

GREEN BOULEVARD

PROPERTY ACQUISITION STUDY

March 2016

Prepared by **GTECH Strategies**
for **Economic Development South** and
the **Saw Mill Run Watershed Association**

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Executive Summary

GTECH was engaged by Economic Development South (EDS) and the Saw Mill Run Watershed Association (SMRWA) to develop and apply a decision making matrix to identify priority parcels for inclusion in the Route 51 Green Boulevard. In partnership with EDS, GTECH completed some of the foundational elements which will enable the transformation of the Route 51 corridor into an amenity which provides a variety of triple bottom line benefits.

The long-term vision for the Green Boulevard is to enhance the economic, environmental, and social health of the corridor. The Route 51 corridor and the Saw Mill Run watershed currently face several challenges such as blighted properties, localized flooding, and impaired water quality. Transforming under-utilized impervious areas such as parking lots and/or blighted properties into naturalized or floodable recreation areas represents the opportunity to reduce stormwater and flooding impacts, improve water quality, increase the viability of the commercial corridor, expand passive and active recreational options, and improve property values.

The goals of this project include:

- Benchmark national best practices to inform goals and objectives,
- Develop a decision-making matrix to identify parcels of land for inclusion in the Green Boulevard planning effort,
- Apply the matrix along the Route 51 and Library Road corridors, and
- Identify both near-term and long-term priority acquisition parcels.

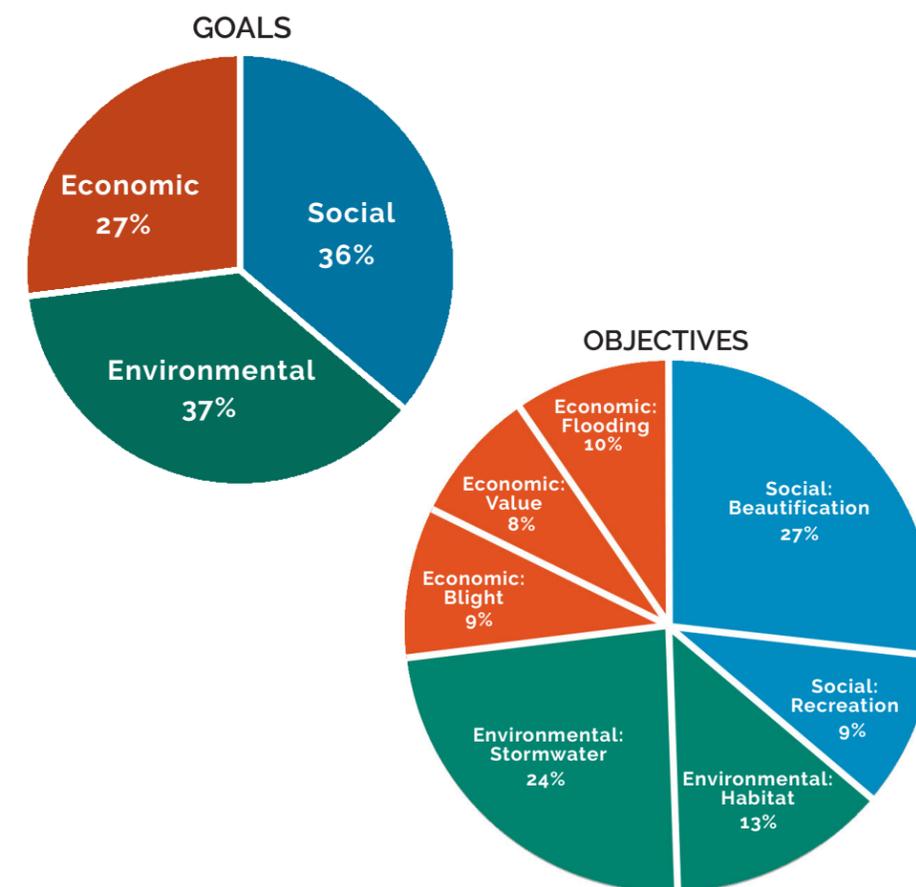
The benchmarking process is summarized in Appendix A. A total of 8 case studies were compiled to both inform the development of the decision matrix and also plug into the larger planning effort to help set a precedent for the concept for stakeholders and future partners. Topics such as funding amount and sources, partners, regulatory environment, and property acquisition strategy are included.

Our methodology is a combination of Analytical Hierarchy Process (AHP) and Multi-Criteria Spatial Analysis (MCSA). This procedure allows for stakeholder input to assign weights to various goals and objectives. Each goal and objective is then measured by the physical attributes (criteria and associated metrics) of each individual parcel. This means that we are combining both qualitative and quantitative inputs to inform final decision making.

First, overall goals, objectives, and criteria were established to guide the process. AHP relies on a hierarchical structure of goals, objectives and criteria to capture, and subsequently measure,

detailed elements of a complex situation.

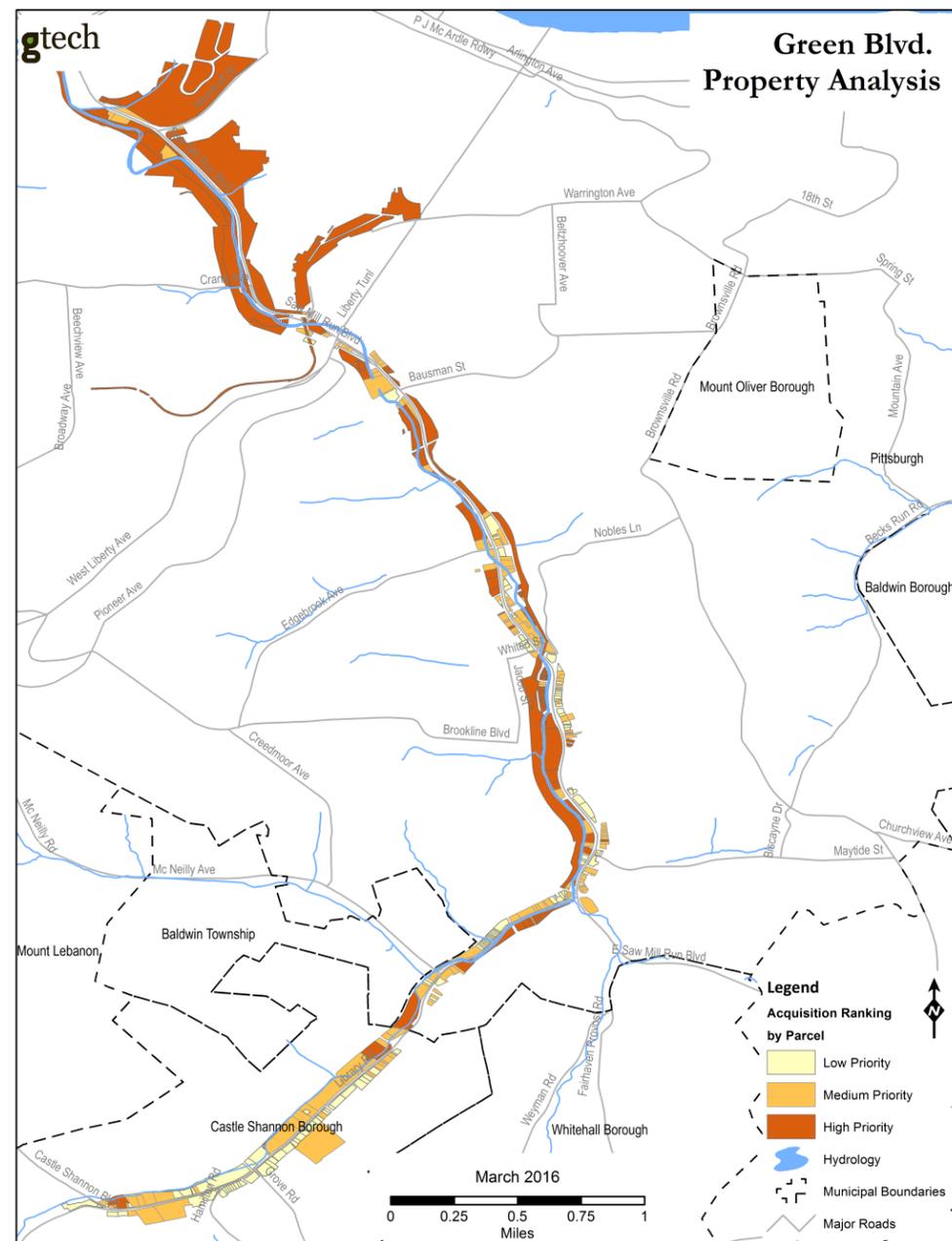
Next, a Google survey was created and distributed to a range of stakeholders via email and social media in January 2016 to gauge priorities and interest. A total of 143 responses were received from a variety of stakeholder groups. Represented stakeholder groups included municipalities, public agencies, residents, politicians, non-profits representing a variety of missions, and many more. (A full list can be found on pages 16 - 18.) Pairwise comparison, a process of comparing entities in pairs to judge which entity has a greater amount of quantitative value, was conducted on the results of the stakeholder input in order to assign weights to project goals and objectives. This analysis revealed that stakeholders value environmental and social goals as similarly important, with the economic goal as significant but least important in the context of the transformation of the Route 51 corridor. Each goal's objectives were then analyzed to understand their value within the overall goal weight. The process is detailed in Figure 2. The results of this analysis are shown below.



