were mainly related to factors that would prevent people from using the park if not properly addressed. These included activities that target only a specific group in the community – e.g., children – noise pollution, nearby traffic and safety, and the urban heat island effect. The students carefully evaluated and addressed these threats by proposing design recommendations for the Cool Pocket Community Park aimed at reducing or eliminating potential barriers that park users could face in the future. As the next section shows, they critically reflected on including an abundance of shade by using natural and manmade elements - i.e., trees and plants, or shading structures – alongside water features to cool down the temperature and mitigate the urban heat island effect.

The SWOT analysis was a powerful tool that helped students gain analytical and technical skills, as well as an abundance of useful data and information that informed their design process and the development of the proposed design recommendations.

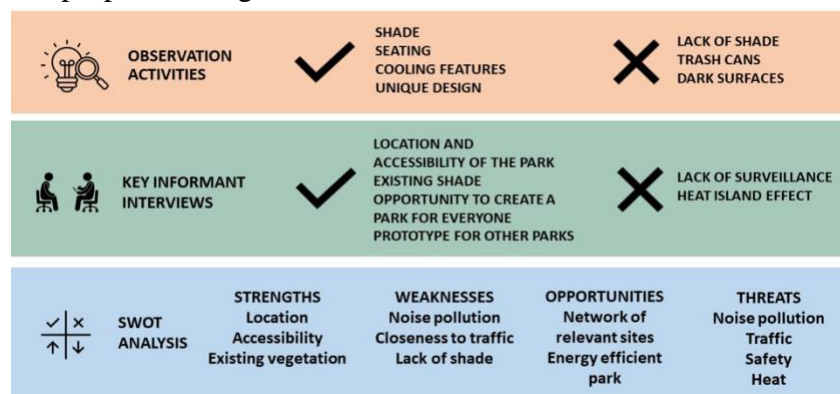


Figure 23: Summary of Key Research Findings



COOL POCKET COMMUNITY PARK DESIGN RECOMMENDATIONS

The site for the Cool Pocket Community Park is located on the RCC campus and it is currently an underutilized parking lot – parking lot #3. The Roxbury Community College plan for this site is to transform part of it into a soccer field and part of it into a pocket park. Students relied on the RCC proposed boundaries for the park to develop a concept map and detailed design recommendations for each area of the park (Figure 24). They identified four main areas for the Pocket Park: (1) a rest area, (2) a play area, (3) a water area, and (4) a gathering area. This section introduces each of these areas and related design recommendations. The recommendations are illustrated through images and best design examples students identified during a best practice research process. Specifically, by relying on examples presented in class, field trips, internet searches, and online landscape architecture databases – i.e., Landezine and ArchDaily – students identified and selected illustrative examples of their ideas regarding park functions and activities, design elements, and materials.

