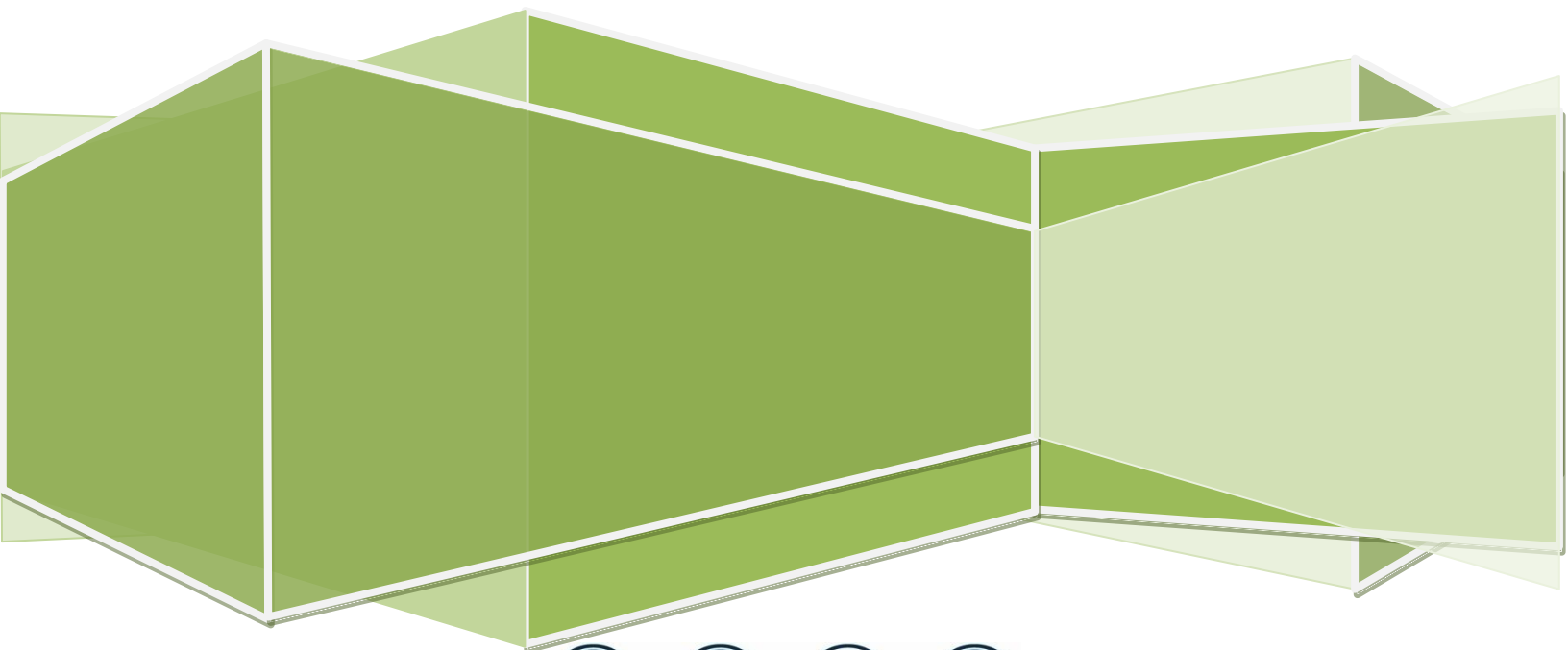


October 2009

Implementing Green Infrastructure:

Developing a Winning Strategy to Fund
Philadelphia's Ambitious Visions

Prepared for: The Pennsylvania Environmental Council



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Executive Summary

“*Greenworks Philadelphia* is not a panacea for the city and its current economic struggles. Rather, it is a vision for how Philadelphia can and should seize this moment, building upon the assets left to us by earlier Philadelphians and creating a better future for ourselves, our children and generations still to come.”

-Mayor Michael A. Nutter
City of Philadelphia

Philadelphia has ambitions to become the greenest City in America. Its recently released comprehensive sustainability plan, *Greenworks Philadelphia*, articulates that vision. And yet, its infrastructure is crumbling. Facing increasingly scarce resources, simultaneously achieving green-city goals and a state of good repair will require a change of approach.

Enter green infrastructure, an emerging paradigm that couples the economic benefits of traditional infrastructure with the ancillary environmental and social benefits that can accrue from natural design elements. Studies have shown this new approach to be a good dollar-for-dollar investment, particularly for cities seeking innovative ways to undertake cost-effective development programs and promote future economic competitiveness.

Still, green infrastructure’s incorporation into Philadelphia’s redevelopment strategy has been

anything but seamless. Despite well-researched plans, clear economic, environmental, and social benefits, and growing public consensus, stakeholders have failed to develop a consistent method for implementation.

This frustration is not for a lack of vision. Proposed projects and plans languish for lack of funding, but the impasse runs deeper. Solutions demand strategies that match the scale of proposed investments. A scan of national best practices reveals two: making the case, and “routinizing” the investment.

But, of course, best practices only go so far. Philadelphia’s unique challenges add complexity to the decision-making process. This reality is reflected in the report. In sum, its recommendations form a comprehensive road map to provide City leaders with new tools for navigating the path towards Philadelphia’s green-city goals.