Next, a series of spatial analyses were conducted in order to evaluate each of the study area's 451 parcels. These analyses focused on the 18 criteria that were identified in order to measure the correlation with the project's objectives. The final step before mapping findings was to combine the results of the weighting derived from stakeholder input and the multi-criteria spatial analysis.

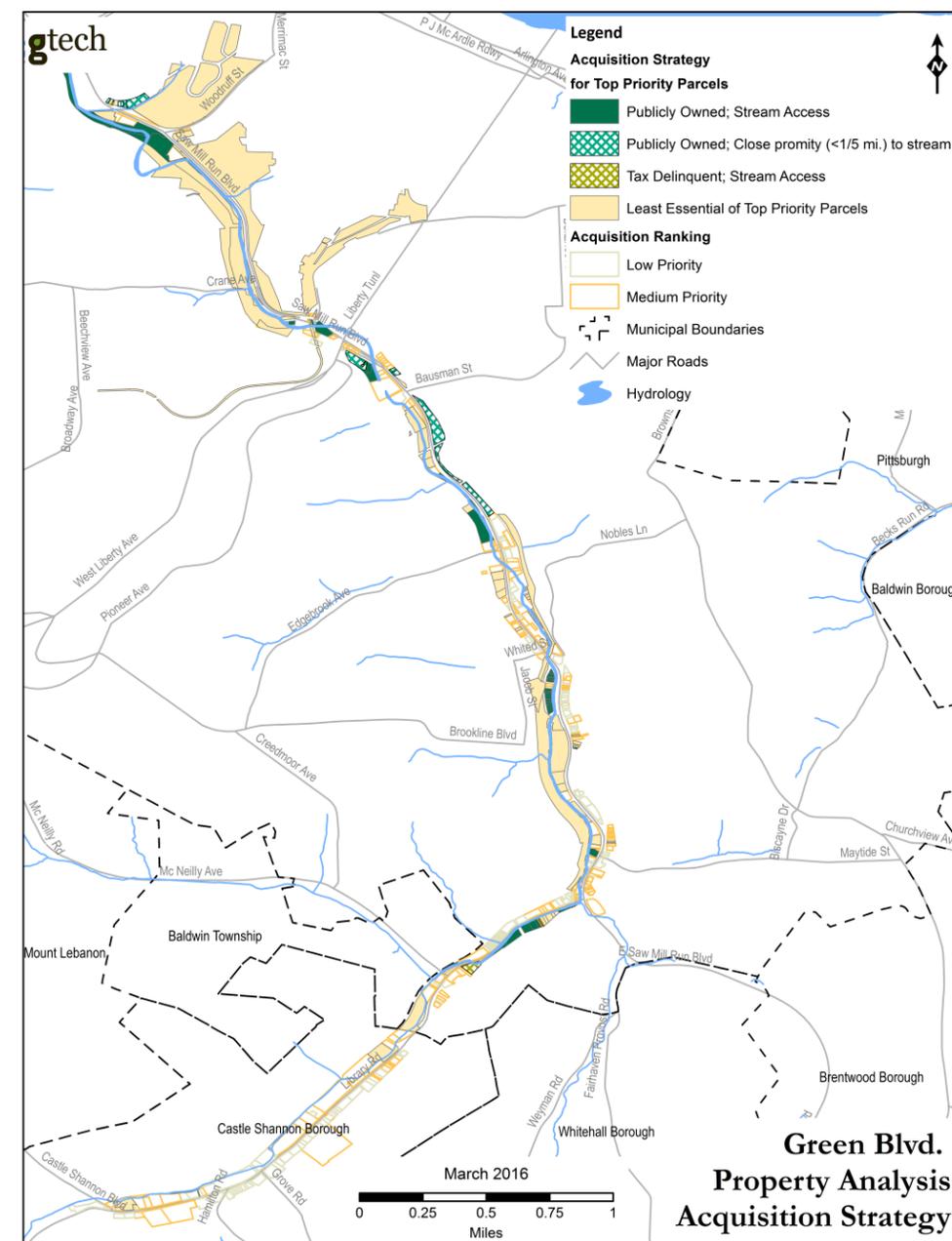
This process includes taking each parcel's score for each criteria and multiplying that score by the weights that were assigned during pairwise comparison. Parcels with the highest scores represent those with the highest priority for acquisition to support the long-term vision of the Green Boulevard.

The application of the methodology outlined above identified 124 high priority, 196 medium priority, and 131 low priority parcels. The geographic distribution of those results are shown below.



Additionally, the 124 high priority parcels were further analyzed in order to identify near term acquisition priorities. The 45 publicly-owned parcels with stream access were determined to be the top acquisition priority. The next tier of acquisition priority includes 12 publicly-owned parcels that are in close proximity (<1/5 mile) to the stream and 3 privately-owned tax delinquent parcels with stream access. The geographic distribution of those results are shown below.

The entire process or parts of the process can be re-run at any point that additional information is available. This is exceptionally important due to an anticipated multi-year acquisition process.



Introduction

This report summarizes the process and findings of an innovative planning and analysis approach that was developed by Growth Through Energy & Community Health Strategies (GTECH) for Economic Development South (EDS) and the Saw Mill Run Watershed Association (SMRWA). GTECH was tasked with developing and applying a decision-making matrix to identify parcels along the Saw Mill Run corridor for inclusion in a Green Boulevard along Route 51 that will improve the environmental, social, and economic health of the corridor.

Who We Are GTECH Strategies

GTECH is a Pittsburgh based nonprofit social enterprise, whose mission is to cultivate the unrealized potential of people and places. We partner with communities to transition land use liabilities into community assets. As an organization, GTECH is dedicated to utilizing innovative investigative approaches to facilitate action.

Economic Development South and Saw Mill Run Watershed Association

Economic Development South (EDS) is a nonprofit community and economic development corporation governed by a Board of Directors comprised of leading local civic and business leaders from the Brentwood, Baldwin, Whitehall, Carrick, Overbrook, Mt. Oliver, Pleasant Hills, Jefferson Hills, and Brookline communities of Allegheny County. EDS engages in activities and initiatives that seek to reinforce and revitalize local commercial districts, while encouraging long-term, sustainable investment in its neighborhoods. EDS launched the Saw Mill Run Watershed Association (SMRWA) in 2014 with the mission to improve and restore the health and vitality of the streams and communities in the Saw Mill Run Watershed through education, stewardship, and advocacy. They inspire their communities by providing environmental leadership, engaging citizens in direct action and partnering on key issues that affect the wellbeing of the watershed.

Green Boulevard Long-Term Vision

The Saw Mill Run watershed and the Route 51 corridor face a number of challenges but also present a variety of opportunities to transform those challenges into assets. Saw Mill Run's floodplain has been densely developed, large stretches of the stream have been channelized, and its banks have been reinforced with engineered materials. The stream's water quality is impaired by a variety of pollutant sources including combined sewer overflows, urban stormwater runoff, abandoned mine

drainage, and habitat modification. The Route 51 corridor is one of the most blighted corridors in Pittsburgh. Weaving along the narrow floodplain of the Saw Mill Run Stream, the properties are prone to flooding. Some businesses are blighted and abandoned. Bike and pedestrian infrastructure is almost non-existent; traffic is often congested.

The long-term vision for Route 51 is to create a Green Boulevard to enhance the economic, environmental and social health of the corridor. Potential elements of the Green Boulevard include natural areas, green stormwater infrastructure installations, recreational trails, and improved aesthetics. Transforming under-utilized impervious areas such as parking lots and/or blighted properties into naturalized or floodable recreation areas represents the opportunity to reduce stormwater and flooding impacts, improve water quality, increase the viability of the commercial corridor, expand passive and active recreational options, and improve property values. The Green Boulevard will both deliver triple bottom line benefits and serve as a demonstration project for meeting economic, environmental, and social goals in a densely developed urban setting.

In addition to Green Boulevard planning efforts, there are various parallel initiatives occurring in the Saw Mill Run watershed. These include but are not limited to Integrated Water Resources Planning being led by the Pittsburgh Water and Sewer Authority (PWSA), a Floodplain Management Study being conducted by the Army Corps of Engineers (ACOE), and various planning, restoration, and civic engagement efforts being led by EDS / SMRWA.