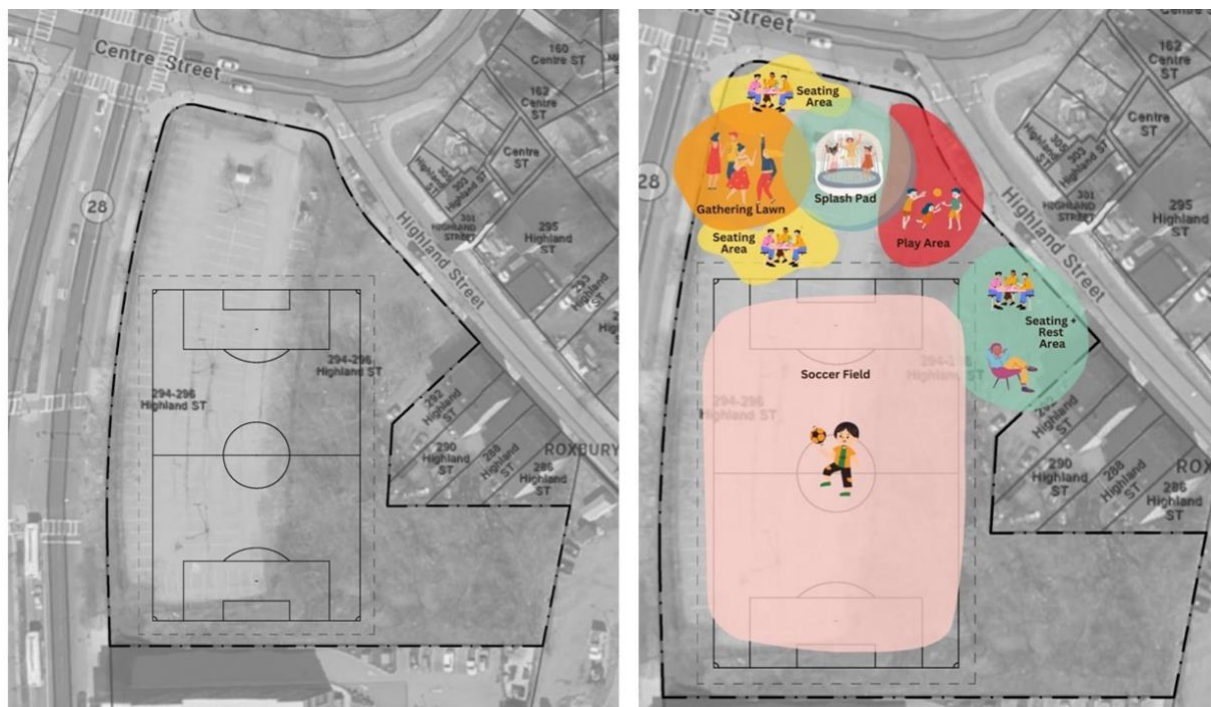


Figure 24: RCC site plan for the parking lot #3 and students' concept map.

Rest Area

The students designed the rest area to be a welcoming space for kids, families, and older adults. They decided to locate it on Highland Street, which is the farthest area of the pocket park



from Columbus Ave, heavy traffic, and noise pollution, and one of the closest to the surrounding residential areas. The inspiration for the rest area is to create a space able to bring people together to rest, enjoy a quiet space shaded by trees, watch soccer games, and cool off during hot days.

During the development of the design proposal, students were encouraged to consider design elements such as those providing shade, seating, tables, and those defining the edge of this area. During the site visit, students noted that the area has existing vegetation that provides an abundance of shade. Hence, they recommend keeping the existing trees and plants but also adding species such as the Red Maple tree, which is a durable tree that can survive winters up to -15 degrees and live up to 80-100 years. This tree was chosen also for aesthetic reasons since it adds color to the park with its distinctive, red-colored foliage. The trees in this area can be surrounded by shrubs and flowers for added benefits. The students also proposed using small pergolas with vegetation or other shading structures to provide additional shade in the parts of the rest area not currently shaded by the existing vegetation. This recommendation aims at creating additional shade, especially above the seating area, and a comfortable environment for people during extremely hot days.



*Figure 25: Examples of pergolas with vegetation and red maple trees
(Source: National Recreation and Park Association and the web).*

The students propose three different seating areas in this space. The first seating area is located closer to the soccer field, and it is designed to encourage people to relax, lay down, and enjoy the space. The second seating area has tables where people can sit, gather, and enjoy games or a meal together. These tables will be shaded either by umbrellas, shading structures, or trees, and will be built with materials that do not overheat such as stone, granite, or marble. The third and final seating area proposed is part of a larger design element that separates the street

from the rest area to create a safer environment for all park users. This element includes plants, flowers, and trees as a natural barrier between the street and the park. It also provides an opportunity for the surrounding community to maintain a small garden with edible plants or a pollinator garden. The students also believe that this area, as well as the rest of the pocket park, should be built using natural materials such as wood. Natural materials will be a better fit for the existing landscape, provide users with a more relaxed feel, and not trap heat as much as other materials.



Figure 26: Examples of seatings, tables, and the design element for the edge of the rest area (Source: University of Sidney Cadigal Green, Sanderson Concrete, Southwest Corridor Park, and the web).

The overall goal of the rest area is to serve multiple purposes centered around relaxation: rest, get relief during hot days, watch soccer games, and spend time with family and friends. Therefore, one essential design recommendation for this area is to provide enough shade, so people can enjoy being outside, especially during summertime. To attract several people and serve different purposes, students identified different seating options that can bring people together but also allow them to enjoy a quieter space compared to other areas of the pocket park. Finally, the addition of different plants and trees in the area adds to the park user's experience and contributes to mitigating the urban heat island effect.