Framework of a Winning Strategy

Phase 1: Show Visionary Leadership

With the creation of the Mayor’s Office of Sustainability, the release of *Greenworks*, and the Water Department’s innovative approach to stormwater management, this is well underway. Still, more can be done to:

- Coordinate Internal Capacity
- Demonstrate Public Benefits
- Promote External Partnerships

Phase II: Reconstitute Structures and Policies

Again, progress has been made, particularly of late by the Zoning Code Commission and Task Force on Tax Policy and Economic Competitiveness. For green infrastructure, additional reforms are necessary to:

- Expand Existing Greening Programs
- Realign Developer Incentives
- Address Fundamental Barriers to Tax-Increment Financing (TIF)

Phase III: Leverage Existing Assets

Leadership and structural reform will pave the way for more strategic asset management. To accomplish green infrastructure goals in an era of increasing fiscal constraint will require redeploying existing monetary and non-monetary resources. Opportunities are emerging to:

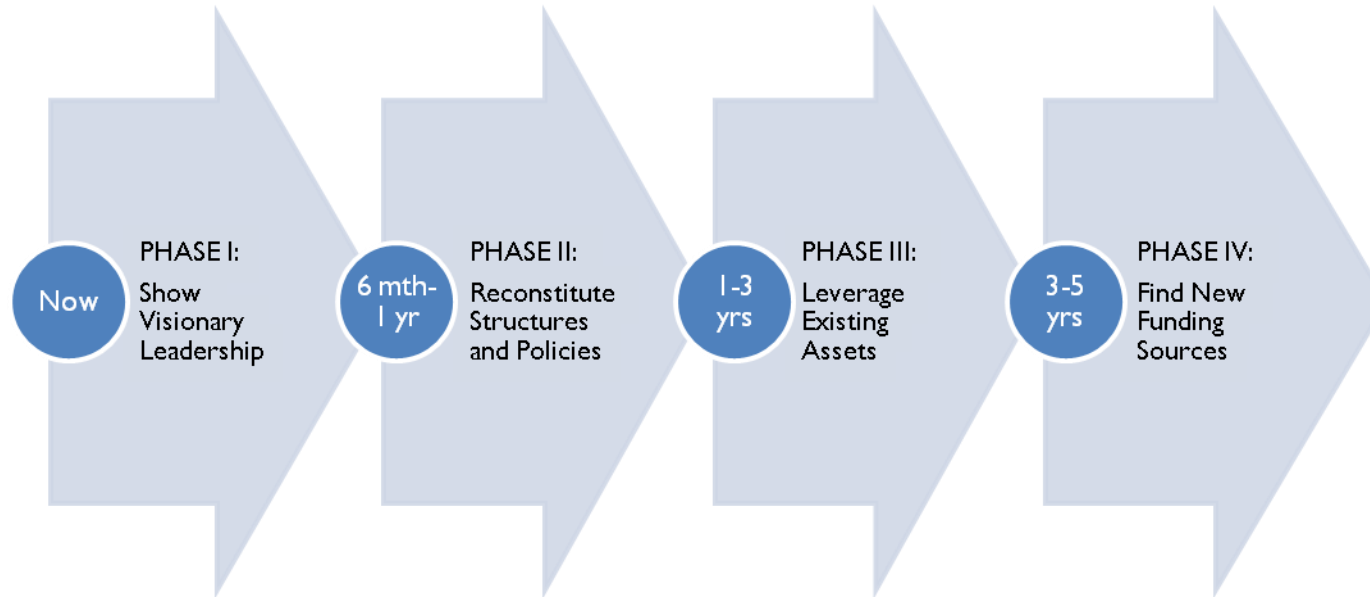
- Reallocate Capital Resources
- Strategically Manage Publicly Owned Land
- Rethink Citywide Open Space

Phase IV: Find New Funding Sources

Ultimately, achieving ambitious goals will require new resources, particularly at the local level. Leaders should begin planning now so that, when the time is right, the City is prepared to take advantage of opportunities to:

- Leverage State and Federal Resources
- Dedicate Future City Tax Revenues
- Adopt Funding at a Regional Scale

Five-Year Roadmap to Routinize Green Infrastructure Investment in Philadelphia



- Coordinate Internal Capacity
- Demonstrate Public Benefits
- Promote External Partnerships

- Expand Existing Greening Programs
- Realign Development Incentives
- Address Fundamental Barriers to TIF

- Reallocate Capital Resources
- Strategically Manage Publicly Owned Land
- Rethink Citywide Open Space

- Leverage State and Federal Resources
- Dedicate Future City Tax Revenues
- Fund at a Regional Scale

Introduction: No Shortage of Plans

There is no lack of vision for green infrastructure development in Philadelphia.