Project Goals

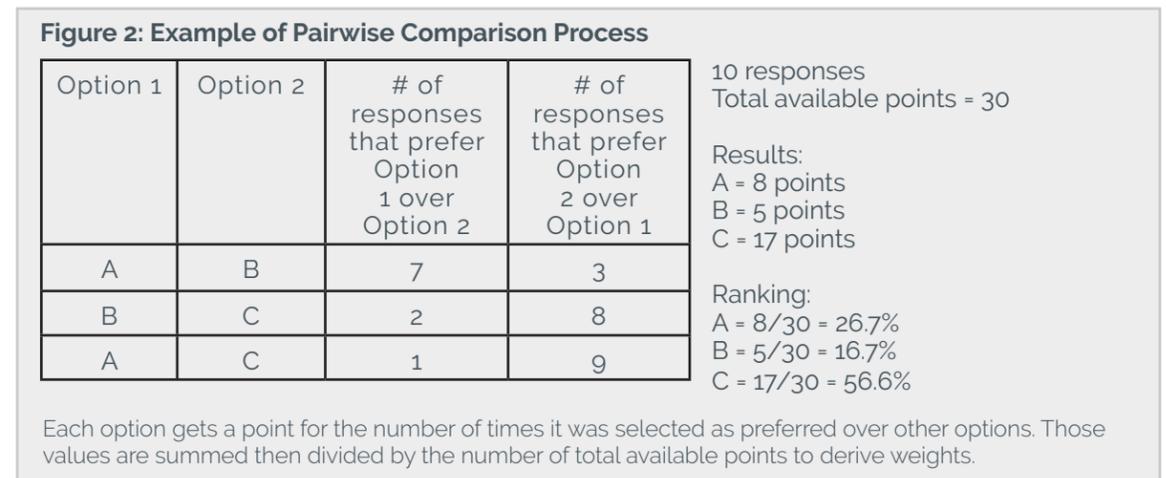
This project was intended to complete some of the foundational planning and analysis steps necessary to support the long term goals for the Green Boulevard. Specific goals include:

- Benchmark national best practices to inform goals and objectives,
- Develop a decision-making matrix to identify parcels of land for inclusion in the Green Boulevard planning effort,
- Apply the matrix along the Route 51 and Library Road corridors and
- Identify both near-term and long-term priority acquisition parcels.

The results of our benchmarking research are summarized in a series of Case Studies that can be found in Appendix A. Our methodology and findings are summarized in the following sections. The study area is shown in Figure 1.

In pairwise comparison, each element is compared individually to all other elements. Instead of asking, "What is the relative importance of A, B, and C?", this process asks "How does A compare to B in level of importance?", "How does A compare to C in level of importance?", and "How does B compare to C in level of importance?" This structure allows one to measure the relative importance of each element compared to one another as well as within the entire system, assigning objectively calculated weights to each.

The value of pairwise comparison lies in the fact that it measures the relative importance of a variety of factors. Ultimately, it helps bring clarity in situations where there are a variety of potential paths to meet project goals, where there may be competing priorities, and where some objectives may be difficult to measure.



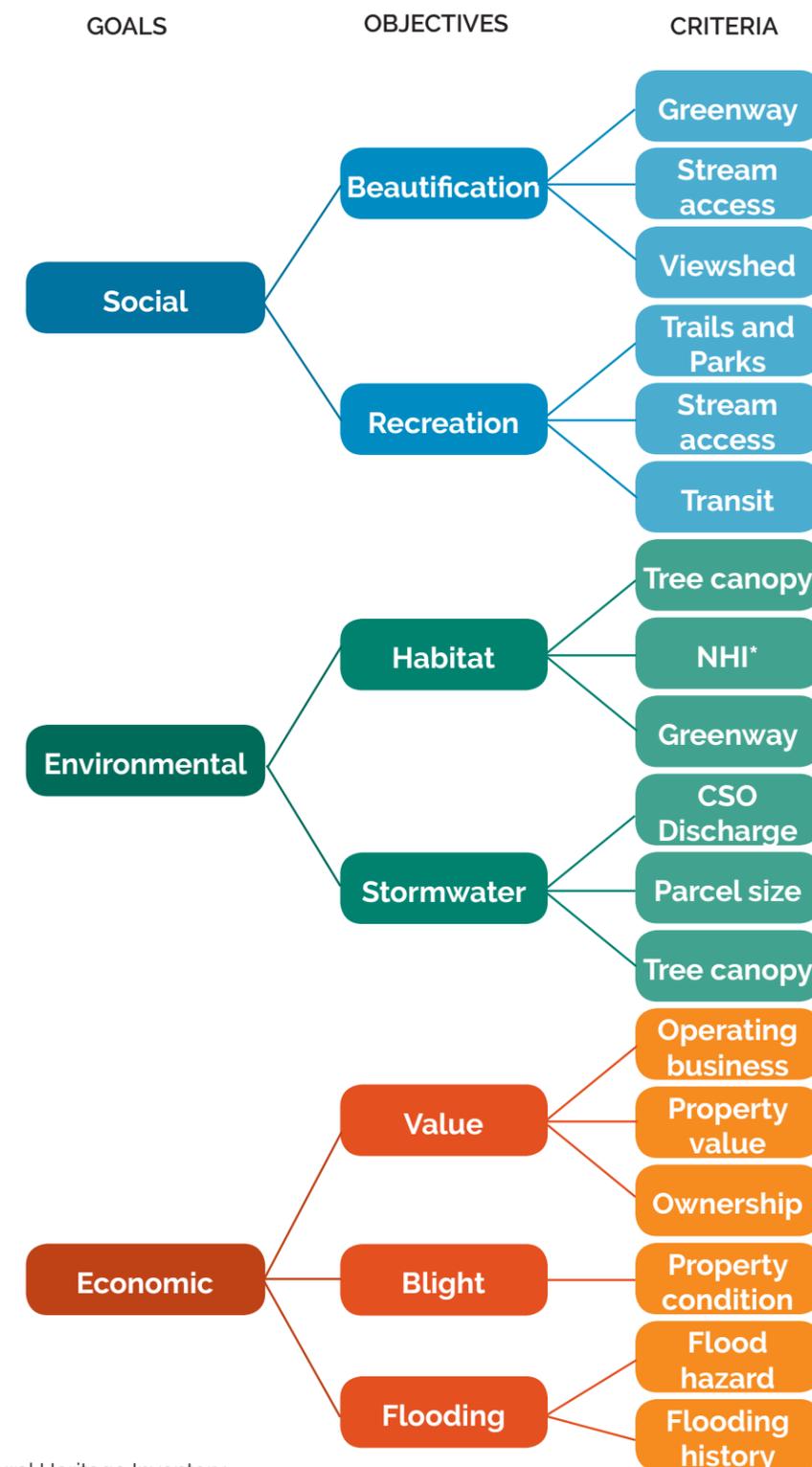
Multi-Criteria Spatial Analysis

Through a geographic lens and equipped with Geographic Information Systems (GIS), each parcel was analyzed for a variety of criteria and associated metrics. **Multi-Criteria Spatial Analysis (MCSA)** is a decision-making tool that is often utilized in planning scenarios to understand various criteria that may affect a situation.

We utilized AHP and its associated pairwise comparison tool to gather stakeholder input and assign the relative weight of goals and objectives. We then used GIS to conduct MCSA to measure the criteria and metrics associated with each objective under the goals.

The breakdown of goals, objectives, and criteria are outlined in Figure 3. Each parcel was analyzed for each criteria separately. Next, the results of that spatial analysis for each criteria was assigned the value that was derived from the pairwise comparison conducted on stakeholder input.

Figure 3: Goals, Objectives, and Criteria



*Natural Heritage Inventory

Applying the Methodology

Step 1: Develop Goals, Objectives, Criteria, and Metrics

Best practice research was applied through the lens of the long-term vision for the Green Boulevard. The study area's context, goals, objectives, and criteria were developed in coordination with EDS and SMRWA. For each of the criteria, metrics were identified in order to analyze each parcel based on physical or historical attributes (Table 1). Developing metrics allowed for a system to rank each parcel based on each of the criteria outlined in Figure 3.