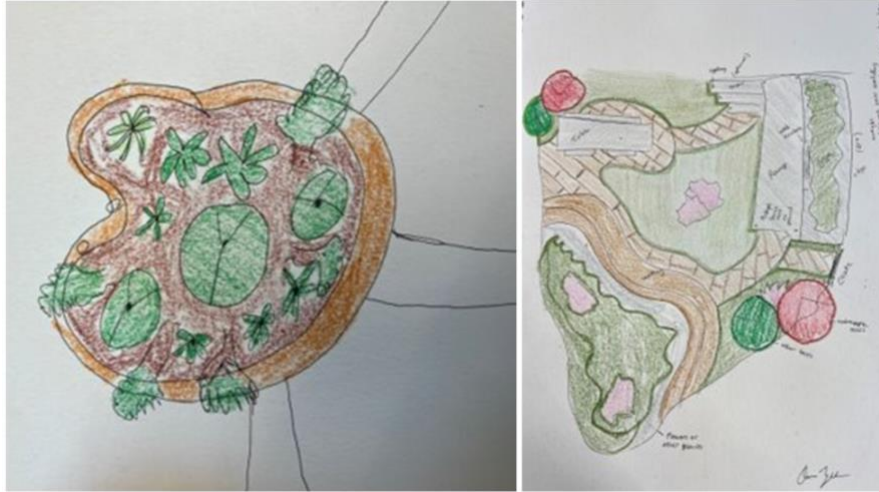


Figure 27: Jeremiah Murat's and Oscar Zelaya's site plan sketches of the rest area.

Play Area

The students included a multifunctional play area in their design proposal for the Pocket Park. This area is adjacent to the rest area and right next to the water area (see concept map Figure #). It is located on the Highland Street side of the Pocket Park and away from Columbus Ave and its heavy traffic, which could pose a safety issue for children and adults playing in this area. One of the main guiding principles for the play area is to create a space in which everyone, and not only children, can play, have fun, and be active. During the data collection phase, students noted that having a space serving the needs of different age groups is not necessarily addressed by existing parks in the area, especially in those providing playgrounds. In fact, some of the other parks in the area have playgrounds designed only for young children or middle-school kids. Including a play area that has activities for all age groups and keeps people active will make the Cool Pocket Community Park unique and attractive for many different people.

To achieve the goal of a play area for all, the students included human-sized games such as chess or checkers, foosball, connect four, and billiards. These games provide a variety of fun and engaging options for everyone. These types of games also help to keep people physically active and mentally engaged. Students also recognized the importance of having swings but emphasized the need to include in the design of the Pocket Park swings for everyone, not only for children. Providing these kinds of games helps differentiate the park from others in the surrounding areas, and attract not only families with children, but also teenagers and adults.



Figure 28: Examples of human-sized games – Source: pictures retrieved from the web.

The human-sized games are complemented by other games that help people to stay active, such as four square, hopscotch games, zip lines and/or climbing structures. The students emphasized the importance of being creative with the designs of these games, so they stand out, increase the aesthetic of the pocket park, and attract more people. Similarly, climbing structures can be artistically and uniquely designed for the park, rather than replicating the more common structures present in the other parks around Boston. Students recognize the importance of implementing a visually stunning, but also multifunctional design that addresses the space limitations for this area while providing unique and engaging opportunities to stay active.



Figure 29: Examples of game to keep people active – Source: pictures retrieved from the web and taken at the Jackson Square and Marcella playground.

Similar to the design of the rest area, students stressed the importance of providing shade in the majority of the play area to guarantee a cooler and comfortable environment during hot days. The importance of shaded areas emerged directly from students' observations and experiences during field trips, which, in turn, prompted them to consider design elements that can provide shade without blocking completely the airflow and potential breeze. They propose using a combination of shading trees and structures to provide coverage and protection from the sun. The shading structures should be sized and shaped according to the space, incorporate vibrant colors to add to the aesthetic and attractiveness of the park, and use a combination of shading canvas to guarantee the airflow. The flooring of the play area should be built with a soft rubber material to ensure increased safety in the play area. This kind of material helps reduce the

harmful impact of anyone falling while playing and allows to easily incorporate different colors and designs to add to the uniqueness of the park.