In fact, the City may be reaching a point of “green” saturation. Major studies and plans have proposed significant expansion of riverfront greenways, new neighborhood parks, storm water management facilities, and green energy programs. Recent plans include:

- North Delaware Riverfront Greenway (*Delaware River City Corporation*);
- Master Plan for the Lower Schuylkill (*Schuylkill River Development Corporation*);
- Frankford Creek Greenway Master Plan (*City of Philadelphia*);
- Central Delaware Civic Vision and Action Plan (*City of Philadelphia/PennPraxis*);
- Green Plan Philadelphia (*City of Philadelphia*);
- Cobbs Creek Integrated Watershed Management Plan (*Darby-Cobbs Watershed Partnership*);
- Tookany Tacony Frankford Integrated Watershed Management Plan (*Tookany/Tacony-Frankford Watershed Partnership*);
- Green City Strategy (*Pennsylvania Horticultural Society*); and
- Next Great City Agenda (*PennFuture*).

In April, the City released *Greenworks Philadelphia*, a comprehensive sustainability plan that brings together elements of these plans to craft targets and initiatives for a more economically and environmentally sustainable future. Greenworks sets specific targets for expanding green infrastructure and calls for several initiatives to meet those benchmarks.

To date, some previously proposed initiatives have been implemented. But many have not. Despite well-researched plans, clear economic, environmental, and

social benefits, and growing public consensus, stakeholders have failed to develop a winning method for funding green infrastructure. The culprit is a general lack of resources, but the roots of the impasse are deeper. Implementation plans have focused on project needs rather than broader civic objectives. As a result, projects have moved forward in a sporadic way, while many have languished for lack of funding.

Greenworks has created a framework for advancing green infrastructure. But Philadelphia’s ambitious objectives cannot and will not be accomplished through occasional measures. What is needed now is a focused policy discussion about implementation strategies equal to the scale of the proposed public investments. This report fills the gap by exploring two reinforcing approaches: 1) Making the case, and 2) Routinizing the investment. Following through on these lines of attack will go a long way towards achieving Philadelphia’s goal to become the greenest City in America.

Strategy 1: Making the Case

A New Paradigm for Infrastructure Investment

Infrastructure fuels economic growth. For over a century, America's cities – the country's economic engines – have been built on it. Investments in water, transportation, energy, and telecommunications continue to provide the foundation for economic competitiveness, environmental sustainability, and social equity. Ultimately, these investments support the American quality of life.

But now, cities are facing pressure like never before. The financial meltdown has led to economic recession. Global climate change threatens the environment. Growing income disparity has eroded the once-vibrant middle class. In America, this economic, environmental, and social maelstrom comes at a time when cities are least able to deal with it. The American Society for Civil Engineers (ASCE) 2009 Report Card for America's Infrastructure assigns an overall grade of D to the nation's infrastructure. According to ASCE, \$2.2 trillion is needed to achieve a state of good repair. The infrastructure that built America's cities is falling apart.¹

In older cities, decaying infrastructure has brought about a new reality: managing decline. In Philadelphia, the City has lost nearly one-third of its population over the past half-century with no commensurate resizing of infrastructure. An eroded tax base has led to fiscal constraint, exacerbating underinvestment by limiting resources for renewal. Continued underinvestment will perpetuate this vicious circle and threaten Philadelphia's economic competitiveness. More money will help solve this problem. But more money does not grow on trees. For cities like Philadelphia, managing – and ultimately reversing – decline will require a new approach.

Green: The New Shade of Gray

"Green infrastructure" is an emerging paradigm for coupling the economic benefits of traditional "gray" infrastructure with the ancillary environmental and social benefits that can accrue from a green approach.

For example: a traditional street is paved to improve its transportation functionality. A "green" street serves the same function but also captures stormwater, thereby reducing the strain – and maintenance costs – of built water infrastructure. Similarly: a traditional roof covers a building. A green roof provides the same insulation while absorbing stormwater *and* sunlight, reducing building temperatures and reducing energy consumption costs.

Green infrastructure is a term that has been used to describe many types of environmentally friendly developments. What links each is a sustainable design component that "conserves natural ecosystem values and functions and provides associated benefits to human populations with a distinct economic value."²

The basic features of green infrastructure can be subdivided into two groups:

- **Green Elements:** porous pavement, green roofs, green buildings (housing stock, infrastructure addressing climate change/energy use), trees, trails, renewable energy, external building elements, wetlands, meadows, pervious and cool surfaces, and urban agriculture
- **Green Spaces (integrating green elements):** greenways, trails, parks systems, wetlands, rain gardens, trees, swales, landscaping, open space, land conservation, storm water management, woodlands, green development partnerships, green streets, and schoolyards³

¹ American Society of Civil Engineers (2009). Available at: <<http://www.asce.org/reportcard/2009/>>.

² Benedict and McMahon (2001).

³ Drawn from: City of Philadelphia, GreenPlan (Draft: 2008).

Valuing the Green Approach

The **economic, environmental, and social benefits** of green infrastructure have direct dollar value. To calculate economic gain, translation can be straightforward: green roofs reduce energy consumption, lowering energy costs, and green streets reduce strain on water infrastructure, reducing maintenance costs. Other gains are more indirect: well-kept parkland can improve the attractiveness of a neighborhood, thereby increasing property values in surrounding communities. Directly and indirectly, green infrastructure can be valued in monetary terms.

