EMPOWERING PUBLIC PROPERTY

Simulating New Housing, Economic Development and Greenspace Policy with Newark's City-Owned Property Inventory

BREAK-OUT REPORT:

Simulation 3: Transform abandoned spaces into green tools for climate resiliency and placemaking

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Transform abandoned spaces into green tools for climate resiliency and placemaking

About 300 potential green infrastructure sites can create new green spaces, capture rainwater, and help create healthier air in Newark's neighborhoods – all on land the city already owns.[1] Collectively the potential sites cover 17.12 acres of land. These parcels are small in size with a median land area of 2,200 square feet. Most are concentrated in the South, Central, and West Wards -- only five potential sites are located in the East Ward, the most flood-prone area of Newark.

Figure 1
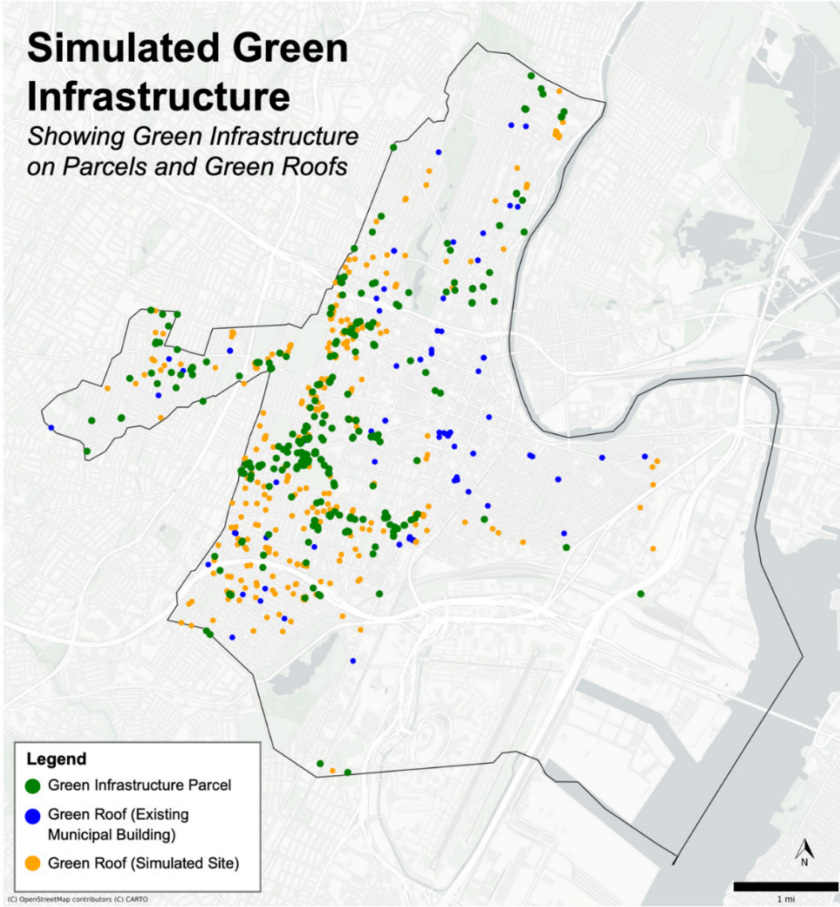
¹ Potential sites for the green infrastructure simulation include vacant or undersized lots with a parcel area of at least 500 square feet.

There are 95 municipal buildings city-wide where green roofs can potentially be installed. Further, the first and second simulations on affordable housing and commercial development demonstrate the possibility of building 329 structures on city-owned lots.

Advancing Climate Resiliency, Health, and Placemaking

Newark's built environment and wastewater infrastructure exposes communities to multiple environmental hazards that are only further magnified by the impact of climate change. Impervious buildings and surfaces dominate the urban landscape with patches of trees concentrated in select parks, trapping heat and expelling floodwater by design. Newark ranks second in the nation for urban heat island intensity.

But Newark has mitigation options. For example, the Ironbound, Newark's densest neighborhood, can benefit from 32 potential green infrastructure sites that could help addresses flooding and the urban heat island effect.

Table 1

East Ward Potential Green Infrastructure Sites	
Site Type	**Count**
Non-Buildable City-Owned Parcel	5
Existing Municipal Building *(Green Roof)*	9
Simulated Affordable Housing *(Green Roof)*	13
Simulated Commercial Development *(Green Roof)*	5
Total Potential GI Sites	**32**

In the West Ward, 35 sites available for small parks could create 1.6 acres of green space.

Figure 2
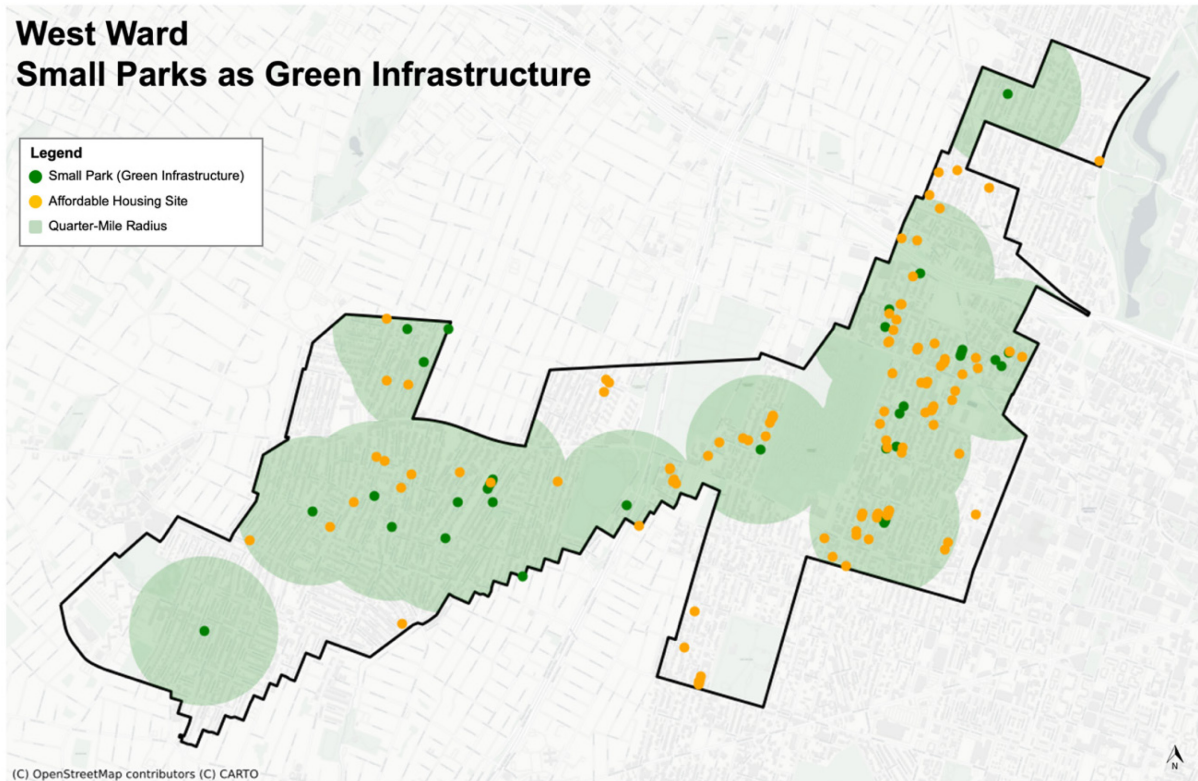
And creating a more prominent role for community planning in green infrastructure development can help Newark neighborhoods reap the multifunctional social and economic benefits of green infrastructure.