*Figure 30: Examples of natural shade, shading structures, and colorful rubber flooring –
Source: pictures retrieved from the web.*

The overall goal of the play area is to engage a wide range of people from different age groups and provide opportunities to stay active and exercise, have fun, or relax. The combination of multiple activities is key to attracting and keeping multiple users engaged. The elements proposed for this area should be uniquely designed to help differentiate this pocket park from other parks in the surrounding area and in the city. Drawing on their personal experiences at different parks and their data collection process, students recommend a play area that allows everyone to have an amazing experience and stay in the park longer.



Figure 31: Urban design students at the Marcella and Jackson Square playgrounds – Photo credits: William Cecio.

Water Area

The students recommend including a water feature in the park to amplify the mitigation effect the park has on the urban heat island problem affecting the neighborhood. The water feature not only contributes to reducing the overall temperature of the area, but also offers an opportunity for people to play with water, cool off during a hot day, and relax. The water area is located at the center of the main area of the Pocket Park (see concept map Figure 39). This is a strategic location for two main reasons: it amplifies the cooling effect allowing it to reach all the areas in the park, and it makes the water area one of the main focal points in the park and one of the first things people see when walking through the main entrance. Additionally, the sound of the water helps to contrast the traffic noise coming from Columbus Avenue.

In line with the overall goal of designing a unique and attractive Cool Pocket Community Park for people of all ages and backgrounds, students decided to design a water feature that included a splash pad to invite everyone to play, cool off, and relax. During their data collection process, they recognized that other parks, such as the Rose Kennedy Greenway or the Marcella playground, have splash pads and water fountains that are mainly designed for young children. In order to make the park unique, the splash pad must have a unique design that distinguishes it from the other splash pads in Boston.





Figure 32: Examples of uniquely designed water features, including colored lights, colorful water misters, and water sprayers - Source: Elephant Park, London (UK), Clyde Warren Park, Dallas, splash pads and elements retrieved from the web.

Students recommended an unconventional and artistic design that utilized sculptures, colored lights, and different water features like misters and water sprayers. The splash pads in Boston tend to have water sprayers coming up from the ground with few or no other elements to engage people. The students wanted to include colorful structures that release water from above while also having water coming up from the ground. This increases the amount of water in the air and can help cool down the park. These structures should also be creatively designed. Features such as misters or water sprayers can be made to look innovative and futuristic while also helping youth have fun and make friends as they play in the area. The inspiration for the water feature is a fun and relaxing area that, at the same time, is uniquely designed to become a piece of art that differentiates this park from others. These kinds of unconventional elements can help create a social atmosphere, attract more people to the park, and increase the fun for users of the park, while also cooling down the entire area. Students also recommend the use of vibrant colors to increase the beauty of the space and soft rubber or foam flooring for safety. Many of

the splash pads at other parks tend to be on concrete, which can lead to injury if youth are running and playing around. Having rubber or foam material can allow children and youth to play without concern about slipping and hurting themselves.



Figure 33: Examples of seating area included in the water feature - Source: urbanstyle.

The students also recommend having a lot of shading and comfortable seating around the splash pad and under some of the water features accessible to everybody. They proposed using a light-colored stone, rather than wood, to prevent the seating from getting too hot and ensure it would last a long time without deteriorating. Using a combination of trees and other shading structures will also keep the area cool and allow attendees of the park to enjoy themselves to the fullest. In addition to shading, lighting is also crucial to keep the area lit up in the evening and add to the aesthetic of the space. Colorful lights can help attract more users to the park when the sun goes down and be utilized for other activities in other areas of the park like during concerts in the gathering area.