Environmental and social benefits can also be translated into monetary gain. Green infrastructure improves air quality by removing pollution, saving mitigation costs. Improvements to social capital have quantifiable value. High-quality and accessible parks also offer attractive recreation opportunities to residents, making neighborhoods more livable, fostering healthier and more cohesive communities.

In short, green infrastructure is a good dollar-for-dollar investment. Particularly for cities managing seemingly intractable economic, environmental, and social issues, evidence shows that embracing this new paradigm of infrastructure development can help to promote future economic competitiveness.

It should also be noted that green infrastructure is a core component of the broader effort to address global climate change – an event which many have called the greatest challenge of our time. Adaptation to climate change will require a proactive approach to sustainable infrastructure management. Adequate investments in infrastructure adaptation could have incalculable – but nonetheless real – value to protect the future of the planet.

Empirical Evidence of Value in Philadelphia

In Philadelphia, a number of studies have analyzed existing green infrastructure assets and proposed projects to provide quantifiable evidence of value. This report highlights findings from three recent cases:

- **How Much Value Does the City of Philadelphia Receive from its Park and Recreation System?**
The Trust for Public Land, 2008
- **North Delaware Riverfront Greenway Plan –**
Pennsylvania Environmental Council, 2005
- **The Determinants of Neighborhood Transformation in Philadelphia: Identification and Analysis** – Susan Wachter, professor of real estate, finance, and city and regional planning at the University of Pennsylvania’s Wharton School, for the Pennsylvania Horticultural Society, 2004

The Value of Philadelphia’s Parks and Recreation System

Philadelphia’s systemic underinvestment in its parks and recreation system is well-documented. With a budget that has been halved over the course of twenty years, Fairmount Park has become a picture of urban neglect. Until recently, advocates bemoaned the situation but lacked the strong empirical case to justify additional funding. As a result, parks continually lost out to competing City budget priorities.

A 2008 study by the Trust for Public Land sought to change that by quantifying – for the first time – the dollar value of Philadelphia’s parks and recreation system. While not traditionally considered an economic development tool, the study marks an increasing realization that parks have value that extends throughout the City’s economic, environmental, and social fabric.

The study estimated the annual value of four dollar-generating factors to the City and its citizens:

- **Revenue Production for City Government: \$24 million**, based on \$18 million in tax receipts from increased property value in surrounding communities, \$5 million from increased tourism activity, and \$1 million from realty transfers.
- **Cost Savings for City Government: \$16 million**, based on \$6 million in stormwater management savings, \$2 million in air pollution mitigation, and \$9 million from community cohesion.

- **Cost Savings for Citizens: \$1.15 billion**, based on \$1.08 billion from direct use by citizens, and \$69 million in improved citizen health conditions.
- **Wealth Increasing for Citizens: \$78 million**, based on \$38 million from increased property values in surrounding communities, and \$40 million in profits from tourism.

The Estimated Annual Value of the Philadelphia Park and Recreation System	
<u>Revenue Producing Factors for City Government</u>	
Tax Receipts from Increased Property Value	\$18.1 million
Tax Receipts from Increased Tourism Value	\$5.2 million
Tax Receipts from Real Estate Transfer Tax	\$1.1 million
Estimated Total	\$24.4 million
<u>Cost Saving Factors for City Government</u>	
Stormwater Management Value	\$5.9 million
Air Pollution Mitigation Value	\$1.5 million
Community Cohesion Value	\$8.6 million
Estimated Total	16.0 million
<u>Cost Saving Factors to Citizens</u>	
Direct Use Value	\$1.076 billion
Health Value	\$69.4 million
Estimated Total	\$1.146 billion
<u>Wealth Increasing Factors to Citizens</u>	
Property Value from Park Proximity	\$37.9 million
Net Profit from Tourism	\$40.3 million
Estimated Total	\$78.2 million

Source: Trust for Public Land, "How Much Value Does the City of Philadelphia Receive from its Park and Recreation System?" (2008).

Not every benefit can be quantified – for instance, the value of improved mood and temperament of park users. Nevertheless, the report makes the case that Philadelphia’s parks are undervalued and in fact *are* a viable tool to promote economic development as well as environmental stewardship and social cohesion. And, by attributing dollar values to parks in their existing state, the report provides suggestive evidence of potentially high returns on future investments in the City’s parks and recreation system.

North Delaware Waterfront Greenway

Philadelphia’s underutilization of waterfront property also is well-documented. The Delaware River has been the subject of intensive visioning and plans for development. In 2001, the City released a long-term vision for renewal and redevelopment of the north Delaware. This vision gained traction and led to a 2005 North Delaware Riverfront Greenway Master Plan. The report recommended building a greenway along eight miles of riverfront property, creating a trail system with publicly accessible open space that could potentially connect with other regional trail systems.

To make a case for the greenway, the plan compared net benefits between a full build-out model, a current “as is” pattern, and alternative investment scenarios. To calculate net benefits, costs – including public capital investments in land acquisition, environmental remediation, road construction, trail construction, and greenway development – were measured against benefits – including increased capital investment, adjacent land values, resident and commercial investments, business activity, tax revenues, income and employment. The benefit-cost analysis found that net benefits of full build-out are in the range of ten to fifteen times greater than the “as is” scenario.