Financing Green Infrastructure Development

Newark should look to various sources of federal, state, and private funding to finance the need for extensive green infrastructure development in the city. The U.S. EPA's 319 Nonpoint Source Program provides grants to states to address pollution from stormwater runoff. Additionally, the agency's Urban Waters Small Grants Program (UWSG) provides grant funding for programs that improve urban water quality while promoting neighborhood revitalization (Georgetown Climate Center, 2023).

INTRODUCTION

The strategic redevelopment of city-owned land in Newark holds immense promise for advancing policies of housing affordability in hand with placemaking, climate resiliency, and equitable development. Land that has come into the possession of the City of Newark due to tax delinquency, foreclosure, or landlord abandonment reflects a living legacy of structural inequality. This report reimagines public use by chronicling the opportunities for equitable growth and household mobility that might arise from a clearer view of Newark's current inventory.

City-owned property is a public asset that can be strategically leveraged as a policy tool to address Newark's immense unmet needs for affordable housing, equitable economic development, and climate resiliency. Newark faces an acute shortage of affordable housing. While multiple approaches are needed to fill the gap, the acquisition of city-owned land at a nominal fee is a critical resource for affordable housing development in Newark. Any plan that seeks to address the housing crisis must leverage a deep layer of subsidies to produce units that are affordable at the local level. However, supporting the development of healthy, livable neighborhoods requires more than brick-and-mortar affordable housing production. In hand with affordable housing development, Newark needs quality jobs and business ownership opportunities to advance the financial security of residents. Investing in infrastructure that increases climate resiliency is equally crucial to the future health and prosperity of a city that is vulnerable to multiple climate risks including the urban heat island effect and wastewater and sewage overflow flooding.

Effectively, these policy goals rely on technical capacity-building at City Hall. It is not possible to envision and oversee the redevelopment potential of Newark without information systems that can record the quantity, location, and basic structural characteristics of property in the City's inventory. Quality data about the inventory is an indispensable tool in the effective management of this finite public resource. Indeed, bureaucratic practices of quantification to conceive of and manage land inventory are as old as modern cities (Scott, 1998). Yet, municipalities operate on an uneven playing field as it relates to having basic data infrastructure to reliably collect information about their assets and services. Building the City of Newark's technical capacity to manage property data is a prerequisite to the implementation of numerous active policy initiatives premised on the use of city-owned land, from the creation of the Newark Land Bank to the Investing in Newark Communities initiative that establishes deed restrictions for up to half of city-owned property (City of Newark, 2020; City of Newark, 2023). CLiME has devoted time and resources to produce foundational data management tools and techniques in partnership with the City of Newark that allow for the efficient and creative use of city-owned land as a resource for equitable development.

CLiME began the project in October 2022 with the goals of creating an up-to-date inventory of city-owned land and developing recommendations to institute data management practices for improved efficiency. At completion, the project has yielded:

- A validated list of city-owned property with fields that indicate the disposition status;
- A restructured database to improve efficiency and prevent future data errors;
- A data dashboard and map to convey the state of the inventory to internal city users and the public.

While this research emerged out of CLiME's technical capacity-building initiative with the City of Newark, the project sparked a broader inquiry into how the City of Newark may steward and transfer public land to advance its goals of affordable housing production, equitable economic development, and climate resiliency. In the first section we describe CLiME's collaboration with the City of Newark and highlight the value of investing in municipal information systems as a cornerstone of policy implementation and evaluation. We continue in the second section by running a series of policy simulations with land inventory data. These simulations estimate the potential of affordable housing production, environmental remediation, and job creation on city-owned property based on development rights defined in the City's proposed 2023 zoning ordinance. Here we also suggest new neighborhood governance and ownership structures that embed democratic processes in local land use and redevelopment planning, such as Community Planning Boards, Community Land Trusts, and a Redevelopment Authority. In the final section we conclude by outlining policy recommendations to leverage city-owned property as a tool for equitable development.

SIMULATION 3: TRANSFORM ABANDONED SPACES INTO GREEN TOOLS FOR CLIMATE RESILIENCY

Born out of generations of public neglect and disinvestment, Newark's built environment and wastewater infrastructure exposes communities to multiple environmental hazards that are only further magnified by the impact of climate change. Impervious buildings and surfaces dominate the urban landscape with patches of trees concentrated in select parks,[2] trapping heat and expelling floodwater by design (Filion et al, 2021). Newark ranks second in the nation for urban heat island intensity[3] (Climate Central, 2021; Filion et al, 2021). Coupling an impervious built environment with nineteenth-century wastewater infrastructure introduces yet another dimension of harm. When water treatment plants exceed capacity[4] -- an increasingly common occurrence due to climate change -- Newark's combined sewage overflow (CSO) system discharges a mixture of untreated domestic sewage, industrial waste, and runoff into the Passaic River, sometimes reaching neighborhood streets and homes (City of Newark, 2023; CD Smith, 2015). Green infrastructure consists of land uses and installations on buildings that mitigate flooding by increasing the porosity of the urban landscape. Green infrastructure should be understood as a multifunctional resource that can benefit range of stakeholders. While mitigating flooding, green infrastructure planning sites can also address crucial environmental, social, and economic needs. As we simulate in the sections that follow, the creative use of city-owned land can help reduce climate threats and strengthen Newark's resiliency. Note that all calculations are based on an assessment of inventory as of June 2023.