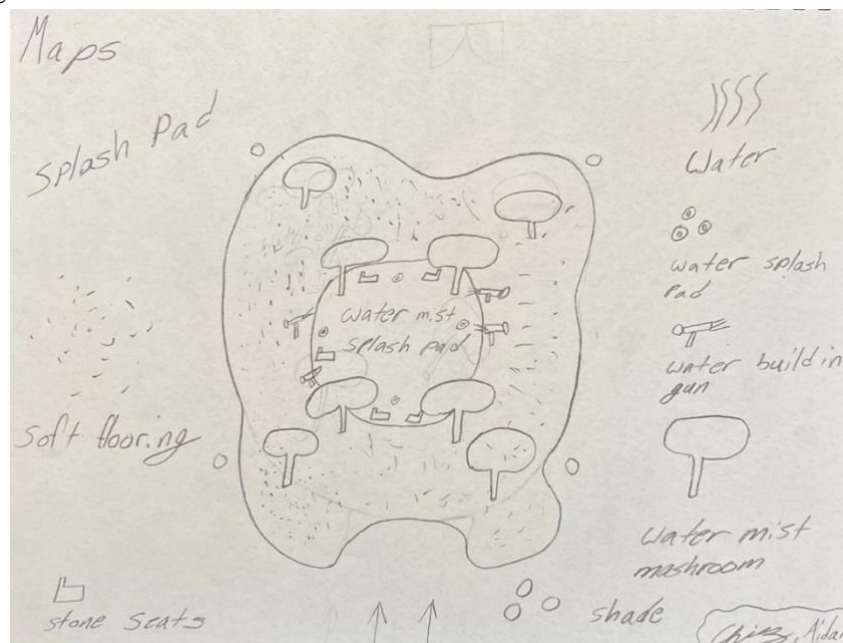


Figure 34: Cristofer Cruz's site plan sketch of the water area.

Gathering Area

The final area of the park included in the students' design proposal is the gathering area, which is located along Columbus Ave (see concept map Figure #). The gathering area is designed to be a multifunctional area where people can practice a variety of activities such as yoga or fitness classes, attend small concerts and events, or simply relax with family and friends. The students designed this area with an open lawn concept with some movable seating and a few tables on the side of the soccer field to maximize the flexibility of the space and the variety of activities that can be performed in it.

The activities the students considered when imagining this space included yoga, fitness classes, and small concerts to provide a combination of calming and energizing social experiences. They believe the Pocket Park offers the opportunity to host a variety of free activities for RCC students, faculty, and staff, as well as the surrounding community. Members of the RCC community and residents of the surrounding areas can participate in the activities as either facilitators or participants. These activities should align with the wants and needs of the community. For instance, yoga and fitness classes were considered productive and relaxing experiences that can improve people's wellbeing and, at the same time, provide opportunities for people to meet one another, socialize, and, hence, reduce social isolation. This space can also be used for small concerts and similar events that bring people together. Students designed this area to be the most versatile and accommodate the needs and desires of the community.



Figure 35: Examples of activities for the gathering area - Source: the web.

Because of the range of activities, students recommend using movable seats as a strategy to maximize space. Searching for best practices, students found movable seats that also provided lighting and shade, picnic table seats that had awnings, and swing-style seats and tables. The design of the seating options was important for students to consider achieving the goal of a flexible, comfortable, relaxing, and eco-friendly space. One seat option contained a solar panel to activate lights at night, and, at the same time, provided shade during the day. Other alternatives included shaded seats with swings so that park users had several seating options in the gathering area to enjoy.



Figure 36: Examples of seating options for the gathering area - Source: the web.

Because of its proximity to Columbus Ave, students recommend building a design element that includes a taller green barrier, a seating area, and murals or artistic signs. The design element will help create a taller green barrier, elevated from the level of the road, that reduces noise pollution coming from heavy traffic, filters air pollution, and separates park users from car traffic. The vegetation should include trees that can survive throughout the winter and can grow to provide shade, which is important for park users when temperatures rise. This design element and green barrier is a defining feature of the gathering area and includes seating options on the inside (park side) and a mural or artistic colorful sign on the outside (roadside) to attract more users. During the site visit, students noted the mural on the side of a residential building on Highland Street, right across from the park site (see Figure 37). They found the mural very attractive and proposed inviting local artists to help paint the outside edges so that the community can see themselves represented and celebrated in the Cool Pocket Community Park. The students also recommend using word art on the outside edges of the park to inspire not only the people who use the park but also those that walk and drive by the site. Incorporating forms of art celebrating the Roxbury community into the design of the pocket park will help attract people and make them feel more welcome in the park.



Figure 37: Example of a design element that includes seating and a green barrier, the Highland Street mural, and word art - Source: Cedar-Sinai Medical Center Levine Park, Ontario, William Cecio's photo, and the web.

The students designed the gathering area to be the most versatile in the park and to accommodate the needs and wants of the community. The gathering area should be a space able to host a wide range of activities, from fitness to creative activities, and to bring people together. A thoughtful and attractive design that includes art and an abundance of vegetation and shade will encourage park users to utilize the space and ensure people have an enjoyable experience.