The report also estimated regional and statewide economic impacts of each scenario. For both the region and the state, public capital investment leverage was greater for the greenway scenario than alternative scenarios by anywhere from 30-50 percent. The analysis concluded that the public greenway would generate returns to the surrounding neighborhoods, region, and state that far exceed the more minimalistic alternatives. This finding illustrates that targeted investments in green infrastructure development can result in substantial economic gain in adjacent as well as outlying communities.

North Delaware Greenway – Benefit-Cost Analysis					
	Net Public Capital Costs	Increased Property Value	Present Value Recreation Benefits	Total Benefits	Net Benefits
As is	\$10 million	\$28 million	\$1 million	\$29 million	\$19 million
Alternative	\$27 million	\$42 million	\$6 million	\$47 million	\$20 million
Greenway Low Range	\$80 million	\$348 million	\$33 million	\$381 million	\$302 million
Greenway High Range	\$214 million	\$348 million	\$33 million	\$381 million	\$167 million

Source: Econsult Corporation, North Delaware Riverfront Greenway Master Plan (2005).

North Delaware Greenway – Public Capital Investment Leverage

	Net Public Capital Costs	Regional Economic Impact	Net Regional Benefits	State Economic Impact	Net State Benefits
As is	\$10 million	\$1,320 million	\$1,310 million	\$2,260 million	\$2,250 million
Alternative	\$27 million	\$1,502 million	\$1,475 million	\$2,543 million	\$2,516 million
Greenway Low Range	\$80 million	\$2,222 million	\$2,143 million	\$3,584 million	\$3,506 million
Greenway High Range	\$214 million	\$2,452 million	\$2,238 million	\$3,935 million	\$3,727 million

Source: Econsult Corporation, North Delaware Riverfront Greenway Master Plan (2005).

Neighborhood Transformations in Philadelphia: The New Kensington Pilot Study

The 20th century decline of many Philadelphia neighborhoods has sparked significant public and private investment in community revitalization. For example, between 1995 and 2002 the Philadelphia Green program partnered with the New Kensington Community Development Corporation to reduce the blight from abandoned land in the North Philadelphia neighborhood. Funded largely by the City's Office of Housing and Community Development with support from The Pew Charitable Trusts and William Penn Foundation, the effort featured a comprehensive greening campaign claiming 480 newly planted trees, 145 settled side yards, 217 stabilized lots, and 15 community gardens.

A 2004 study by Susan Wachter of The Wharton School at the University of Pennsylvania used the New Kensington greening program to model economic benefits of "place-based investment strategies." Wachter's found that tree plantings alone accounted for a \$4 million increase in neighborhood property values, and lot improvements increased property values by \$12 million.

Overall, the study showed that:

- Improving vacant lots can increase adjacent property values by as much as 30 percent;
- Planting a tree within 50 feet of a house can increase its value by about 9 percent;
- Greening the streetscapes will boost a house's property value by \$23,000; and
- Large concentrations of unmanaged vacant lots decrease housing prices on these blocks by about 18 percent.

Aside from obvious aesthetic value, "cleaning and greening" New Kensington had positive economic impact, which Wachter found to be statistically significant. Increased neighborhood property values also expand the City's tax base, contributing additional revenues and improving the City's fiscal stability. Thus, Wachter's analysis ultimately illustrates that greening can improve economic competitiveness, suggesting that future neighborhood revitalization efforts that feature a comprehensive greening component can expect economic gain to result.

Greening New Kensington – Summary of Green Infrastructure Findings		
	Percent Impact	Dollar Impact
<u>Commercial Greening</u>		
Within a ¼ mile of commercial corridor in “excellent” condition	23%	\$19,021
¼ to ½ mile to a commercial corridor in “excellent” condition	11%	\$9,097
Located in a business improvement district	30%	\$24,397
<u>Vacant Lot Management</u>		
Adjacent to a stabilized and greened lot	17%	\$14,059
<u>Neighborhood Greening</u>		
Near a new tree planting	9%	\$7,443
Improvements to streetscapes	28%	\$23,156

Notes: Based upon the 2004 median-priced Philadelphia home of \$82,700; “percent impact” shows the percent change in value, and “dollar impact” shows the dollar change in value when the percent impact is multiplied times the median value of a typical home.
Source: Wachter, Susan, Kevin Gillen, and Carolyn Brown, “Green Investment Strategies: A Positive Force in Cities,” (2008).

The City’s Response

While case studies illustrate the value of green infrastructure, actual implementation requires institutional leadership. In Philadelphia, this process is underway. For instance, on the heels of the North Delaware Riverfront Greenway Master Plan, the Delaware River City Corporation was created as a partnership between public officials, business leaders, and community organizations to guide and facilitate greenway implementation.

The City itself has embraced green infrastructure. The Philadelphia Water Department has initiated a program that features plans for widespread development, and the newly created Mayor’s Office of Sustainability offers the potential for additional institutional capacity to make those plans a reality.

Philadelphia Water Department

The Philadelphia Water Department views green infrastructure development through the lens of stormwater management. Traditionally, the Water Department has fulfilled its mission to provide adequate and reliable water service to the public through investments in gray infrastructure – pipes, tanks, and sewers that at one time were the highest technologies for managing urban water systems.