4.1 The Scope and Location of Available Parcels

We identified nearly 300 potential green infrastructure sites on non-buildable lots and more than 400 green roofs on existing or simulated buildings that can become new green spaces, capture rainwater, and help create healthier air in Newark's neighborhoods – all on land the city already owns. Green infrastructure effectively aims to turn the city into a "sponge" (Apte, 2017). Small or oddly configured lots that are not suitable for residential or commercial development are prime candidates for siting green infrastructure that can help address multifaceted climate and public health challenges in Newark (U.S. EPA, 2023). Green infrastructure can take various passive and active forms, from community gardens and neighborhood parks to pervious sidewalks and rain baskets. Notably, green infrastructure

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[2] ERI: 42 percent of Newark (11 square miles) is composed of impervious surfaces. Impervious surfaces are concentrated in the Ironbound and Downtown. (Filion et al, 2021).

[3] Land surface temperature estimates referenced here are from July 2020 models and represents a snapshot in time. The urban heat island effect varies seasonally and by the time of day.

[4] A 2015 report commissioned by Together North Jersey estimated that 15 minutes of continuous rainfall or 1 inch of rainfall will trigger combined sewage overflow CSOs (CD Smith, 2015, p. ES-1).

generates environmental, social, and economic benefits beyond addressing flooding. Through intentional design, green infrastructure can serve multiple community stakeholders by improving air quality, creating a more equitable distribution of tree cover, and developing neighborhood green space that enhances quality of life (U.S. EPA, 2023; Monteiro et al, 2020; Nieuwenhuijsen, 2020).
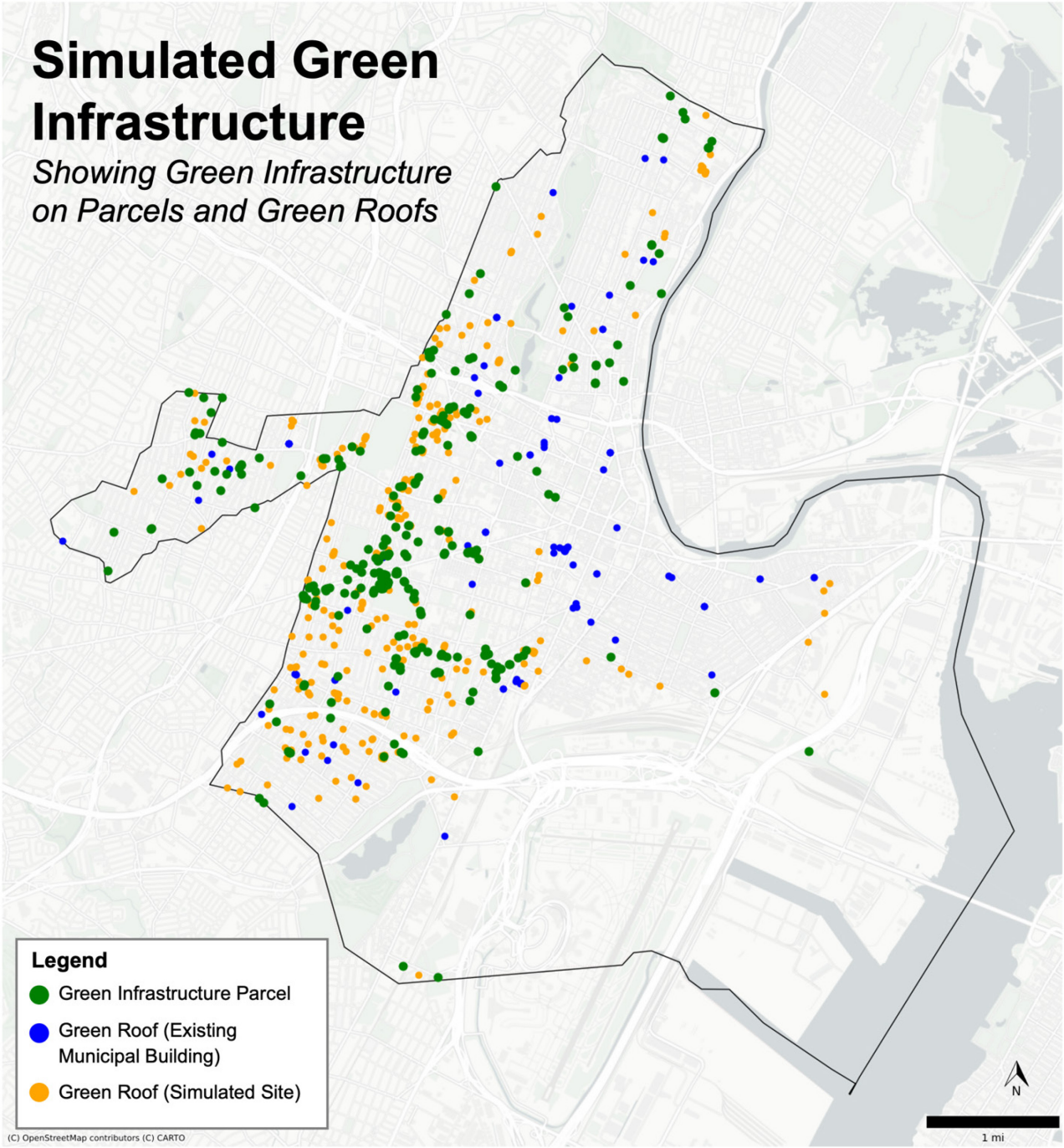
CLiME identified 299 potential parcels for green infrastructure across Newark.5 Collectively the potential sites cover 17.12 acres of land. These parcels are small in size with a median land area of 2,200 square feet. Most are concentrated in the South, Central, and West Wards -- only five potential sites are located in the East Ward, the most flood-prone area of Newark. Bordering the Passaic River and hosting two in five of the city's combined sewer overflow sites, the Ironbound is particularly susceptible to flooding and combined sewage overflow when stormwater exceeds capacity (NJDEP, 2023). Additional study of these 299 potential sites is required to gauge feasibility and assess the impact on reducing flooding in Newark's most vulnerable communities. Feasibility analyses by the Rutgers Cooperative Extension involves field visits and analysis of aerial imagery to determine whether green infrastructure can adequately absorb runoff (Rutgers Cooperative Extension, 2018). We encourage researchers and the Newark Department of Water and Sewer Utilities to use the City's dataset of city-owned property as an entry point to consider possible sites for the expansion of green infrastructure.

