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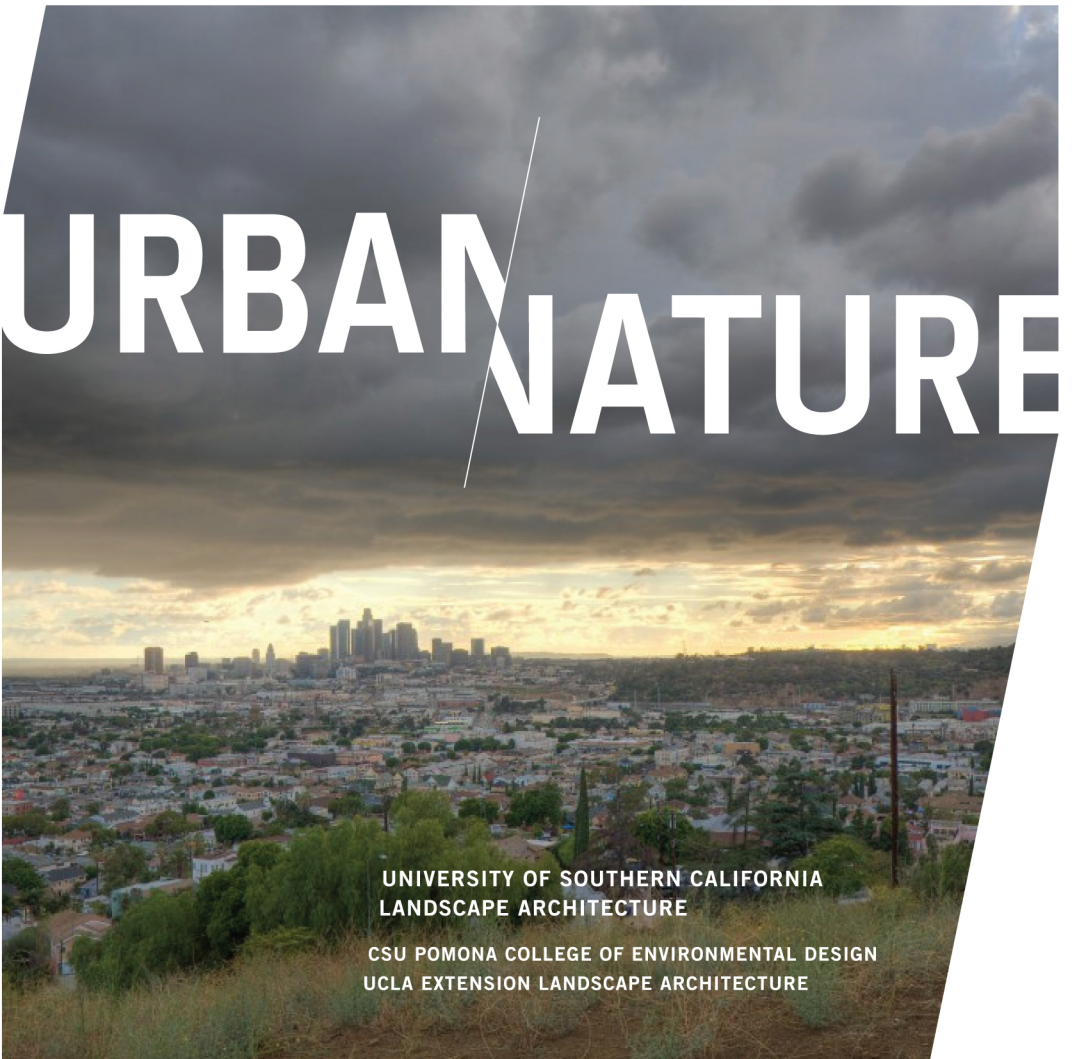

Resilient Cities: A Strategy To Bring About Social And Environmental Well Being In Baltimore

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Abstract

Landscape architects are collaborating with the City of Baltimore to leverage resources for storm water mitigation to simultaneously address blighted neighborhoods and underserved communities. This paper describes an innovative case study in which we have begun to integrate landscape architecture, engineering, and grassroots community engagement to solve social and environmental problems. This approach—entitled Resilient Cities by the authors—is a strategy that is beginning to provide Baltimore with the capability to gracefully expand and contract built and vegetated areas in response to shifts in populations, workforce and climate change.