In Table 1, the metrics are listed in order of importance for acquisition. For example, under the first objective, a parcel within or adjacent to an existing greenway would be the top acquisition priority

Table 1: Goals, Objectives, Criteria, and Metrics

Social Goal	Objective	Criteria	Metrics
Improve and enhance the visual identity, community character, and well-being of communities along Route 51 and Saw Mill Run	Conserve and improve land that will beautify corridor	Proximity of potential conservation land to existing greenway	<ul style="list-style-type: none"> • Adjacent to existing greenway • <1/8 mile to existing greenway • >1/8 mile to existing greenway
		Potential to afford access to water's edge	<ul style="list-style-type: none"> • Adjacent to stream • <1/5 mile to stream • >1/5 mile to stream
		Presence of viewshed	<ul style="list-style-type: none"> • Viewshed present • Adjacent to parcel with viewshed • No viewshed present or adjacent
	Improve access to recreational and open space along Saw Mill Run	Proximity of potential conservation land to existing trails or parks	<ul style="list-style-type: none"> • Adjacent to existing trails or parks • <1/4 mile to existing trails or park • >1/4 mile to existing trails or parks
			Potential to afford access to SMR water's edge
		Proximity to public transportation stations	<ul style="list-style-type: none"> • <1/8 mile to T station or bus station • <1/4 mile to T station or bus station • >1/4 mile to T station or bus station

Environmental Goal	Objective	Criteria	Metrics
Improve environmental quality, provide opportunities for decentralized stormwater management, and protect habitat	Conserve land to improve environmental quality and protect habitat	Existence of tree canopy	<ul style="list-style-type: none"> • >40% tree canopy • 20% - 40% tree canopy • <20% tree canopy
		Proximity to Natural Heritage Area	<ul style="list-style-type: none"> • Within or adjacent to Natural Heritage Area • <1/4 mile to Natural Heritage Area • >1/4 mile to Natural Heritage Area
		Proximity of potential conservation land to existing greenway	<ul style="list-style-type: none"> • Adjacent to existing greenway • <1/8 mile to existing greenway • >1/8 mile to existing greenway
	Conserve land to improve water quality and manage stormwater on-site	High CSO discharge sewershed	<ul style="list-style-type: none"> • >10 MG / typical year • 1 - 10 MG / typical year • <1 MG / typical year
		Size of parcel	<ul style="list-style-type: none"> • > 1 acre • 1/5 acre - 1 acre • <1/5 acre
		Existence of tree canopy	<ul style="list-style-type: none"> • >40% tree canopy • 20% - 40% tree canopy • <20% tree canopy
Economic Goal	Objective	Criteria	Metrics
Enhance property values and reduce impacts of flooding on residential and commercial properties	Conserve and improve land to enhance economic value of residential and commercial real estate	Proximity to operating business	<ul style="list-style-type: none"> • No business present and not adjacent to business • Adjacent to operating business • Operating business on-site
		Value of property (building and land total)	<ul style="list-style-type: none"> • <\$50,000 • \$50,000 - \$100,000 • >\$100,000
		Property tax & ownership status	<ul style="list-style-type: none"> • Publicly owned • Privately owned & tax delinquent • Privately owned & not tax delinquent
	Mitigate the effects of blight	Condition of property	<ul style="list-style-type: none"> • Vacant lot • Building, not well-maintained (presence of graffiti, some disrepair, etc) • Building, reasonably well-maintained
		Reduce exposure to flooding impacts	Proximity to flood hazard
		History of flooding	<ul style="list-style-type: none"> • Previously flooded • Not previously flooded

under the greenway criteria. Parcels within ¼ mile would be the next tier of acquisition priority, and parcels greater than ¼ mile from an existing greenway would be of lowest acquisition importance.

Step 2: Assemble Data

A combination of primary and secondary data was used in this analysis. Primary data included history of flooding, property condition, viewshed, proximity to operating business, and potential to afford access to Saw Mill Run. With the exception of flooding history, primary data was collected in the field during Winter 2016. Due to public access restrictions associated with history of property flooding, it was necessary to assemble our own dataset on the subject. Flooding history was created via stakeholder survey input as well as archival newspaper research. No viewsheds were founded during fieldwork, therefore, that criteria was removed from this analysis.

Secondary data was obtained from a variety of sources such as the Allegheny County Property Assessment, the Pennsylvania Natural Heritage Inventory, and the Federal Emergency Management Agency's (FEMA) floodplain mapping. A complete list of secondary data sources used in this analysis can be found in Appendix B.

Step 3: Gather Stakeholder Input

The ability to capture stakeholder input to shape the process is critical for the success of any planning initiative. Our methodology relied on stakeholder input to assign relative importance of each goal and objective through the pairwise comparison process.

A Google survey was created and distributed to stakeholders via email and social media in January 2016. Respondents were asked to compare each goal to one another (social vs environmental, social vs economic and environmental vs economic). Additionally, respondents were asked to compare the objectives under each goal to one another (social objective a vs social objective b, environmental objective a vs environmental objective b, and so on). In addition to comparing goals and objectives, respondents were asked to report locations with known flooding issues as well as provide any additional comments on the Route 51 Green Boulevard planning effort.

A total of 143 responses were received from a variety of stakeholder groups. Represented stakeholder groups included municipalities, public agencies, residents, politicians, nonprofits representing a variety of missions, and many more. A complete list of represented stakeholder groups is listed below.

- 3 Rivers Wet Weather
- ALCOSAN
- Allegheny County Conservation District
- Allegheny County Economic Development
- Antioch University
- Baldwin Borough

- Baldwin Borough Council
- BBW Chamber of Commerce
- Baldwin Emergency Medical Services
- Bike Pittsburgh
- Bloomfield Development Corporation
- Brentwood Borough
- Brentwood Rentals Appeal Board
- Brentwood School Board
- Brentwood-Baldwin-Whitehall Shade Tree Commission
- Brookline Chamber of Commerce
- Business owners
- Carnegie Library of Pittsburgh
- Castle Shannon
- Carrick Community Council
- Carrick-Overbrook Historical Society
- City of Pittsburgh
- Pittsburgh City Planning
- Construction Junction
- Dormont Borough
- Dormont Planning Commission
- Dormont Stormwater Authority
- Duquesne University
- Economic Development South/ Saw Mill Run Watershed
- Engineering, Architecture & Planning Firms
- Fairhaven United Methodist Church
- Greater Pittsburgh Literacy Council
- Highmark
- Hike it Baby Pittsburgh
- Hilltop Alliance
- Jefferson Regional Foundation
- Keep Pennsylvania Beautiful
- Keystone Specialties
- Mount Washington Community Development Corporation
- Mt. Oliver Borough
- Municipality of Bethel Park
- Nine Mile Run Watershed Association
- Overbrook Community Council
- Penn State Center Pittsburgh
- Pennsylvania American Water
- Pittsburgh City Council
- Pittsburgh Public Works
- Port Authority
- Pittsburgh Water and Sewer Authority
- Residents
- South Hills History
- Southwest Pittsburgh Community Development Corporation

- Southwestern Pennsylvania Commission
- State Representative
- The Penn State Center Pittsburgh
- Three Rivers Bioneers
- Tree Pittsburgh
- University of Pittsburgh
- Whitehall Council
- Whitehall UCC Appeals Board
- YWCA Greater Pittsburgh

Step 4: Conduct Pairwise Comparison on Stakeholder Input

In order to derive the relative importance of our goals and objectives, the stakeholder responses were used to conduct pairwise comparison. The process of conducting pairwise comparison is outlined in Figure 2. This analysis revealed that stakeholders value environmental and social goals as similarly important, with the economic goal as significant but least important in the context of the transformation of the Route 51 corridor. The results are included in Figure 4. The first chart shows the weighting of the goals and the second chart shows the weighting of the objectives which collectively make up each goal.