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5 Potential sites for the green infrastructure simulation include vacant or undersized lots with a parcel area of at least 500 square feet.

Figure 3

Simulated Green Infrastructure

Showing Green Infrastructure on Parcels and Green Roofs

Legend
- ● Green Infrastructure Parcel
- ● Green Roof (Existing Municipal Building)
- ● Green Roof (Simulated Site)

(C) OpenStreetMap contributors (C) CARTO

1 mi

In addition to potential sites on non-buildable parcels, green infrastructure can also be installed on existing buildings in the form of green roofs. There are 95 municipal buildings city-wide where green roofs can potentially be installed. Further, the first and second simulations on affordable housing and commercial development demonstrated the possibility of building 329 structures on city-owned lots. Green roofs create a layer of vegetation on building rooftops to retain stormwater and

provide cooling effects. An EPA analysis of a green roof program in Kansas City demonstrated that installation on existing buildings significantly reduced stormwater runoff, lowered temperatures to dampen the urban heat island effect, and reduced air pollution associated with heat and ground-level ozone (U.S. EPA, 2018). When planning the development of affordable housing and below-market commercial buildings on city-owned land, there is an opportunity to require green roofs and other forms of green building design to align development with climate resiliency and public health imperatives.

4.2 Examples from the Wards: Flood Mitigation and Public Green Space

To illustrate the disparate threats to Newark neighborhoods, consider the East Ward. **The Ironbound, Newark's densest neighborhood, can benefit from 32 potential green infrastructure sites that could help addresses flooding and the urban heat island effect.** Tree cover in the Ironbound is sparse. Nearly 80 percent of surface area of the Ironbound neighborhood is impervious (NJDEP, 2015). Impervious surfaces, such as sidewalks, buildings, and parking lots, repel water while absorbing and emitting heat, simultaneously contributing to flooding and the urban heat island effect. In the Ironbound, surface temperatures have hit 95 to 106 degrees Fahrenheit during the summer months (Filion et al, 2016). Exposure to extreme heat increases the risk of heat stroke and dehydration and aggravates chronic health conditions such as cardiovascular and respiratory diseases that low-income communities are already predisposed to (National Institute of Health, 2023). Resilient Northeastern New Jersey reported that by 2050 projected increases in heat stress may lead to a 55 percent increase in heat-related mortality in the metropolitan region compared to 1990 levels (Resilient New Jersey, 2022, p. 52). Green infrastructure on parcels and as installations on existing buildings can potentially dampen the urban heat island effect in Newark's densest neighborhood. Prioritizing potential sites that are in or close to areas with high population density would generate the greatest health benefit for Ironbound residents. **Figure 17** shows that about 25 out of 32 potential sites are located in or close to residential areas with higher levels of population density.

There are 95 municipal buildings city-wide where green roofs can potentially be installed.

Figure 4

East Ward Green Infrastructure

Legend

● Green Infrastructure (Parcel or Green Roof)

Population Density (persons per sq. mi)

- 39,035 - 56,911
- 28,880 - 39,035
- 18,612 - 28,880
- 5,065 - 18,612
- 187 - 5,065

(C) OpenStreetMap contributors (C) CARTO
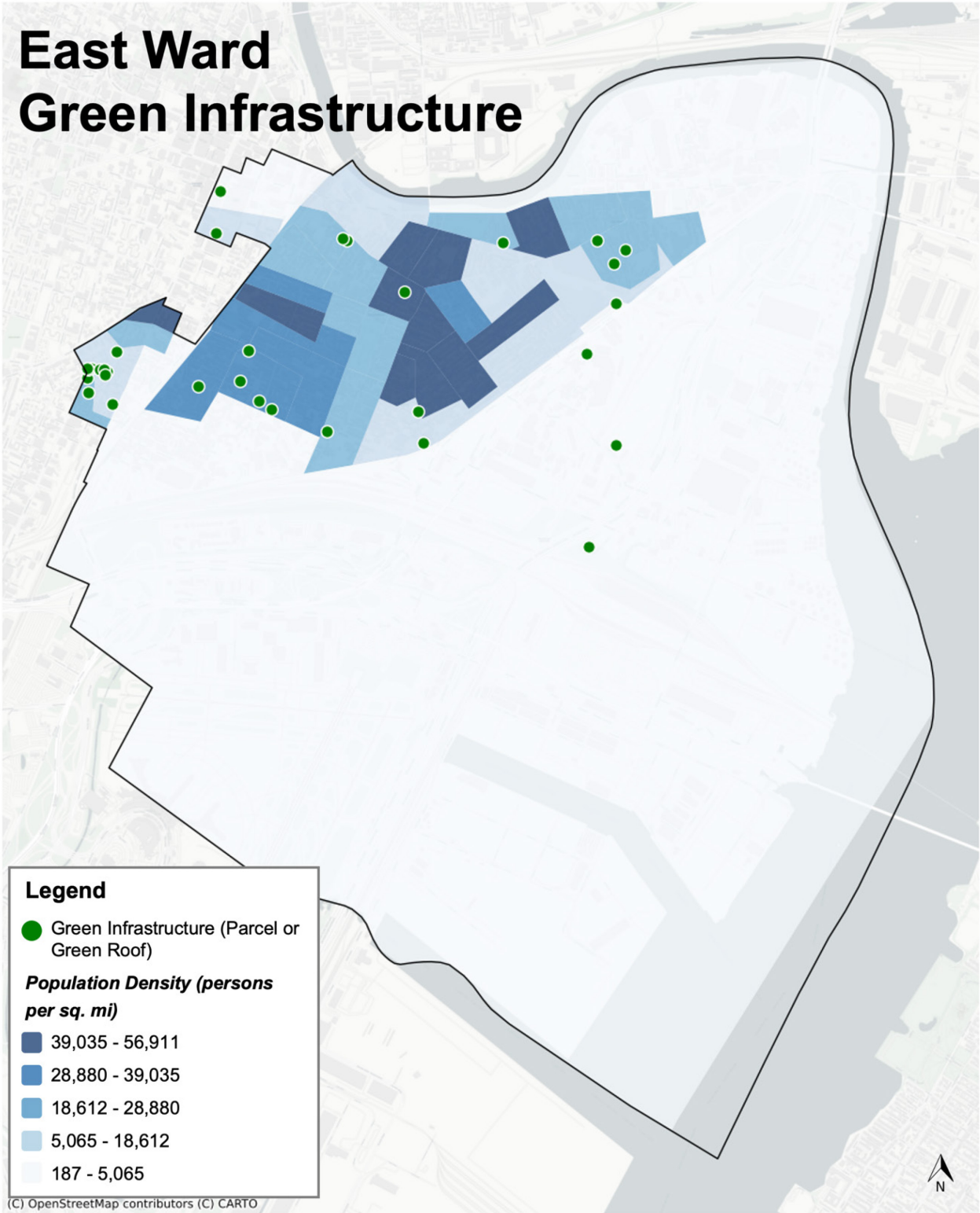
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Proposed Commercial Development *(Green Roof)*	5
Total Potential GI Sites	**32**