To initiate this process, we mapped the city's watersheds—the first step in planning storm water mitigation. Watersheds are the underlying structure of Baltimore—and most cities. Layers of infrastructure such as storm drains, highways, train tracks and ports are built on the contours of watersheds; neighborhoods, institutions, commercial districts and parks flourish—and fail—in response to the infrastructure

as well as the watersheds. As cities evolve over time, the watershed becomes invisible to most people beyond the engineers and water management specialists who deal with the problems of flooding. Yet the watershed is always there, a geologic formation and a dynamic force that is constantly shaping environmental and social change. When watersheds remain invisible, attempts to solve the problems of cities can only address the symptoms. Revealing the profound effects watersheds have on city life provides the basis for design solutions that can tackle the root causes of many of the city's problems and maximize its greatest strengths.

We have found that watershed mapping is a powerful way to help city planners, public works engineers and community leaders imagine a shared vision of a Baltimore in which areas of blight and decay evolve into interrelationships between built and vegetated areas, an expanded tree canopy, and recreation areas which arise in response to the watersheds, and become components of a system of green amenities that lower summer temperatures and reduce flooding. In the future, the same general principles can be applied to other cities to identify underlying unseen patterns of social change, and provide a basis for transformative design.

1.0 Introduction

1.1 The City

Baltimore City expanded in population and acreage greatly after each of the world wars (Pietila) From its peak of 950,000 in 1950, it has shrunk to 622,000—65% of its peak population which now lives within its decaying, constructed terrains. Baltimore is a patchwork of blighted, marginal districts interwoven with thriving upscale neighborhoods. The city has struggled to address the effects of a shrinking population, applying expansionist-based practices of large tract redevelopment on its most impoverished areas (Baltimore City Urban Renewal Plan 1994). Expensive and unsustainable, these practices have been abandoned with no alternative vision**:** until now. The *Resilient Cities* approach does not require large acquisitions, a courageous developer trying to make the numbers work, or the relocation of tenacious residents. Ours is a mosaic approach that develops a strategy based on watersheds and evolves towards a shared vision of transformation.

1.2 A Mandate to Protect the Chesapeake

The Environmental Protection Agency has mandated the city of Baltimore to comply with regulations regarding storm water flow into the Chesapeake Bay, a nationally protected estuary (see figure 1, the city on the bay). Pollution from storm events is exacerbated by expanses of pavement and limited vegetated areas for infiltration dumping distressing levels of toxins in the bay. Baltimore must invest in its storm water management; it has no choice.

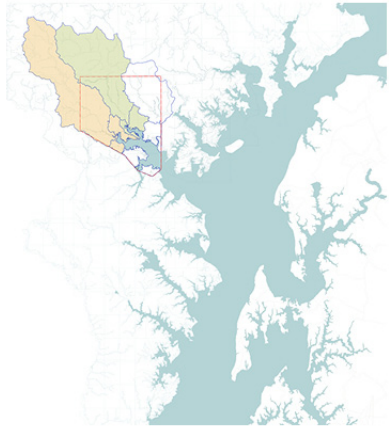


Figure 1. Baltimore city on the Chesapeake Bay

1.3 Income Disparity

Despite the fact that Maryland has the highest median household income of all 50 states, 22% of Baltimore City's residents live at or below poverty (US Census 2010). Baltimore, the largest city in Maryland, suffers from decades of a shrinking population, and now has the highest poverty concentration in the state.

This combined social and ecological pressure provides an extraordinary opportunity to apply the principles of *Resilient Cities to* Baltimore's urgent environmental problems and entrenched poverty.