Figure 38: Kelly Mendes's and Jayla Cardoso's site plan sketch of the gathering area.

Internal Connections, Access Points, and Edges of the Park

The four areas identified by the students will be connected internally with signage and lighting structures that will guide park users around the park. The students proposed signage and structures that followed the theme of using natural materials, such as wood, and ambient lighting

to fit the overall welcoming and relaxing atmosphere of the park. Signage will help guide users to where they want to go while lighting will provide users with a greater sense of safety. These elements will be essential and placed strategically along the pathway into the four different areas of the park.



Figure 39: Concept Map with access points and internal connections, example of signage and lighting structures retrieved from the web.

The park can be accessed through four different entrances. There will be one main entrance on Centre Street, which leads users straight to the water area, and four side entrances which lead users to the gathering area, play area, and rest area. The students proposed having multiple entrances for people who may want to go to a specific area of the park and having the convenience of not walking across the other areas of the park. Additionally, the students recommend building a main entrance decorated with a beautiful arch signaling the park's presence and attracting users. The main entrance could use a combination of artistic sculptures with lighting representing the community's history.



Figure 40: Illustrative examples for the main entrance of the Pocket Park – Source: Overton Park, Memphis, TN and James Canning Gardens, Toronto, Canada.

The edges of the park should be defined by green barriers, rather than more common metallic fences. These barriers can be elevated from the level of the street to provide extra protection for park users and should include trees, bushes, and gardens to provide shade, filter noise, and reduce air pollution from the surrounding streets. Students recommend planting larger trees on the side of Columbus Ave since that area is the most affected by noise and air pollution. In addition, having seating integrated into this barrier can provide more space for folks to relax and enjoy themselves at the park. On the outside of this barrier (the street side) students recommend including art in the form of murals or painted motivational signs to attract more people to the park and make the Cool Pocket Community Park stand out from others in the surrounding area. The art included in the park should be designed and/or created involving the local community and local artists. Finally, on the side of the soccer field, students recommend creating a structure that people can climb and sit in to separate the field from the park. This kind of structure not only helps divide the two spaces, but also engages park users and allows them to watch a soccer game and have fun.

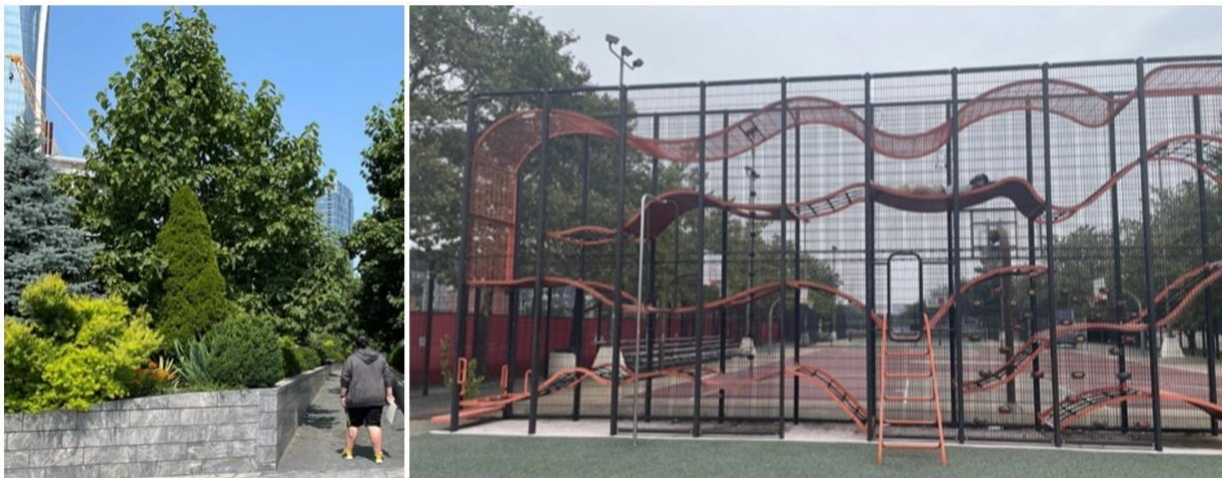


Figure 41: Illustrative examples for the edges of the park including a green barrier and a climbing structure - Photo credits: Sara Tornabene and William Cecio.