In the West Ward, developing green infrastructure in the form of small parks can serve as a placemaking vehicle that enhances health and quality of life. **In the West Ward, 35 sites suitable for small parks could create 1.6 acres of green space.** These small parks are located in a dense cluster of proposed affordable housing sites from the first simulation. There are 87 proposed affordable housing sites located within a quarter-mile radius of the proposed small parks. All identified sites are at least 1,000 square feet in size and publicly accessible from the street. There is an opportunity to advance a comprehensive community development strategy by linking park development and affordable housing.

Urban gardens and small neighborhood parks are forms of "active" green infrastructure that can contribute placemaking and health benefits for neighborhoods in hand with climate risk mitigation. Small parks that function as green infrastructure fold green space into the everyday urban fabric. Urban green space and community well-being are deeply interconnected (Egorov et al, 2016).

Studies have demonstrated that small parks can provide meaningful physical and mental health benefits similar to those more frequently documented in larger parks (Chiesi and Costa, 2022; Wood et al, 2017). Well-maintained parks can create healthy public spaces, improve air and water quality, and elevate property values in distressed neighborhoods, among other social and economic impacts (Harnik & Crompton, 2014).

Figure 5

**West Ward
Small Parks as Green Infrastructure**

Legend
- Small Park (Green Infrastructure)
- Affordable Housing Site
- Quarter-Mile Radius

(C) OpenStreetMap contributors (C) CARTO
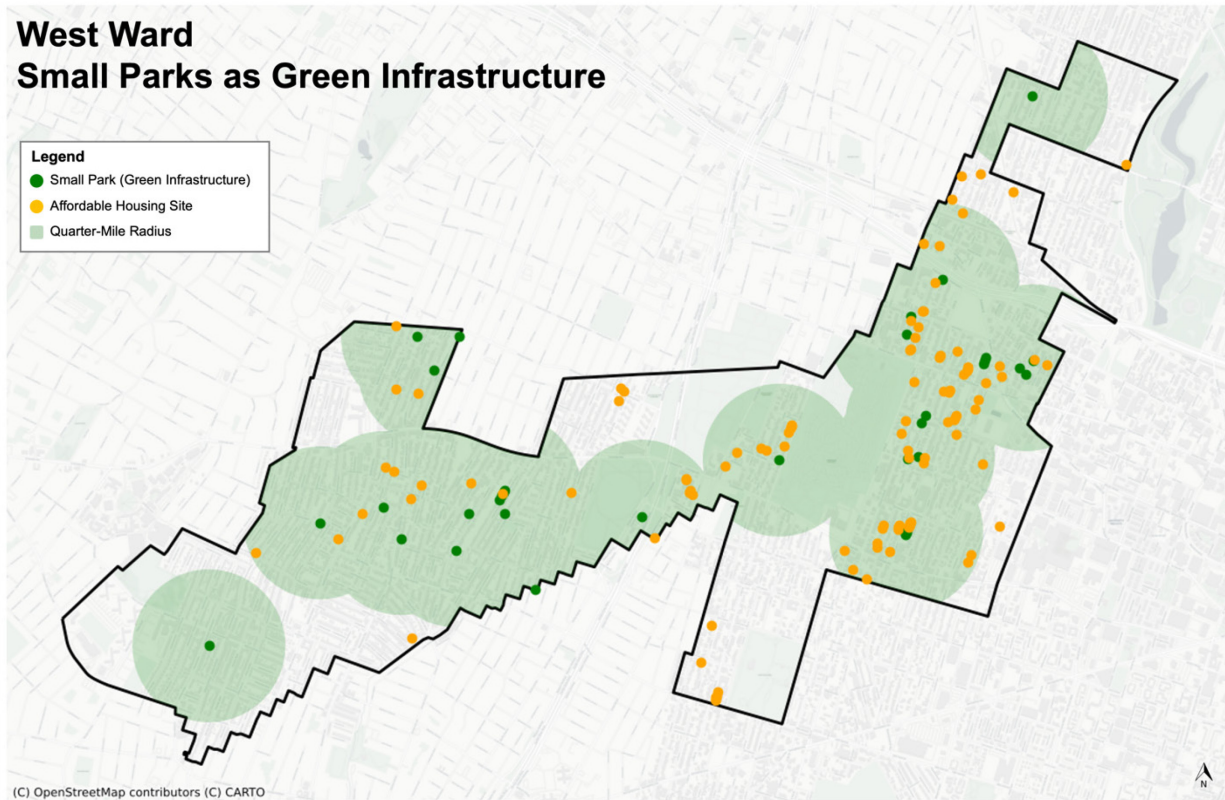
4.3 Governance Systems for Green Infrastructure

The dataset of city-owned property can aid existing green infrastructure planning initiatives taking place in the city and the broader region. Key organizational stakeholders leading the green infrastructure planning process include the Passaic Valley Sewage Commission, the City of Newark, Newark Water and Sewer, and Rutgers Cooperative Extension. Since 2013, Passaic Valley Sewage Commission has been working with 48 municipalities across five counties to develop and implement stormwater mitigation plans. Rutgers Cooperative Extension has partnered with PVSC and local government to conduct feasibility analyses and lead educational programming and community outreach (for current and past initiatives, see Newark Water and Sewer, 2023; City of Newark, 2018; Rutgers, 2017; CD Smith, 2015). The Passaic Valley Sewerage Commission, the City of Newark, and neighboring municipalities are developing a regional Long Term Control Plan to address combined sewage overflows. Newark DIG documented the installation of seventeen green infrastructure projects citywide from 2013 to 2016 (Newark DIG, 2017). Newark Water and Sewer is currently piloting twelve green infrastructure sites out of 100 proposed total sites (NJEP, 2023; Filion et al, 2021; Newark Water and Sewer, 2023).