Our paper outlines a plan to bring the city into compliance with environmental regulations by applying landscape solutions that simultaneously meet federal requirements and promote social equity and economic growth. Our design presents a strategy for building a framework for new landscapes that integrate the infrastructure of storm water mitigation with recreation spaces. Productive as infrastructure, these new spaces are not reliant on new development for their economic viability.

This proposal builds on Baltimore's enormous strengths as the key to redefining itself: geographic location; a transportation infrastructure already in place; and a strong creative class. The city can shrink *and* thrive. *Resilient Cities* provides a map to initiate and guide this transformation.

2.0 Background

2.1 Geography and segregation

Baltimore City covers a sprawling area of over 92 square miles. The city is organized East/West, with the original eastern city boundary of the Jones Falls stream valley now in the center of town. It is one of five streams within the city's neighborhoods and commercial centers. Route 83, a divided highway, was laid within the streambed, etching a double barrier created by the trough of a major highway embedded within a steep-sided stream valley. Just west of the central business district, the six-lane Martin Luther King Jr. Boulevard repeats this bifurcation, separating low-income African-American communities from the downtown, and shielding high-income waterfront condominiums from tracts of abandoned neighborhoods. These poor neighborhoods are isolated from access to key institutions, amenities and job opportunities that could unlock the multiple-grip of poverty.

Today Baltimore reflects a history of segregation policies imprinted through design and planning (Pietila) (Wilson 1987). Throughout the 20th century, laws, tax breaks and federal funding were consistently used to enhance well-to-do communities and isolate the underserved neighborhoods in near east and west Baltimore. After World War II redlining practices created all-white neighborhoods by blocking minorities' access to federal housing loans (Pietila). In the 1960's and 1970's numerous highway promoted city access to wealthy suburbs and severed struggling neighborhoods (BCURP). In the 1980's federal block grant funds were used to build high-income waterfront developments at the inner harbor and Fells Point. As desegregation became mandatory, Baltimore County was forced to open its doors to middle-class and more affluent African Americans; their departure from the inner city left the remaining inner city population isolated by race (Robinson), low income and without social and physical access to appropriate level jobs as the work demands moved to the county (Wilson 1996).

And yet despite the enormous challenges it faces, Baltimore is a city with the capacity for resiliency. Our proposal recognizes Baltimore's great strengths as the starting point for its transformation.

In comparison to Flint or Detroit, Michigan or Youngstown Ohio, Baltimore's central business district is intact and stable; its trendy waterfront areas desirable and appealing. Situated on the I-95 corridor, Baltimore is 40 miles north of Washington DC and linked to freight rail, light rail, a major port with two deep water routes to the sea, and a number of vibrant waterfront areas. World renowned educational and arts institutions and established sports franchises provide jobs, investment and recognition. This unique combination of assets provides a solid foundation on which to build. Furthermore, it is not unreasonable to propose that the city start investing the results of its prosperity to raise the quality of life for everyone. The city now has a valuable opportunity to leverage investments required by mandatory storm water mitigation and other projects to provide all residents with a shared set of opportunities for access to work, mobility, connectivity and recreation.

2.2 Income Disparity and Racial Isolation

Income disparity, racial segregation (Wilson 2009) and isolation (Massey, Fischer) are the key factors that maintain the current social distress of Baltimore City. Up until now, much of the city's

revitalization efforts have been concentrated on the development of high-end waterfront communities (BDC, UDAG). While this investment focus has helped some populations, it has driven a wedge between the highest and lowest incomes, fragmenting services that should serve all the city's population (see figures 2 and 3). To avoid pitfalls of urban interventions in the past, we have developed a series of mapping strategies to identify areas of greatest isolation and limited access thereby prioritizing critical points for intervention. Our proposal identifies stakeholders within existing schools, institutions and community organizations to reweave the fabric of connectivity. While previous urban intervention strategies sliced through local fabric in grand swathes of redevelopment, our grassroots approach partners with city services to empower local communities, respecting their understandings of what they most need and recognizing the obstacles to achieving it.