Figure 4: Ranking of Goals and Objectives based on Stakeholder Input

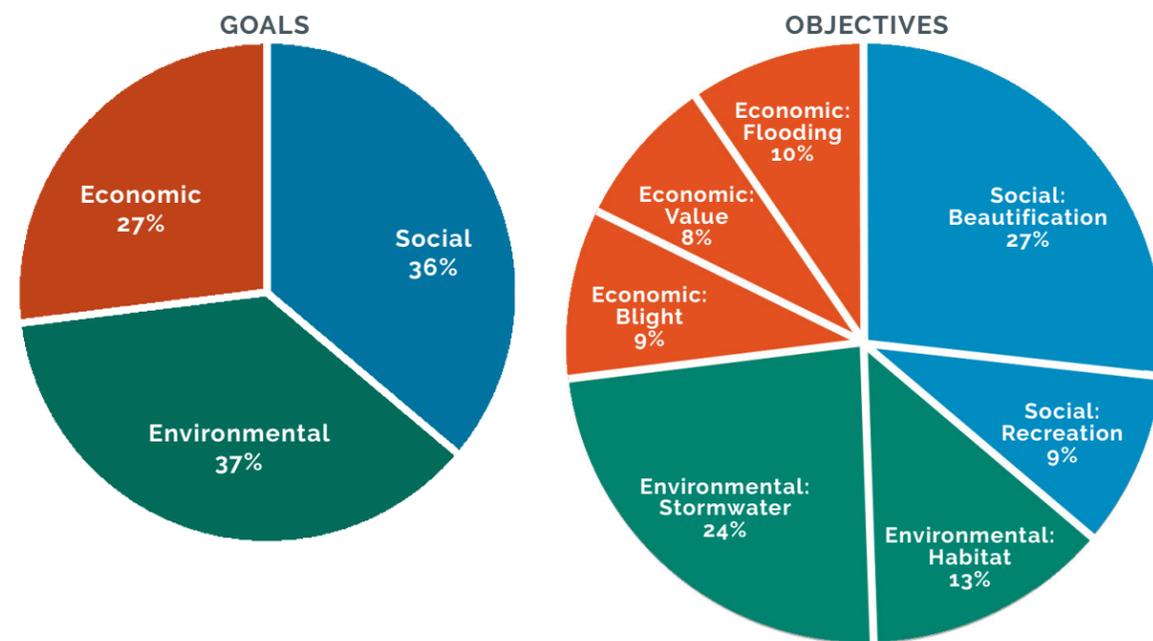
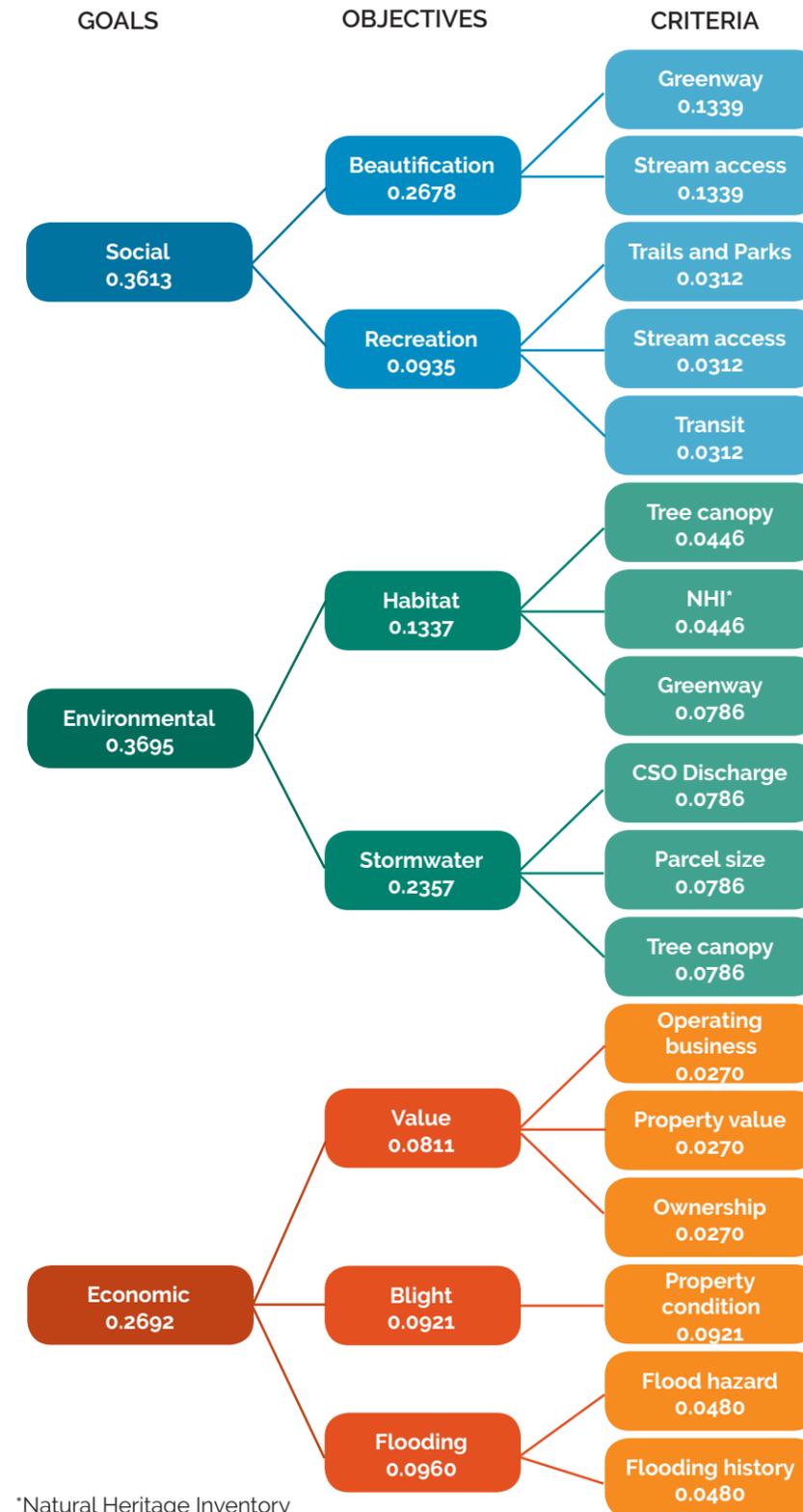


Figure 5: Goals, Objectives, and Criteria with Weightings Derived from Stakeholder Input



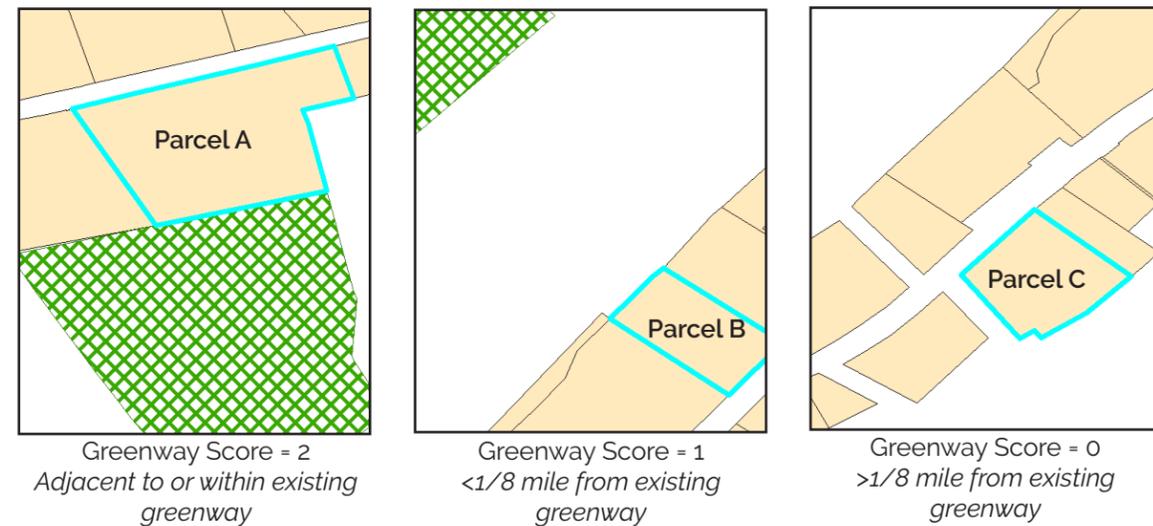
*Natural Heritage Inventory

Step 5: Perform Multi-Criteria Spatial Analysis on Study Area Parcels

Next, a series of spatial analyses were conducted in order to evaluate each parcel in the study area based on the relevant criteria (characteristics that must be present to achieve our objectives) that were developed during the study design process. Each parcel was analyzed for each criteria and assigned a score based on the metrics of that criteria.

This process included assigning a value to each parcel for each criteria and its associated metrics listed in Table 1. An example of the process is shown below in Figure 6. This example highlights the process for parcel proximity to greenways, which is the first criteria of the beautification objective that is associated with the social goal.

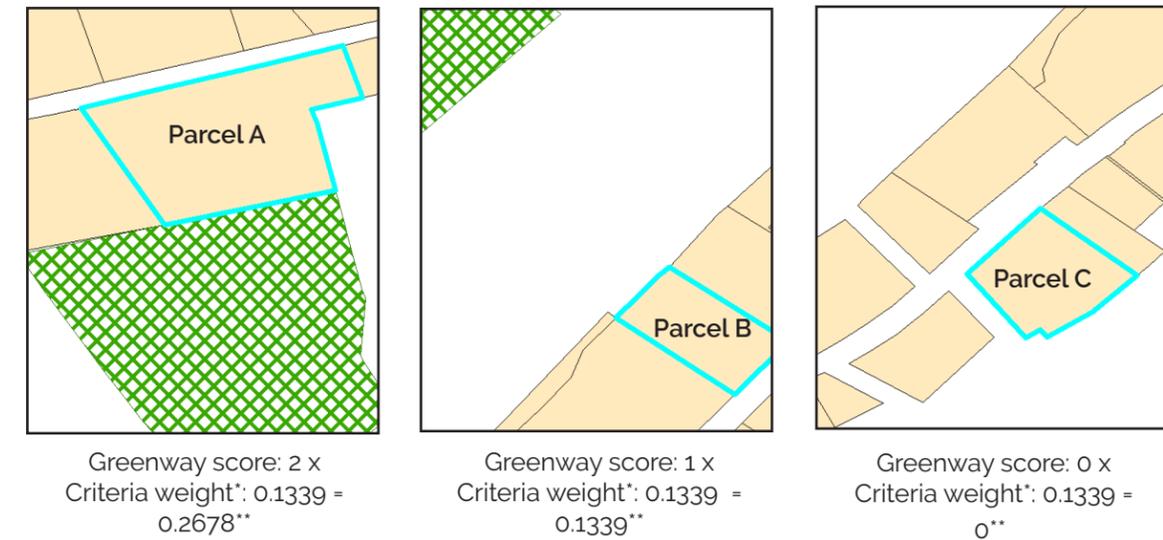
Figure 6: Example of Parcel Ranking Based on Criteria & Metrics



Step 6: Combine Results of Weighting and Multi-Criteria Spatial Analysis

The final step before mapping findings was to combine the results of the weighting derived from stakeholder input and the multi-criteria spatial analysis. This process includes taking each parcel's score for each criteria and multiplying that score by the weights that were assigned during pairwise comparison. This was done for all 18 criteria. The weighted scores for each criteria were summed for each parcel. This resulted in a cumulative score for each parcel. Highest scores represent the highest priority acquisition parcels and lowest scores represent the lowest priority acquisition parcels.