The city-owned property dataset can aid current green infrastructure planning initiatives by providing an expanded dataset of potential sites. Green infrastructure impact studies have

demonstrated that intentional site selection can optimize reduction in flooding and combined sewer overflow. A 2015 Nature Conservancy study for the City of Camden analyzed the potential impact of using 125 city-owned lots for green infrastructure to reduce combined sewage outflows (CSO) and mitigate flooding. While modeling indicated that the use of multiple small sites generated "cumulative benefits," the use of optimal sites as opposed to randomly selected sites yielded more than double the volume of CSO and floodwater reduction (Creveling, 2015). Information about the full span of public sites can help stakeholders determine how to optimize stormwater management.

Governance necessarily involves enhanced neighborhood participation. Creating a more prominent role for community planning in green infrastructure development can help Newark neighborhoods reap the multifunctional social and economic benefits of green infrastructure. The community planning process can help inform what form green infrastructure takes so that the additional social and economic benefits are aligned with neighborhood priorities and interests. For example, a community with young children may wish to see a small park that provides recreational opportunities or a space with outdoor art to create shared green space in the neighborhood. Key stakeholders in a community planning process include residents, community-based organizations and

faith institutions, and small business representatives. Community planning can be a step on the green infrastructure planning process. Alternatively, creating a role for Community Planning Boards in the land use review process can create a direct role for Newark residents to shape development decisions in their neighborhoods. Section four provides a more detailed description of the mechanics of Community Planning Boards.

Beyond these considerations of institutional expertise and community participation remain basic questions about what kind of entity would be responsible for overseeing policy implementation. A comprehensive assessment of the kinds of specific organizations cities form in order to implement environmental planning requires a more searching legal inquiry beyond the scope of this simulation. However, we refer the reader to the earlier discussion of governance in the affordable housing simulation. There we made two relevant points. First, the City may already have agencies or divisions within existing departments that can take on these functions. Second, if no current entity exists, some of the new entities we proposed in the housing context might apply in the environmental— namely, a dedicated environmental redevelopment authority and community land trusts.

4.4   Financing Green Infrastructure Development

Newark should look to various sources of federal, state, and private funding to finance the need for extensive green infrastructure development in the city. The U.S. EPA's 319 Nonpoint Source Program provides grants to states to address pollution from stormwater runoff. Additionally, the agency's Urban Waters Small Grants Program (UWSG) provides grant funding for programs that improve urban water quality while promoting neighborhood revitalization (Georgetown Climate Center, 2023). Funds from the U.S. Department of Housing and Urban Development (HUD)'s Community Development Block Grant (CDBG) program can also be used for green infrastructure development under certain conditions where projects support neighborhood revitalization and increase property values. The Department of Energy's Weatherization and Intergovernmental Program can fund building retrofit projects for green roof installation and green building design. Additionally, FEMA has numerous pre- and post-disaster hazard mitigation grant programs that can support green infrastructure development, such as the Building Resilient Infrastructure and Communities (BRIC) program (U.S. EPA, 2023). Additional federal grant programs that can be used to fund green infrastructure development are too numerous to list here (see U.S. EPA, 2023).

At the state level, the New Jersey Environmental Infrastructure Financing Program (NJEIFP) is a major source of funding for green infrastructure development. The New Jersey Department of Environmental Protection (NJDEP) and New Jersey Environmental Infrastructure Trust jointly administer low-cost financing to support the design, construction, and implementation of projects that improve water quality (NJ Environmental Infrastructure Financing Program, 2017). The program's funding is derived from a combination of Federal State Revolving Fund capitalization grants and borrowed funds through revenue bonds (Ibid). From 2018 to 2022, the program has provided more than $2.2 billion of low-cost loans statewide. There are currently five active clean water projects in Newark administered by the City of Newark and the Passaic Valley Sewerage Commission (NJDEP, 2023).

Conclusion & Policy Recommendations

This report reflects a partnership between a university research center and a city government as well as an experiment in public scholarship. Most U.S. cities own some property that does not have a municipal use. Most face challenges providing enough affordable housing, stimulating wealth and job creation through business development and dealing with the unpredictable and unprecedented effects of climate change. Newark is different only in the relatively large amount of land it owns and the urgency of need among its lower-income residents. The City required a clearer picture of its inventory. This report began as a project to increase the City's property data organization and interpretation capacity. We then showed through three simulations how the property in the City's inventory could be a critical tool in advancing policies to build affordable housing, economic development and green infrastructure. The goal was not to offer all the answers but to present research that promotes better questions and deeper discourse. We conclude with the following policy recommendations.

1. **Build institutional capacity for data literacy within and across local government, civic organizations, and educational institutions to support civic engagement with city policy.**
   - Resource data infrastructure at City Hall by investing in training for staff, hiring additional staff where there are gaps in key roles, and investing in hardware and software that enables effective and secure data integration across departments.
   - City government should commit to a high standard of transparency and accessibility for users inside and outside of government. Select datasets, such as the dataset of city-owned property, should be published on a regular basis with an accompanying data user guide that helps the public understand what the fields and values represent.
   - Establish programming to create and sustain cross-sectoral partnerships between civic organizations, educational institutions, and city government to promote a civic culture of data literacy. Examples of programming include class projects and studios with schools and universities; partnerships between civic organizations and city government; public events and conferences such as "Open Data Week"; and interdisciplinary data literacy trainings for staff in city government and civic organizations.