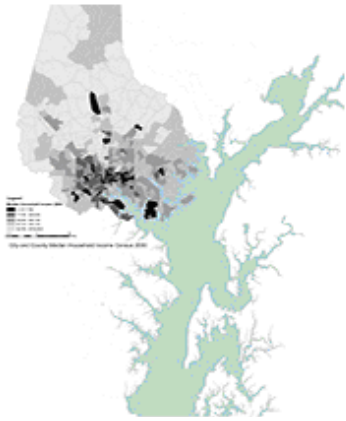


Figure 2. Income disparity in Baltimore city and Baltimore county

Figure 3. Racial isolation

2.3 Watershed Maps Reveal Patterns of Inequity

Mapping income by watershed offers an innovative method to approach community organizing, urban design, and funding (see figure 4). Working upstream from the waterfront, we have paired upstream watersheds with their adjacent waterfront watershed. Examining income through the environmental lens of watershed geography allows us to frame social conditions in a new way. Even when political boundaries are removed, it is possible to read the geometric city boundary line and observe income disparity divided by watershed.

The city's poorest and most concentrated ranges of poverty lie within the Gwynns Falls and Middle Branch watersheds. The Gwynns Falls watershed also has an extremely high rate of block groups (the census statistical division of 600-3000 persons) isolated by race. Teasing out these kinds of patterns can be instrumental in formulating meaningful solutions in each area. When we consider median income by watershed, we see a potential for working towards balance within each watershed.

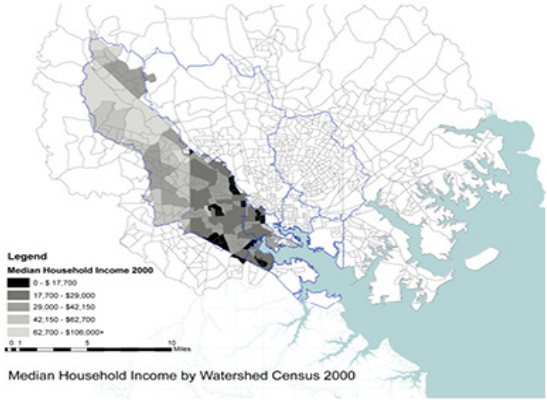


Figure 4. Income by watershed: Gwynns Falls and Middle Branch watersheds

2.4 Institutions Connected by Geography

The transformation of Baltimore requires active participation and commitment on the part of the city's offices, organizations and tax-exempt institutions both big and small. Many of these institutions, for example Johns Hopkins University, have long been actively engaged in multiple programs to transform the city. Mapping allows us to visualize geographic relationships among these organizations and envision new ways that these stakeholders can contribute to and benefit from geographic transformation that drives social change.

By examining a map, it is possible to quickly see potential relationships among institutions such as Coppin State University, the B & O Railroad Museum, MICA, Camden Yards, city parks, the Housing Authority and the Convention Center and others. (See figures 5 and 6 for tax exempt land and key institutions).

Figure 5. Tax exempt land in West Baltimore

Figure 6. Key institutions in West Baltimore

Our goal is to create a sense of positive change that has a ripple effect. In addition to the city's new storm water tax, a core of long-term land commitments made by city, state and private institutions provides stability and credibility required to anchor and attract neighboring property owners, lease-holders and tenants as active participants.

3.0: Creating the Vision Plan for Resiliency

To begin, we created a proof of concept plan by developing one possible scenario of transformation. Through mapping, we identified areas where infrastructure and mitigation projects have the potential to break down isolation through interconnectivity, activity, employment and mentoring. We identified Baltimore schools, universities and research centers as potential stewards and mentors. Many of these institutions are already running their own internship and outreach programs. By marking their locations and tagging each as a geographic node, we were able to organize paths and destinations, and provide a 'big picture' vision that can demonstrate how these disparate efforts can come together.