Figure 7: Example of Combining Weighting and Multi-Criteria Spatial Analysis



*Assigned during pairwise comparison under the beautification objective

**This process was conducted for each of the 18 criteria. The values were then added to determine a cumulative score for each parcel.

Findings

Long Term Green Boulevard Vision

The application of our methodology identified 124 high priority, 196 medium priority, and 131 low priority acquisition parcels for support of the long-term Green Boulevard vision. The high priority parcels are the ones that most fit stakeholder social, environmental, and economic goals associated with this project. These parcels fit criteria such as providing stream access, are located within the 100 year floodplain, have a low total land and building value, are vacant or have poor condition buildings, are in close proximity to existing trails, parks, and greenways, and so on. The lowest priority parcels have characteristics such as being in good condition and/or have an operating business, are located outside of the 100 year floodplain, are privately owned and not tax delinquent, do not provide stream access, and so on.

Due to the long term implications of this analysis and findings, details of these findings (such as maps and parcel IDs) were shared directly with EDS and SMRWA.

Near-Term Acquisition Priorities

In order to identify near-term acquisition priorities from within the 124 high priority parcels, the properties were further analyzed based on stream access and property ownership/tax status. A total of 45 properties were found to be both publicly owned and provide stream access. These 45 parcels were determined to be the top tier acquisition priority from within the high priority parcels. A total of 13 parcels were found to be publicly owned and in close proximity to the stream (<1/5 mile) and a total of 3 parcels were found to be privately owned and tax delinquent with stream access. Parcels that fall within these 2 scenarios were determined to be the next tier of acquisition priorities from within the top priority parcels. The remaining 63 parcels were grouped into a category of being the least essential of top priority parcels.

Collectively, the top tiers of acquisition priority parcels form 4 clusters. The first cluster is at the northern section of the study area near Woodruff Street. These parcels can generally be described as mostly vacant, publicly owned, near the stream, Emerald View Park and trail, within existing greenways, and within a Peregrine Falcon biodiversity area. The second cluster is less dense and stretches from north of the Liberty tunnels to north of Edgebook Ave. Many of the parcels closer to the Liberty tunnels are vacant parcels and/or have vacant buildings present, have experienced flooding, are within the 100 year floodplain, are publicly owned, or are in close proximity to the stream, transit stations, existing greenways, and McKinley Park. The southern portion of this cluster shares many of the same characteristics as the northern section with the exception that flooding history was not reported and these parcels are of significant size. The third cluster includes 20 parcels in the Ansonia Place area. These parcels are vacant, publicly owned, have experienced flooding, provide stream access, and are in close proximity to greenways and transit stations. The last and most southern cluster of priority parcels is located along Library Road, just south of where it merges with Route 51. These parcels are mostly vacant with stream access, are within greenways and the 100 year floodplain, publicly owned and/or tax delinquent.

Due to the long term implications of this analysis and findings, details of these findings (such as maps and parcel IDs) were shared directly with EDS and SMRWA.

Additional Considerations

Site-Specific Characteristics

During the acquisition process, it will be important to take site specific characteristics into consideration. At minimum, an investigation into land use and building history, presence of historical features, and plans for redevelopment or development should be conducted. Depending on various factors such as funding sources and planned use, the findings of such an investigation could potentially increase or decrease the importance of acquisition. For example, the presence of a brownfield adds restrictions to the suite of possibilities for stormwater management. This may lessen the priority of that parcel unless the funding source is specifically for the remediation of brownfields. Our analysis provides a starting point or guideline to conduct further investigation, breaking the 451 parcels into more manageable study areas.

Data

The development of the Green Boulevard is going to be a multi-year process. The findings of various parallel efforts such as the ACOE Floodplain Management Study and the PWSA Integrated Water Resources Planning Initiative will generate new robust data sets. Beyond these efforts, additional datasets will become available and existing datasets will be updated. For these reasons, this process and resulting matrix was designed to be flexible in order to accommodate additional information. As conditions change, such as progress on creating the Green Boulevard, it will be beneficial to solicit additional stakeholder input and reassess the weightings derived from the initial round of stakeholder input.

Conclusion

This report summarizes the process and findings of an innovative planning and analysis approach that was developed and applied along the Route 51 corridor in order to create the foundation for the transformation of the corridor into a Green Boulevard. The long-term vision for the Green Boulevard is to transform existing liabilities into assets, ultimately improving the social, environmental, and economic health of the Route 51 corridor and the quality of Saw Mill Run. The entire process or parts of the process can be re-run at any point that additional information is available. This is exceptionally important due to an anticipated multi-year planning and acquisition process which will likely result in additional data availability and potentially changing conditions.

This process utilized stakeholder input to inform a data-driven methodology to analyze 451 parcels along the Route 51 and Library Road corridors. A combination of the Analytical Hierarchy Process and Multi-Criteria Spatial Analysis was used to conduct parcel-level analysis to identify properties which can support the transformation of the corridor. Our analysis divided the study area into 124 high priority, 196 medium priority, and 131 low priority parcels. The high priority parcels were further analyzed to determine which parcels represent potential near-term acquisition priorities. Of the 124 high priority parcels, the 45 which are publicly owned and offer stream access were identified as most important for short term acquisition. The next tier of acquisition priority includes 12 publicly-owned parcels that are in close proximity to the stream (<1/5 mile) and 3 privately-owned tax delinquent parcels with stream access.

Appendix A: Case Studies

Capital Cascades Park and Trail

Location: Tallahassee and Leon County, Florida

Status: Construction in Progress

Cost: \$80 Million

Regulatory Environment: MS4

Funding Mechanism: Primarily funded through Blueprint 2000, an intergovernmental-agency funded by a 1 cent county sales tax dedicated to preserve, protect, and enhance quality of life. Additional funding obtained through grants and private donations.

Partners: Blueprint 2000, City of Tallahassee, Leon County, and EPA

Property Acquisition: Parcels utilized in this project include an EPA Superfund site, occupied residential and commercial properties, and undeveloped properties.

Project Goals

Reduce periodic flooding, improve water quality, and provide recreational and cultural amenities.

Overview

The project area is a 5.2 mile corridor that is comprised of 4 distinct sections. Key features include stormwater management facilities, stream morphological enhancements, ecological restoration, and recreational and cultural assets. Specific features include:

- Capital Cascades Park, a floodable 25 acre park, that includes a variety of recreational and cultural amenities such as 2.3 miles of trails, a discovery garden, an interactive fountain and play area, a cascade waterfall, an amphitheater, a Korean war memorial, pond viewing platforms, enhanced lighting and more,
- Connection of smaller parks and 2 universities (FAMU & FSU) with a multi-use trail through a greenway setting; also includes stormwater BMPs and a large public gathering space,
- Conversion of a 4 lane highway with a drainage ditch median to a 2 lane



1. Stormwater BMPs, fountains, and an amphitheater are just a few of the environmental and recreational amenities at Capital Cascades Park.



2. Multi-use trails wind throughout the 4 zones of the project.



3. Features such as this imagination fountain utilize filtered stormwater.

street with landscaping, multi-use trails, stormwater culverts, and

- Enhancement of an existing drainage ditch to improve water quality, including creation and restoration of wetlands, native plantings, and development of a nature park.

Pittsburgh-Region Application

- Creation of a green urban corridor that serves multiple functions,
- Utilization of vacant land, including a brownfield, for multiple goals,
- Integration of stormwater management, flooding mitigation, recreational amenities, ecological restoration, and
- Linear project which incorporates variation in design 'zones' based on localized geography and needs.