Rationale:

This project originated as a collaboration between CLiME and the City of Newark's Department of Economic and Housing Development to build the City's capacity for data management and analysis. Our initiative represents one step in a much larger transformation that is needed to reorient how the City of Newark, local civic organizations, and the public engage with city-generated data and urban policy.

Newark needs a cross-sector data literacy initiative to improve how the City and the public engage with data to develop, implement, and evaluate urban planning and policy.[6] If data was left to data analysts and technologists alone, Newark would risk minimizing its democratic potential. Public administrators in local government, civic institutions, and residents all have important roles to play as users of city-generated data.

City government needs adequate resources in the form of staff and information technology infrastructure. There is also a need to establish institutional norms for data production, management, and analysis grounded in collaborative workflows between public administrators, data scientists, and information technology professionals to ensure that data is accurate, reliable, and accessible for users inside and outside of local government.

Educational institutions and civic organizations that engage youth and adults should train and empower all residents to become responsible data users who can interpret, process, and question public data. Educators and civic leaders can guide participants in understanding why reading and working with data is relevant to their daily lives and the challenges facing their community.

Members of the public can exercise data literacy through advocacy, civic engagement, and when interfacing with government services. Using data to build or question a narrative during a public forum is an example of how data is embedded in everyday practices of civic engagement.

2. **Maximize the use of city-owned land as a public resource for affordable housing.**
   - 100 percent of city-owned land suitable for residential uses should be dedicated to affordable housing at Newark income levels.
   - Institute 99-year affordability restrictions on affordable housing constructed on city-owned land, most likely in the form of deed restrictions. Establish mechanisms within city government or a municipal redevelopment authority to oversee compliance with affordability restrictions.
   - Align affordable housing development with community needs by creating housing with varying forms of tenure (limited equity cooperative, owner-occupied, rental) and of larger sizes to accommodate families of all kinds.

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[6] Data literacy is a multifold and involves several capabilities – in some contexts, select skills may be more applicable than others. Data literacy involves "reading data" (understanding how data represents the world); "working with data" (acquiring and processing data); "analyzing data" (describing, aggregating, and manipulating); and "arguing with data" (using data to construct a narrative) (D'Ignazio and Bhargava, 2016).

Rationale:

City-owned land is a public resource, and its use should be maximized to generate the greatest public value. Requiring all housing constructed on city-owned land be made affordable to moderate- and low-income Newark residents would expand the city's affordable housing stock. Further, expanding the duration of affordability requirements would significantly increase the total number of Newark households served over time. Finally, it is crucial that the characteristics and design of housing (e.g., form of tenure, size, rate of rent) aligns with the needs and income levels of Newark residents.

3. **Leverage city-owned land as a channel for equitable economic development.**
   - On city-owned lots suitable for mixed-use development, create first floor commercial space with below-market rents to support tenant businesses that provide healthcare and other essential consumer amenities. The municipal redevelopment authority or other entity managing commercial space should strategically curate a mix of businesses that aligns with neighborhood needs. Locally owned businesses that employ Newark residents in quality jobs should be prioritized as tenants.
   - Redevelop industrially zoned lots into light industrial space for advanced manufacturing, design, and technology businesses. The managing entity should have in-house expertise to curate a space that attracts and retains multisectoral clusters of high-tech production and design businesses.
   - Establish a rubric to set below-market rental rates that proportions subsidies in relation to demonstrable community benefits and prioritizes businesses owned by Newark residents.
   - Invest Newark and small business technical assistance intermediaries should coordinate with the managing entity to connect emerging local entrepreneurs with real estate opportunities that help them seed and expand their business.
   - Connect commercial and industrial redevelopment opportunities to equitable workforce development goals. The managing entity of light industrial space should partner with workforce development intermediaries to prepare the Newark workforce for quality jobs in the advanced manufacturing, design, and technology sectors. Workforce intermediaries could have an on-site office, work with tenant businesses to hire Newark residents, and partner with tenants to establish apprenticeships and other training programs that prepare Newark residents for career opportunities.

Rationale:

CLiME's simulation of redevelopment on commercial and industrial-zoned land demonstrated that there are opportunities to redevelop up to 21 acres of commercial and

industrial land. Transferring ownership of the land to a redevelopment authority or other entity with capacity to strategically curate commercial space can potentially create economic benefits for Newark in the form of local jobs and business ownership opportunities. Generating economic benefits for Newark residents would require close and effective coordination with small business development and workforce intermediaries to connect Newark businesses to suitable space and prepare workers for quality job opportunities.

4. **Creatively use non-buildable lots for green infrastructure to support climate resiliency and community development.**
   - Use lots that are not suitable for residential or commercial development as potential sites for green infrastructure. The city should commission feasibility studies to refine the list of potential sites that can effectively absorb runoff. Additionally, the city needs to commission an impact analysis to quantify how potential sites could reduce flooding volume, reduce combined sewage overflow volume, and generate other public health benefits such as improved air quality and lowered surface temperature.
   - Use green infrastructure planning as a vehicle for neighborhood placemaking and community development. Residents should have a voice in determining what form green infrastructure should take in their neighborhood to align green infrastructure with community needs. For example, neighborhoods with young families may wish to see playgrounds with pervious sidewalks; a neighborhood with limited access to grocery stores may desire urban agriculture on their block; others may wish to see sites used as space for public art to express and build connection to place.

5. **Establish governance systems to create community leadership roles in the disposition and management of city-owned land.**
   - Establish Community Planning Boards to create a leadership role for Newark residents in redevelopment decisions affecting city-owned land in their neighborhoods.
   - Transfer ownership of clusters of residential, mixed use, and green space property to a Community Land Trust to preserve long-term affordability and establish a governance system with board leadership roles for tenants, neighborhood residents, and civic leaders.
   - Create a strategic plan to convey property from the City to the Newark Land Bank.
   - Establish a municipal redevelopment authority -- within or independent of Invest Newark – to efficiently and equitably manage the redevelopment of multifamily residential, mixed-use, and industrial property at scale.