But Philadelphia’s systems are antiquated and can no longer adequately protect the City’s water supply on its own. For example, rainstorms can overload sewer capacity and result in “combined sewer overflows,” or discharges of untreated sewage into surface waters. Discharges pollute rivers and streams, and have become the subject of U.S. Environmental Protection Agency regulations and Congressional action aimed at reducing combined sewer overflows.

Green infrastructure mitigates combined sewer overflows by capturing stormwater and reducing the amount that invades the sewer system. The Water Department has incorporated a set of ten green infrastructure initiatives into its strategy for halting combined sewer overflows:

- Green Streets
- Green Alleys, Walkways and Driveways
- Green Schoolyards
- Green Public Facilities
- Green Parking
- Public Open Space - Parks and Recreation
- Green Homes
- Green Business and Commerce
- Green Institutions
- Green Industry

The goal of the Water Department's green infrastructure program is to capture the first inch of citywide stormwater. In 2006, 17 million gallons of rainwater were captured, saving nearly \$35 million in infrastructure costs.⁴ Expanding this program would reduce the strain on existing infrastructure and save potentially billions of future dollars in water infrastructure repair needs.

But broadening the program will require additional investment. One way that the Water Department is addressing this need is through an adjustment to its stormwater fee allocation. Historically, the Water Department has charged rates based on metered water consumption, a methodology that does not account for contribution to stormwater runoff. So whereas parking lots comprise some of the largest impervious land areas in the City, the runoff is unmetered and therefore parking lot owners do not pay Water Department charges. The new stormwater fee would adjust the allocation methodology to a formula based on extent of impervious land that accounts for a property's contribution to stormwater runoff.

The new rate structure would accomplish two core goals:

- **Promote private investment in green infrastructure by putting a price on runoff:** Changing the cost structure would incentivize developers to install green roofs, porous pavement, and bioswales for large properties. Developers who successfully mitigate runoff may even see a reduction in their properties' water bills as a result.
- **Create a funding pool for the Water Department to invest in green infrastructure on City-owned land:** Currently, resources are limited for retrofitting City streets and other public facilities with green infrastructure. New fees could be linked with additional green infrastructure investment and promote widespread implementation of the Water Department's strategy to mitigate combine sewer overflows.

At the time of publication, the proposed stormwater allocation fee was awaiting City Council approval.

Mayor's Office of Sustainability

The Mayor's Office of Sustainability institutionalized Mayor Michael Nutter's commitment to make Philadelphia the "Greenest City in America," and will provide City leadership with much-needed capacity to implement *Greenworks Philadelphia*, its comprehensive plan that features 15 targets across five thematic areas: energy, environment, equity, economy, and engagement. Taken as a whole, *Greenworks* provides the impetus to link existing green infrastructure programs with broader citywide sustainable development objectives.

⁴ Presentation by Howard Neukrug and Christine Marjoram to the Philadelphia Zoning Code Commission, January 9, 2008.

The Need for Continued Advocacy

Potential economic, environmental, and social benefits have not compelled a fundamental shift in how most cities, including Philadelphia, invest in their infrastructure. New projects rely on traditional gray approaches and treat green design as attractive but superfluous. For this reason, green infrastructure projects are addressed sporadically and in an *ad hoc* way.

For Philadelphia, it is one thing to develop “green” plans – it is another to implement them. To achieve its ambitious goals will require a change in mindset that establishes green infrastructure development as a core goal for key City institutions. Investments must be routinized in the same way as traditional gray infrastructure. Funding for green infrastructure cannot be the exception – it must become part of the rule.

Greenworks Philadelphia – Themes, Goals, and Targets

Energy: Philadelphia Reduces its Vulnerability to Rising Energy Prices

Target 1:	Lower City Government Energy Consumption by 30 Percent
Target 2:	Reduce Citywide Building Energy Consumption by 10 Percent
Target 3:	Retrofit 15 Percent of Housing Stock with Insulation, Air Sealing and Cool Roofs
Target 4:	Purchase and Generate 20 Percent of Electricity Used in Philadelphia from Alternative Energy Sources

Environment: Philadelphia Reduces its Environmental Footprint

Target 5:	Reduce Greenhouse Gas Emissions by 20 Percent
Target 6:	Improve Air Quality Toward Attainment of Federal Standards
Target 7:	Divert 70 Percent of Solid Waste from Landfill

Equity: Philadelphia Delivers More Equitable Access to Healthy Neighborhoods

Target 8:	Manage Stormwater to Meet Federal Standards
Target 9:	Provide Park and Recreation Resources within 10 Minutes of 75 Percent of Residents
Target 10:	Bring Local Food within 10 Minutes of 75 Percent of Residents
Target 11:	Increase Tree Coverage Toward 30 Percent in All Neighborhoods by 2025

Economy: Philadelphia Creates Competitive Advantage from Sustainability

Target 12:	Reduce Vehicle Miles Traveled by 10 Percent
Target 13:	Increase the State of Good Repair in Resilient Infrastructure
Target 14:	Double the Number of Low- and High-Skill Green Jobs

Engagement: Philadelphians Unite to Build a Sustainable Future

Target 15:	Philadelphia is the Greenest City in America
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Source: Greenworks Philadelphia

Strategy 2: Routinizing the Investment

Pretty Parks are Nice, but How Do We Pay for This?