More Information

blueprint2000.org/projects/capital-cascades-trail/
 Master plan available at crtpa.org/files/84061493.pdf

Lick Run Watershed Restoration

Location: Cincinnati, Ohio

Status: Early Implementation

Cost: \$192 Million

Regulatory Environment: EPA Consent Decree

Funding Mechanism: Wastewater bills, HUD Community Challenge Planning grant

Partners: Metropolitan Sewer District of Cincinnati (MSD), Cincinnati Parks, and EPA

Property Acquisition: Parcels utilized in this project include privately owned occupied and vacant commercial and residential properties, vacant land, and brownfields.

Project Goals

Reduce periodic flooding, improve water quality, and provide recreational and cultural amenities.

Overview

The Lick Run Watershed Restoration is part of Metropolitan Sewer District of Greater Cincinnati's (MSD) Project Groundwork, a \$3.2B initiative to reduce and eliminate combined and sanitary sewer overflows. The Lick Run Watershed Restoration is a 12-part project that includes a variety of green stormwater infrastructure strategies, ecological restoration, and



4. Design concept includes 12 distinct projects which aim to manage stormwater and improve economic, social and environmental conditions

cultural and recreational amenities. The project area includes the South Fairmont neighborhood, which has experienced a decline in population and households and increased vacancy, foreclosure and physical property condition. Specific Lick Run projects include:

- Stream daylighting of 2 historical streams that are enclosed in combined sewers,
- Variety of bioretention areas, including bioswales, rain gardens and curb-side bump-outs,
- Wetland and riparian buffer restoration, and
- Multi-use path, civic recreation space improvements and safety features such as lighting.

Pittsburgh-Region Application

- Completed 'early success' demonstration projects to build support and educate residents prior to full plan development,
- Leveraged legally-required wastewater infrastructure investments to strategically improve communities,
- Integrated multiple stormwater, environmental, cultural and recreational goals, and
- Utilizing deconstruction practices where buildings need to be demolished in order to reuse materials and minimize landfill waste.

More Information

- projectgroundwork.org/projects/lowermillcreek/sustainable/lickrun/index.htm
- Master plan available at projectgroundwork.org/downloads/lickrun/lick_run_master_plan.pdf

Rock Creek Park

Location: Washington, DC

Status: Complete; extensive restoration efforts occurring upstream in Maryland throughout Upper and Lower Rock Creek Watershed

Cost: Unknown

Regulatory Environment: Created in advance of Clean Water Act, however, the watershed is now subject to MS4 requirements and has TMDLs for bacteria, nutrients, and sediment

Funding Mechanism: Federal funds for creation, 2\$ M grant in 2000 for restoration and funds from County's Water Quality protection charge



5. Planned improvements will span the South Fairmont business district, which has experienced the effects of declining population.



6. MSD installed 'early success' demonstration projects such as this bioinfiltration basin to help build community support and educate residents.



7. Rock Creek Park helps protect water quality in one of the most densely urbanized areas of the country.

(impervious fee)
 Partners: Originally created by Congress; current partners are National Park Service, Rock Creek Conservancy, and others
 Property Acquisition: Unknown

Project Goals

Preservation of natural and historic resources.

Overview

Created in 1890, Rock Creek Park encompasses 1800 acres and provides a variety of recreational opportunities, green space, and floodwater storage in an urban area. The park connects to two additional regional parks, which were created in the 1950s in the face of rapid urbanization. Specific Rock Creek Park features include:

- Provides areas for flood storage during typical floods,
- Preserved high-value ecosystem areas such as wetlands, woodlands, riparian areas and springs,
- Over 32 miles of multi-use trails, playgrounds, kayaking, canoeing,
- Sailing opportunities and equestrian trails, and
- Cultural and historical features, including a nature center and planetarium, a historic mill and historic structures.



8. High-value ecosystem areas such as the stream, wetlands, riparian areas, and springs are preserved throughout the park.

Pittsburgh-Region Application

Preserved park area allows for high quality ecosystem functions within one of the most developed areas in the country,

- Absence of development in floodplain within the park reduces economic impacts of flooding, and
- Establishment of park has allowed for nearly 125 years of environmental, economic, and social benefits.

More Information

rockcreekconservancy.org

Buffalo Bayou Park

Location: Houston, Texas

Status: In progress

Cost: \$58M for park

Regulatory Environment: MS4 and bacteria TMDL

Funding Mechanism: various foundation grants, including \$30M from Kinder Foundation, Downtown Tax Increment Reinvestment Zone (TIRZ) fund, Congestion Management and Air Quality Improvement (CMAQ) grant, and private donations.

Partners: City of Houston, Buffalo Bayou Partnership, Kinder Foundation, Harris County Flood Control District, Texas Department of Transportation, and various community partners

Property Acquisition: Project utilized publicly-owned land

Project Goals

To improve regional parks for natural and recreational opportunities, manage flood waters, provide park access from adjacent neighborhoods, and provide the opportunity for private and public development.

Overview

The project encompasses a 160 acre, 2.3 mile corridor that includes channel restoration, naturalization of landscape areas, trails to connect neighborhoods, existing trail improvements, and public art. Buffalo Bayou Park restoration is a core part of a broader regional initiative to connect greenways, improve ecological health, and provide enhanced recreation opportunities. Specific Buffalo Bayou projects include:

- Channel restoration, including sediment removal, re-grading of slopes to reduce erosion and invasive species removal,
- Naturalization of landscape areas, including conversion of 50% of parkland from turf grass to native meadow,
- Re-introduction of native plants to various plant communities, including riparian zone, wetlands, woodlands, rambles and formal perennial gardens,
- Creation and enhancement of multi-use trails and dedicated walking trails, and
- Various destinations, including formalization of dog park, restoration of historic fountain, children’s natural play area and a performance pavilion.

Pittsburgh-Region Application

- Integration of ecology, art, history (including industrial heritage) and recreational amenities,
- Emphasis on creating zones that will require minimal maintenance,
- Diversified funding sources by integrating a variety of topic-specific projects (dog park, trails, ecological restoration, flooding etc) and



9. Vegetation management goals include reduction of turf grass and increase of native species throughout various plant communities.



10. Both multi-use trails and dedicated walking trails are found throughout the park.



11. Public art is one of the many cultural amenities throughout the park.

- Incorporated opportunities for private business (e.g. kayak and canoe rentals, food vendors, etc) within park.

More Information

- Master plan can be found at buffalobayoupark.org/masterplan/

Carroll Creek Park

Location: Frederick, Maryland

Status: Flood control box culverts installed (1993), Park Phase I Complete (2006), Park Phase II in progress

Cost: \$87M total (\$60M for flood conduits, \$11M for Phase I park amenities, \$15.8M for Phase II park amenities)

Regulatory Environment: National Floodplain Insurance Program

Funding Mechanism: City capital improvement projects funds, \$2.9M grant through state Transportation Enhancements Program for Phase II and leveraged private investments through tax credits and other incentives

Partners: City of Frederick, Frederick County, state of Maryland

Property Acquisition: Rights of Way had to be acquired from surrounding land owners

Project Goals

To mitigate impacts of flooding, ultimately remove downtown Frederick from the 100 year floodplain and provide opportunities for economic development. Note: In 2003, FEMA officially removed downtown from the 100 year floodplain.

Overview

The project includes a 1.3 mile linear park through downtown Frederick, Maryland. Project planning began over 30 years ago after major floods devastated downtown Frederick's business district in the 1970s. Flood control focuses around closed underground conduits; park amenities were built on the 'roof' of the conduits and include multi-use trails, cultural and landscape features. Specifically project elements include:

- Underground conduits for managing floodwaters, with only a small portion of the water remaining above ground.
- Multi-use trails, pedestrian bridges, water access and boating opportunities,
- Landscape elements such as shade trees, planter boxes and fountains, and
- Cultural features such as a 350 person amphitheater, plazas, and public



12. The portion of Carroll Creek that flows above ground through the park provides recreational opportunities.



13. The park connects residents and visitors to water while also providing economic opportunities.

art.

Pittsburgh-region Application

- Creation of a multi-use urban park which has successfully stimulated economic growth through private investments of over \$30M and expected to exceed \$100M in private investments,
- Project successfully mitigated risk of flooding while supporting redevelopment, and
- Project removed portions of the city from floodplain.

More Information

- md-frederick.civicplus.com/DocumentCenter/Home/View/923

Fairview Park / Genetta Park Stream Restoration

Location: Montgomery, Alabama

Status: In Progress (Phases I & II complete)

Cost: \$3.5M

Regulatory Environment: Tributary of impaired Catoma Creek, MS4 requirements

Funding Mechanism: ADEM Section 319 grant, loan from Alabama's EPA-funded Brownfields Revolving Loan Fund, HUD Community Development Block Grant, Montgomery general fund, EPA's Clean Water State Revolving Loan Fund, National Fish & Wildlife Federation Five Star Grant

Partners: EPA, Army Corps of Engineers, Alabama DEP, HUD, National Park Service, FHWA, Dept of Agriculture, USGS, and Maxwell Air Force Base

Property Acquisition: The park project required the City of Montgomery to acquire a single 4 acre light-industrial parcel. The City has continued to acquire parcels adjacent to the park with the current goals of expanding educational and community outreach initiatives.