Based on our mapping of isolation, income and institutions, we decided to focus on west Baltimore, which lies primarily within the Gwynns Falls watershed, as a prototype for the development of a mosaic approach to transformation (see figure 7). In addition, we included significant places in adjacent watersheds. (Since the city's neighborhoods and parks were not laid out on watershed lines, a strict adherence to this boundary would have eliminated these key

connections.) We used the watershed concept as a boundary with a wide buffer, and as apolitical conceptual organizer.

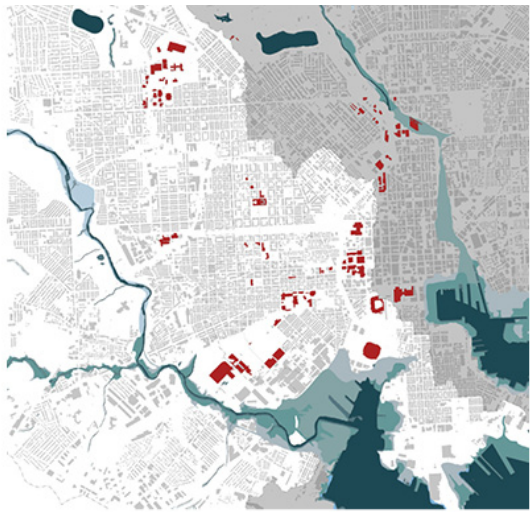


Figure 7. Project area for proof of concept plan

3.1 Grids and Webs: Hierarchical Street Layouts, Rhizomatic Network, or Both?

We propose that projects be organized around common paths or routes creating geographic continuity through grids and webs of green paths.

For our prototype, we worked with key routes North South and East West through west Baltimore linking assets such as transportation hubs, key institutions and existing or potential green corridors (figure 8). We also developed a web of paths with a school-to-school network of informal pedestrian and bike paths connecting schools, for example, it would be possible to bike or walk easily and safely through the community along a connective path going from School to School to School (figure 9).

3.2 Partner

In the west Baltimore proposal, we are collaborating with the Baltimore City Office of Sustainability, Baltimore Green space, a group mapping forest patches, the National Forest Service, and the Neighborhood Design Center, an organization that pairs design volunteers with communities in need of design services for vacant lots and public open space projects.