Rationale:

CLiME's simulations have demonstrated that there is potential city-owned land at a substantial scale that encompasses up to 27.1 acres of land for affordable housing, 21.3 acres of land for commercial and industrial development, and 17 acres of land for green infrastructure. Redevelopment at this scale begs the question of who makes decisions about the use of public resources. How can available public assets be optimally aligned with a range of pressing community needs? It is crucial to create leadership roles for Newark residents in redevelopment planning on city-owned land to ensure that residents have a voice over changes in their neighborhoods. Governance entities such as Community Planning Boards and Community Land Trusts that create leadership roles for neighborhood residents and for tenants are compelling models that elevate neighborhood decision-making.

Further, CLiME's simulations raise the question as to what entities are best equipped to carry out redevelopment and management of city-owned property. Governance of public assets should be effective and efficient. Newark could establish a centralized body in the form of a municipal redevelopment authority -- that is either housed in or separate from Invest Newark – to streamline redevelopment processes and align property management with public goals.

6. **Organize capital to enable the redevelopment of city-owned land at scale.**
   - Establish a bridge fund dedicated to supporting the redevelopment on city-owned land in Newark. The fund can be sourced by a mix of public and private grants alongside patient investment capital. The bridge fund should be administered by a local CDFI or other financial entity with capacity fundraising, underwriting, and oversight.

Rationale:

There are numerous established public and private sources of senior debt to finance pre-development and development costs. Senior lenders – namely, banks, regional and national CDFIs, and select state agencies with loan products – have capacity to issue loans in large volumes, but will typically issue loans that cover 65 percent of the cost of the project. Creating a bridge fund dedicated to redevelopment projects on city-owned land in Newark would help the City leverage these senior debt capital sources and close the financing gap.

APPENDIX A: METHODOLOGICAL NOTES

1. **Policy Simulation Methodology**

This report developed three simulations to estimate the maximum development potential for residential, commercial/industrial, and green infrastructure development under development rights encoded in the City of Newark's proposed 2023 zoning ordinance. Two limits are taken into consideration in the simulation to estimate maximum development potential: the inventory of available land and development rights. In actuality, there are many additional limits and trade-offs that inform development trajectories. For example, environmental constraints are a significant factor of the predevelopment process. About 3 percent of the inventory or 59 parcels are on NJDEP's list of contaminated sites that require environmental remediation (NJDEP, 2023). Additionally, development rights are potentially adjustable when landowners receive a variance in the land use review process. Other limits include financial and organizational constraints to implement potential development plans. While CLiME's estimate of development potential on city-owned land takes available land and development rights into consideration, only a portion of estimated development may be viable when taking these additional limits into consideration.

The simulations define the universe of property as all available city-owned land in standard zoning districts under the proposed 2023 zoning ordinance. City-owned property located in Redevelopment Areas are not included in the simulation because development rights are specific to the block or parcel level and are difficult to simulate. Additionally, public land is limited to property that is available for conveyance (i.e., property without a municipal use, property that is not in the disposition pipeline, and property without a municipal use managed by the City). We removed an additional 28 property records because the records are missing from the parcel map which impedes our calculation of lot area.

We estimate development potential by joining the zoning spatial layer to a parcel spatial dataset of city-owned property. The City's 2017 zoning spatial layer was manually updated to reflect changes in the March 2023 proposed zoning ordinance by georeferencing PDF maps released by the City's planning department (City of Newark, 2023). After linking parcel records to the proposed 2023 zoning map, the simulation assesses whether the parcel meets minimum requirements for development and quantifies maximum development potential on the parcel in terms of number of housing units or square feet of commercial and industrial space.

Parcels are not "repurposed" across simulations. If a lot is used in one simulation, an alternative use of the same space is not re-simulated in a subsequent simulation. In some zoning districts, it may be permissible to construct either residential or commercial uses under the zoning code. The simulations are sequential and prioritize the use of land in the order that the simulations

are presented. First, we consider all available city-owned land that is suitable for housing in residential, mixed-use, and commercial zoning districts. Then, we simulate economic uses in mixed-use buildings as well as industrial buildings in mixed-use, commercial, and industrial zoning districts. Finally, we simulate potential green infrastructure sites on lots that are not suitable for residential and commercial development because the lot is below the minimum required size or is oddly configured.

The only case where there is overlap between parcels across simulations are mixed-use buildings. The housing simulation identifies lots suitable for mixed-use buildings, proposing that all but the first floor is dedicated for residential uses. The economic development simulation takes those same mixed-use buildings and suggests that the first floor is reserved for commercial uses. There is an overlap in parcels but not in simulated space.

Simulation 3: Green Infrastructure Development

The third simulation identifies potential sites for green infrastructure. Any sites that are used in the prior simulations for affordable housing and commercial/industrial development are excluded from the scope of the green infrastructure simulation. The universe of potential sites includes available city-owned lots categorized as vacant or undersized lots without a structure. Additionally, the simulation identified sites with existing or simulated structures where green infrastructure can be installed in the form of green roofs. We queried city-owned lots categorized as municipal buildings and verified that lots had an existing structure by comparing to an open source spatial dataset of building footprints (Microsoft Maps, 2018).

1. **Calculating Land Area**

CLiME's calculation of land area will differ from estimates derived from administrative records. The State of New Jersey's MOD-IV property tax assessment records contain an automated field called "calculated lot area" derived from the accompanying field, "land dimensions." The values for "land dimensions" are known to be unreliable and were undergoing an update during the time of writing. CLiME used GIS software to calculate lot area from a spatial file of the parcel map to develop a closer approximation of lot area. All property records that had additional lots associated with the primary property record were merged to calculate the total area of the property record.

There are 28 property records with missing data for estimated lot area because these records are not included on the parcel map. Most of these records are sub-elements of lots and not represented on the parcel map (e.g., condo units, parking lots, billboards). These property records would have a very small lot area relative to a standard buildable lot.

2. **Policy Simulation Methodology**

This report developed three simulations to estimate the maximum development potential for residential, commercial/industrial, and green infrastructure development under development rights

encoded in the proposed 2023 zoning ordinance. Two limits are taken into consideration in the simulation: available land and development rights.

Defining the universe of property for the simulations. All simulations limit the universe of land to property in standard zoning districts outside of redevelopment areas.

Additionally, public land is limited to property that is available for conveyance (i.e., property without a municipal use, property that is not in the disposition pipeline, and property without a municipal use managed by the City). We removed an additional 19 property records because the records are missing in the parcel spatial layer.