CONCLUSIONS AND RECOMMENDATIONS

The Urban Design cohort of students developed their design recommendations through a research process that involved observation activities, key informant interviews, a SWOT analysis, and best practice research. Drawing on their experiences on the field and the data collected, students developed a concept map for the Cool Pocket Community Park including four main areas – a rest area, a play area, a water area, and a gathering area – to address the emerging needs of (1) having a multifunctional space able to attract members of the community with diverse backgrounds and from different age-groups, and (2) having a park designed to mitigate



the urban heat island effect in the area and offer a cooling space for the community during hot days.

The previous sections have introduced design recommendations for each area and examples to illustrate students' ideas. This section summarizes the main general recommendations students developed for the Cool Pocket Community Park that will be built on the Roxbury Community College.

RECOMMENDATIONS:

- The park must be accessible, welcoming, attractive for everyone
- The design of the park must be unique to differentiate this park from the others in the city and to attract more users
- The park should be built using safe, cooling, and natural materials to reduce the urban heat island effect and an energy-efficient mindset.
- The park should be built to be a multifunctional space where several activities can be performed in line with the needs and wants of the surrounding community.
- The park should have a water feature for everyone to play in, cool down, and find relief during hot days.
- Most of the park should be shaded with trees or with small and colorful shading structures that allow the wind to pass through. Shade is a key element to mitigate temperatures and allow users to enjoy the park during hot days.
- The edges of the park should be green barriers that provide shade, filter air and noise pollution, add greenery to the park, and separate park users from the surrounding traffic.
- The park should be designed in connection with the ongoing project of reimagining the Southwest Corridor and the renovation of the Historic Dudley House.



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ACKNOWLEDGEMENTS

2023 Summer School in Urban Planning Participating School

1. Madison Park Technical Vocational High School
2. Dearborn STEM Academy
3. TechBoston Academy
4. Boston Community Leadership Academy/McCormack School
5. Blue Hills Regional Vocational High School

Educational Partners

1. Wakullah Dale Neighborhood Assoc. – Roxbury’s Emancipatory History
2. Shailah Stewart, S.K.Y. Strategies – What Universities Can Contribute to Improving Public Education
3. The Emerald Necklace Conservancy – Olmsted’s Contribution to Healthy Place-Making
4. City of Boston, Department of Parks and Recreation – ABC’s of Urban Design
5. City of Boston, Environmental Department – Designing the Resilient City
6. City of Boston, BPDA – The Rose Kennedy Greenway – Lessons for the New Boston
7. Museum of Science - Empowering Citizen Scientists to Mitigate Extreme Heat
8. EMI for the US Senate – Promoting Public Action for Human Health
9. Professionals of Color in the Environment – Promoting Diversity Where it is Most Needed!
10. Massachusetts Coalition for Occupational Safety and Health – Fighting for a Safe and Inclusive Workplace
11. TRIO Program – UMB – Promoting Transformational Teaching and Learning in Higher Education
12. Office of University Partnerships- UMB- Promoting reciprocity equity in engaged scholarship

Professional Partners

1. MA Chapter of the American Planning Association
2. Presidential Taskforce on Racism, Association of Collegiate Schools of Planning
3. President’s Office, National American Planning Association
4. Metropolitan Area Planning Council
5. Planners Network of Greater Boston
6. Professionals of Color Interest Group (MA Chapter of the APA)
7. Urban Land Institute



Urban Planning Internship Program Participants

1. Boston Planning and Development Agency
2. Metropolitan Area Planning Council
3. Boston Water and Sewer Commission
4. Campus Planning, UMass Boston
5. A Better City
6. ARROWSTREET
7. 100 Resilient Cities Network

Essential Collaborators

1. University Health Services, UMass Boston
2. CVS Minute Clinic – Quincy – Trinh Nguyen NP
3. Codman Square Health Center
4. Frugal Books, Roxbury, MA
5. Fresh Food Generation, Dorchester, MA
6. Mike Bryant Photography, Roxbury MA

Summer Program in Urban Planning Staff

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6. Adam Forrester, Mentor, UMB Graduate Planning Student
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