Project Goals

To improve water quality, provide green space and revitalize surrounding community.

Overview

The creation of Fairview Park (originally called Genetta Park) and the associated stream restoration was conducted on a 4 acre brownfield site. The park provides a gateway to a 54 mile existing trail system and included stream



14. Park features include pedestrian bridges, multi-use trails, public art, and landscaped areas.



15. Stream daylighting and wetland creation are key elements of the restoration.



16. Signage about BMPs and habitat support public education goals.

daylighting, stormwater BMPs, and recreational amenities. Future phases of the project will include restoration of a currently-culverted downstream portion of Genetta Stream and additional park amenities. Specific completed Genetta Park and stream restoration features include:

- Stream daylighting, floodplain restoration and wetland creation,
- Highly visible stormwater BMPs, including rain gardens and permeable pavement, to provide opportunities for public education, and
- Walking paths and lighting.

Pittsburgh-region Application

- This project is an important component of larger regional initiative to revitalize communities and remediate brownfields,
- Successfully leveraged various partnerships and funding sources,
- Expanded greenway, connectivity and recreational opportunities.

More Information

- epa.gov/landrevitalization/download/Final%20Green%20Infrastructure-g-16-14.pdf

Saw Mill River

Location: Yonkers, New York

Status: Phases I & II complete; Phase III in progress

Cost: \$19M

Regulatory Environment: Project was independently motivated but economic hardship and stormwater issues encourages its initiation.

Funding Mechanism: Grants from New York State Empire State Development, New York State Department of Environmental Conservation, New York State Environmental Facilities Corporation and the City of Yonkers.

Partners: Groundwork Hudson Valley, Saw Mill River Coalition, City of Yonkers, the Project for Public Spaces, Inc., the Public Library, the Beczak Environmental Education Center, the Friends of Phillipse Manor Hall

Property Acquisition: The land used for first phase of the project was owned by the City of Yonkers. Some negotiations for private land had to be carried out for phases II and III.

Project Goals

To enhance habitat, stimulate economic development, and provide recreational opportunities through daylighting of a portion of Saw Mill River



18. Getty Square provides an opportunity to connect residents with water.

Overview

The project area is situated in the heart of downtown Yonkers, New York, a city with an industrial heritage. The project includes 3 phases which include daylighting, habitat restoration, development of recreational amenities, art, and more. Elements of each phase are:

- Phase I included daylighting of 800 feet of stream, creation of Van der Donck Park and habitat restoration through the creation of tidal and freshwater pools,
- Phase II included daylighting of an additional 100 feet of stream, creation of a 20,000 ft2 park, public art, bike paths, and more,
- Phase III will include the creation of a 1.25 acre park and ecological restoration as well as infrastructure upgrades such as sewer separation and grit chamber installation.

Pittsburgh-region Application

- Project relied heavily on having a variety of stakeholders at the table from the very beginning, including developers, the City, ecologists, environmental engineers, and community groups.

More Information

- <http://www.americanrivers.org/wp-content/uploads/2014/04/daylighting-streams-report-2.pdf>
- <http://www.yonkerstribune.com/2014/10/yonkers-saw-mill-river-daylighting-project-phase-iii-wins-2-million-competitive-nys-dec-grant>

Lititz Run

Location: Lancaster County, Pennsylvania

Status: Completed and on-going

Cost: \$295,000

Funding Mechanism: Grants from Donegal Chapter of Trout Unlimited, PA Department of Environmental Protection, Chesapeake Bay Program, Farmer's First Bank, Environmental Protection Agency, and Warwick Township

Regulatory Environment: Initial activities were not driven by regulations, but the municipalities involved recognized the importance of being proactive rather than reactive.

Partners: Lititz Run Watershed Alliance, LandStudies, Inc., Lancaster County Conservation District, Donegal Chapter of Trout Unlimited, PA Dept of Env. Protection, Penn State Extension, Natural Resource Conservation Service, Lancaster County Planning Commission, Lancaster County GIS Department,



19. Stream daylighting and wetland creation are key elements of the restoration.



20. This newly created park provides wildlife habitat and a recreational space for the community

Lancaster Farmland Trust, Lancaster County Conservancy, Municipalities, Warwick School District, Warwick Township, Millersville University, Chesapeake Bay Foundation, Alliance for Chesapeake Bay, Millport Conservancy, Brubaker Agronomic Consulting Service, League of Women Voters, Borough of Lititz

Property Acquisition: The project started out on municipal property, and the remaining land was donated voluntarily by private owners.

Project Goals

To improve the health of the Lititz Run Watershed through a watershed management plan that includes management of natural resources, land-use planning, education, and community engagement.

Overview

The seven mile stream, Lititz Run, has been singled out for having a high concentration of nutrients and pharmaceuticals, among other contaminants, flowing into the Conestoga River. Throughout this project, citizens, scientists, local and state government, and local watershed partners worked together to carry out 15 projects in the Lititz Run Watershed. The DEP has noted the Lititz Run project as a very successful restoration project, and the watershed has been declared a "National Showcase Watershed" by the EPA.

Pittsburgh Region Application

As a similarly sized stream, the Lititz Run may be a good example of the time frame and cost needed to restore a stream. The significant number or organizations involved opened up more opportunities for funding, connections to land-owners, and healthy communication with stakeholders.



21. The restoration of Lititz Run allowed it to be designated as a Cold Water Fishery (CWF) in 2009.

More Information

- <http://www.americanrivers.org/wp-content/uploads/2014/04/daylighting-streams-report-2.pdf>
- <http://www.yonkerstribune.com/2014/10/yonkers-saw-mill-river-daylighting-project-phase-iii-wins-2-million-competitive-nys-dec-grant>

Appendix B: Data Sources

The following is a comprehensive list of datasets that were used in this analysis.

Data	Source
Combined Sewer Overflow Discharge Volume	3 Rivers Wet Weather Gross Flow Monitoring Sheds (2009) & ALCOSAN Wet Weather Plan Discharge Statistics (2012)
Flood History	Primary Data Collection (stakeholder survey and online research - 1/2016)
Floodplain	National Flood Hazard Layer for Allegheny County (2015)
Greenways	Allegheny County Greenway (2010)
National Heritage Inventory	Allegheny County Natural Heritage Inventory (2000)
Operating Business	Primary Data Collection (field survey & online research - 1/2016)
Parcels	Allegheny County Parcels (2015)
Property Condition	Primary Data Collection (1/2016)
Property Owner & Tax Status	Allegheny County Online Assessment Data (1/2016)
Property Value	Allegheny County Assessment Data (2013)
Stream Access	Primary Data Collection (1/2016)
Trails & Parks	Explore PA Trails (2016) & Allegheny County Parks (2000)
Transit Stations	City of Pittsburgh Transit Stations
Tree Canopy	Allegheny County Land Use (2010)

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Neighborspace of Baltimore County, Open Space Planning, <http://www.neighborspacebaltimorecounty.org/openspaceplanning.html>

Photo credits

Photo 1: http://www.gannett-cdn.com/-mm-/80224b2d62fae951c8483914c8154f50d01890db/c=288-0-4896-3456&r=x404&c=534x401/local/-/media/Tallahassee/2015/03/06/B9316502231Z.1_20150306171209_000_G2SA546D2.1-0.jpg

Photo 2: <https://www.facebook.com/DiscoverCascades/photos/>

Photo 3: https://www.talgov.com/uploads/public/images/parks/parks/cascades_fount_day.jpg

Photos 4, 5, & 6: www.cincinnati.com

Photo 7: <http://www.nps.gov/rocr/learn/nature/index.htm>

Photo 8: <http://adasisrael.org/jmcw-hhd-2015/>

Photos 9 & 10: <https://hehy51.wordpress.com/2013/01/29/buffalo-bayou-promenade-in-houston-texas-by-swa-2006/>

Photo 11: https://c2.staticflickr.com/6/5253/5516382474_ff465c4f80_b.jpg

Photo 12: https://syciphers.files.wordpress.com/2015/02/dsc_0328.jpg

Photo 13: <http://www.cityoffrederick.com/index.aspx?NID=169>

Photo 14: <http://media-cdn.tripadvisor.com/media/photo-s/04/45/5f/a4/carrol-creek-linear-park.jpg>

Photos 15, 16, & 17: <http://www.2dstudiollc.com/2015/07/genetta-park-gets-a-new-name-fairview-environmental-park-now-open/>

Photo 18: <http://landarchs.com/wp-content/uploads/2015/11/Saw-Mill-River.jpg>

Photo 19: <http://daylightyonkers.com/wp-content/uploads/2010/02/Daylight-boardwalk-1-580x245.jpg>

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