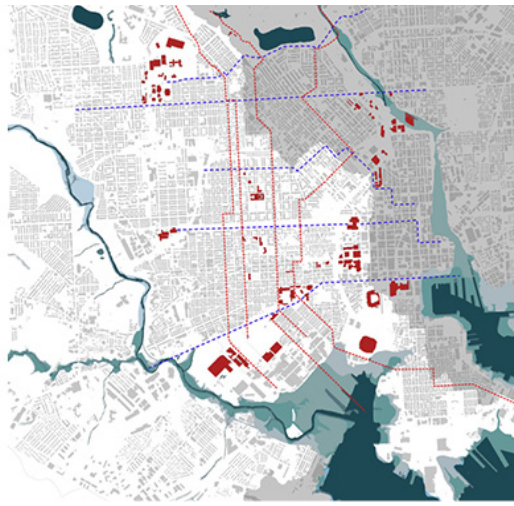


Figure 8. Key Routes and Institutions

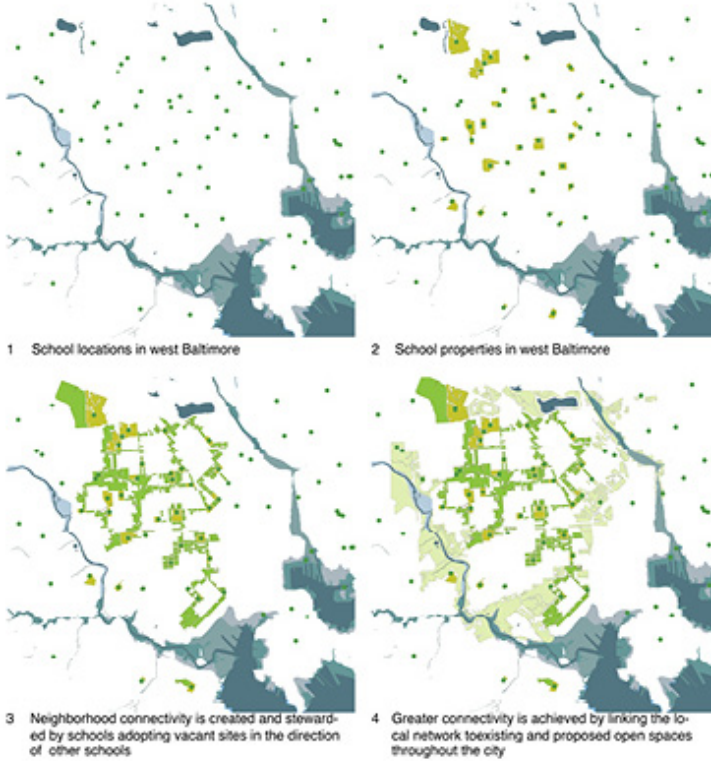


Figure 9. School to School network of connectivity

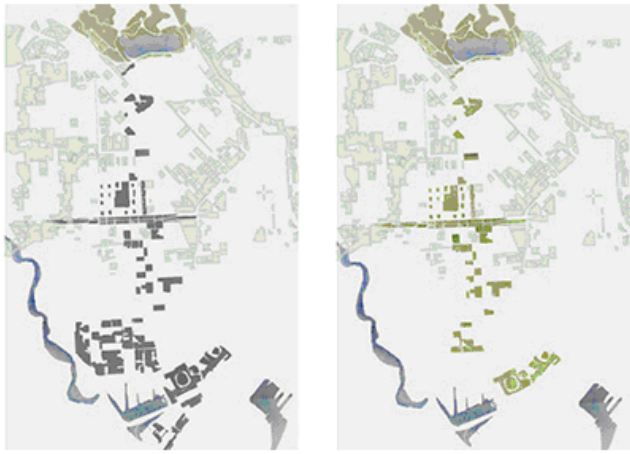
We are applying our combined efforts to initially focus along Carey Street, the longest north-south street in Baltimore that links Druid Hill Park to a new waterfront opportunity at the Middle Branch just south of Oriole Park at Camden Yards. Because isolation is a key factor in extending generations of poverty, we are choosing routes of greatest connectivity to connect to assets outside at-risk area, hypothesizing that these paths will provide access from within the isolated west Baltimore communities to social and cultural amenities that have a city-wide appeal—such as baseball. Our first priority is to identify areas of intervention in which we can make an immediate, measurable difference that will provide proof of concept and inspire community involvement.

3.3 Transformation sequence

The following sequence describes how we generated the vision plan for west Baltimore as a proof of concept.

3.3a The worst first

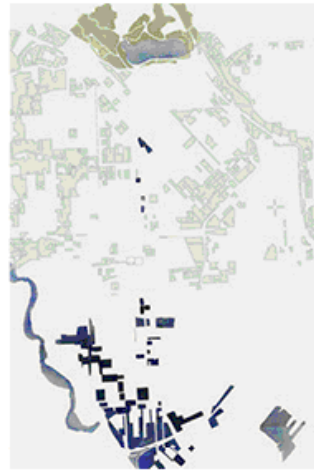
We first identified the most paved, impervious and underutilized sites, proposing to transform these areas into meadows, fields, agricultural or landscaping of commercial properties (figures 11 and 12). This first transformation raises the condition of the worst sites in environmental and social metrics. For our prototype, we made the selection based on greatest square footage of pavement.



Figures 10 and 11. Transforming the worst first

3.3b Deeper green and blue

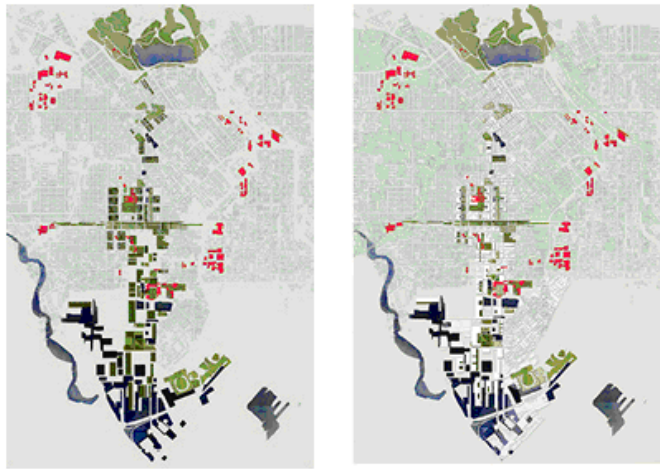
We then identified sites with potential a long-term greening solutions: tall tree canopy areas, areas for long-term storm water projects that may also serve as the greening of commercial sites, parks, wetlands or ball fields (figures 12 and 13). Waterfront sites include increasing intertidal resilience to sea level rise by increasing volumes for potential water and raising a series of piers for recreation and potential future development.



Figures 12 and 13. Deeper Green and Blue

3.3c Designing for Multiple possible outcomes

By supporting these transformative projects as investments in infrastructure, development is a card that can be played in the future, or not at all (figures 14 and 15). Baltimore would have the opportunity to continue to expand its greening strategies, transforming low-density, underutilized built areas into green amenities and work towards an optimal population based on available resources. In this way, success is redefined not as unchecked, unquestioned growth, but in terms quality of life, quality of public realm, and ecology of social and environmental balance. New development projects can respond to new needs, and utilize new technologies for a reduced environmental footprint.



Figures 14 and 15. Multiple possible outcomes

4.0 Results

4.1 Proof of concept plan becomes planning tool

We are now working, to implement the first stage of this plan —a prototype project to develop the over-arching framework for integrating many small, seemingly fragmented projects into an exciting big-picture vision that can be shared, inspiring every participant who shares a vision of how they can contribute and how they can benefit. By collaborating with the city's ecosystem forest-patch project we will synchronize our efforts and apply limited resources to multiple goals that address social and environmental concerns simultaneously.

5.0 Next steps

Resilient Cities has become a pilot program for change in west Baltimore, an area within a sub-watershed of the Gwynns Falls area known as watershed 263. The authors are working closely with the Baltimore City Office of Sustainability, the Neighborhood Design Center and Baltimore Green Space to apply the principles of Resilient Cities to a pilot a mapping project that includes increasing the city's forest patch areas and connectivity, a community engagement desire map, a police crime map, and potential development sites on along a future light rail line, identifying stewardship sites that with maximum potential for transformative activity.

5.3 Applicability to other urban areas

The *Resilient Cities* approach to Baltimore can be implemented in other shrinking cities, as well as expanding cities in developing areas. The integration of social and environmental issues is key to equitable, sustainable futures. For growing cities, organizing around watersheds, maintaining porosity and access to work for those of all levels of income is essential.

6.0 Vision for the future

At the core, the sustainability of our cities and communities is measured by the quality of life and access to opportunity for all its citizens. As we invest in infrastructure changes to accommodate climate change, we can take the opportunity to address the disenfranchised side of our economic and cultural successes, and work toward a sustainable environmental and social ecology that supports all members.

We imagine porous, adaptive landscapes with bike paths and habitat that can be left to nature or be developed in new and sustainable ways, serving communities with a range of income levels and ethnicities. This is a call to make landscape attractive and available to all income levels of society, transformable over time; capable of retreating into the natural state or accommodating urban growth, without a trail of detritus, a vibrant, sustainable, connected city.

While it may sound idyllic, it is possible for members of the community to realize such a vision. Baltimore and other cities can transform themselves with this new urban paradigm.

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