Achieving Philadelphia’s green infrastructure goals will require an expanded pool of resources. In an era of increasing fiscal constraint, this will be a challenge. With entitlements such as pension costs and imperatives such as public safety swallowing a larger portion of its budget, the City’s capacity to devote significant resources towards the environment is limited.

Traditional financing mechanisms will be insufficient to achieve the City’s ambitious visions and plans. More widespread implementation will require creative approaches that link limited existing funds with innovative financing techniques to create new and expanded pools of funding. These revenue streams must be incorporated into a routinized investment strategy designed to meet ongoing funding needs.

The City must play a central role in this process, although its position need not always be as funder. In many cases, the City can facilitate or incentivize private investments. Doing so requires the City to be an active and effective collaborator with private interests. Its first step is to assert green infrastructure as a top priority across all relevant agencies and throughout the development process.

But while private support can fill a void, public resources cannot be replaced. There are three general ways for the City to tap into its powers and resources to create and expand pools of public funding:

- Broaden use of public funding sources
- Leverage access to low-cost capital
- Tap market incentives

Broaden Use of Public Funding Sources

The most straightforward way to generate additional resources is to tap into new streams of public funding. Traditionally, additional funds have been made available through intergovernmental transfers (grants) or increased local taxes and fees.

Traditional Mechanisms

Grants. Intergovernmental transfers are widely used to fund green infrastructure projects. At the federal level, earmarks and competitive grants are often available through the Departments of Transportation, Energy, and Agriculture, as well as the Environmental Protection Agency, Fish and Wildlife Service, and National Park Service. States also have related programs. In Pennsylvania, the Departments of Conservation and Natural Resources, Environmental Protection, Community and Economic Development, and Transportation offer grants and loans that could be used to finance green infrastructure projects. Regionally, *ad hoc* funding may be available through the Delaware Valley Regional Planning Commission and the Delaware River Port Authority. Additional grants and loans can be made available from private and not-for-profit entities, including foundations and land trusts.

Taxes and Fees. Dedicated revenues are another potential resource. General Fund appropriations, taxes, and fees can be used to support green infrastructure by dedicating a percentage of total revenues or a specific revenue source. Revenue sources need not be related to use – for instance, the Commonwealth of Pennsylvania transfers a portion of revenues from its State Realty Transfer Tax to fund open space preservation and enhancement. The City of Philadelphia uses a portion of its Parking Tax to fund Fairmount Park. Increased fees on park usage and water bills can be designed to match the benefits of green infrastructure with the costs of usage and maintenance.

Innovative Alternatives

In a fiscally constrained environment, the availability of traditional funding mechanisms will be limited. Grant programs are increasingly competitive, and taxes and fees promise to be politically unpopular. Innovative alternatives offer another way.

New Sources of Revenue Generation. New fees can be structured and used to promote green infrastructure. Forward-thinking public water utilities, including the Philadelphia Water Department, have begun to consider reallocating stormwater fees based on relative contributions to runoff, creating an incentive for pervious design and a pool of public funding for reinvestment. Developer exactions, such as Philadelphia’s “One Percent for Art” program and suburban parks, recreation, and transportation exactions could be structured to require green elements. Developer easements could serve a similar purpose through open space preservation. Improved

utilization of existing park amenities, such as golf courses, restaurants, and parking facilities, could further expand revenue generating capacity. Permit requirements, licensing fees, and marketing partnerships – through vendor contracts and advertising space – could monetize other untapped assets.

Special Districts. Where municipal levies are untenable, special service districts – in the form of business improvement districts, community benefit districts, or multi-jurisdictional taxing authorities – can fill a void. Special service districts typically are funded through an assessment on commercial and/or residential properties, or from a percentage of a dedicated tax. In Philadelphia, the Center City District is funded through a special assessment on commercial property. A special district devoted to green infrastructure development could be funded through dedicated taxes.

FINANCING ALTERNATIVES AT A GLANCE:

PUBLIC FUNDING

Traditional:

- Grants
- Taxes & Fees

Innovative:

- New Fee-Based Revenue (Stormwater Fees)
- Special Districts

LOW-COST CAPITAL

Traditional:

- General Obligation Bonds
- Revenue Bonds

Innovative:

- Tax Increment Financing
- Revolving Funds

MARKET INCENTIVES

Traditional:

- Tax Credits, Deductions, & Abatements

Innovative:

- Building Regulations
- Trading Schemes

CASE STUDY: ONE PERCENT FOR GREEN

Green Streets Program: Portland, OR

- **Key Features:**
 - Requires development to include green-street facilities
 - Creates a “One Percent for Green” in-lieu fee for projects that do not meet development standards
 - Aligns City development patterns with stormwater management objectives
- **Overview:** Recognizing the need for green streets as a source of stormwater management, the City of Portland, Oregon adopted the Green Streets Maintenance Policy in April 2007. The Policy requires that all City-funded development, redevelopment or enhancement projects must include “green street facilities” in the project. Examples include curb extensions, stormwater street planters, rain gardens, and simple streets with vegetation. Projects that do not meet this requirement must contribute to the “One Percent for Green Fund,” where one percent of a project’s construction costs are paid to a City fund and then redistributed to cover design and/or construction costs of public projects aligned with the City’s Stormwater Management Manual.
- **Implementation:** The Green Streets Maintenance Policy was predicated on the work of a task force consisting of representatives from key City Bureaus. The task force: (1) drafted citywide policy for green streets; (2) identified how to integrate the policy into the City’s Capital Improvement Plan, as well as the Citywide Systems Plan; (3) identified areas of cooperation among City Bureaus; (4) identified examples of “green street facilities” and their technical designs and goals; and (5) developed a funding proposal to ensure that the Green Streets Program was financially feasible and self-sustaining.
- **Advantages:** By convening its task force at inception, the City was able to create a comprehensive, implementable program. Establishing the One Percent for Green fund within the City policy guidelines ensured that city projects either conform to the standards created by the Stormwater Management Plan or contribute to the fund. Either way, Portland is able to push its agenda in creating green street facilities.
- **Challenges of Application:** Developing the Green Street Program required extensive coordination and continual stakeholder consensus to be effective. Maintaining intra-governmental collaboration is a time and resource-intensive process. And yet, the current policy only accounts for City-funded projects and has not yet evolved to include private sector development. The requirements add costs to the development process. In Philadelphia, already-high construction costs create disincentives for development, and additional fees could be prohibitive.
- **For more reading:**
 - Portland Green Street Program: <http://www.portlandonline.com/BES/index.cfm?c=44407>
 - One Percent for Green: <http://www.portlandonline.com/bes/index.cfm?c=48702&>

CASE STUDY: STORMWATER FEES

Stormwater Utility Charge and Discount Programs: Portland, OR

- **Key Features:**
 - Stormwater management fee based on impervious surface area
 - Discount programs to offset high base fees
 - Broad-based implementation authority for dedicated City agency
- **Overview:** Portland was among the first American cities to buck the traditional consumption-based allocation methodology and establish a stormwater utility charge based on impervious surface area. But with the highest average monthly fee in the nation, the City saw a need in 2000 to reduce ratepayer costs while maintaining private stormwater management incentives. Portland enacted a discount program called “Clean River Rewards,” which provides discounted user fees and retroactive credits to eligible applicants for on-site stormwater management practices. Residential property owners can get discounts on roof runoff management practices, while commercial and industrial property owners also can get discounts based on paved surface runoff management. Properties draining directly to a river are exempted from the charge.
- **Implementation:** The City granted its Bureau of Environmental Services broad authority to administer the stormwater utility charge. Property owners are asked to calculate the square footage of impervious area, but the Bureau may audit properties and impose fines as it sees fit. The Bureau also has the capacity to provide technical assistance to property owners to improve stormwater management and grant access to Clean River Rewards. The registration process for discount programs is considered user friendly and is available online. The City ultimately expects approximately three-fourths of property owners to become eligible.
- **Advantages:** The combination of an aggressive stormwater utility charge and array of discount programs incentivizes private investment in pervious building design while providing a pool of resources to be reinvested in public green infrastructure. The runoff-based stormwater charge is considered a more equitable user fee than traditional consumption-based methodologies because it is directly related to a property’s contribution to stormwater management costs. The discount programs put the onus on property owners to actively seek ways to reduce their costs through on-site management practices.
- **Challenges of Application:** Portland’s base stormwater utility charge is the highest in the nation. In Philadelphia, higher utility fees could create a disincentive for developers to build and for businesses to locate in the City. Also, while the Clean River Rewards registration process is simple, it also requires an on-going public education and outreach effort to ensure that property owners apply for the discount programs for which they are eligible. In Philadelphia – a much larger and more diverse City than Portland – the resources required to replicate this degree of successful public outreach could be substantial and costly.
- **For More Reading:**
 - Portland Clean River Rewards: <http://www.portlandonline.com/bes/index.cfm?c=43444&#hist>
 - EPA Municipal Handbook: http://cfpub.epa.gov/npdes/home.cfm?program_id=298

CASE STUDY: SPECIAL GREENWAY DISTRICTS

Regional Taxing Authority: St. Louis Metro Area

- **Key Features:**
 - Extensive citizen engagement and visioning process
 - Voter-approved 0.1 percent sales tax, which generates approximately \$20 million per year
 - Creation of two separate districts
 - Regional (and bi-state) funding and authority
- **Overview:** In 1996, a public-private partnership supported an extensive citizen engagement campaign that drove a bi-state public visioning process in Illinois and Missouri for the St. Louis region. One priority that emerged was the Clean Water, Safe Parks, and Community Trails Initiative. Funding for this initiative was put on the November 2000 ballot through Proposition C, which called for a 0.1 percent sales tax increase (exempting food and prescription drugs) to support the creation of an interconnected regional park system and trail network. The measure was approved by 65 percent of voters in the region, creating two districts: the Great Rivers Greenway District in Missouri, and the Metro-East Park and Recreation District in Illinois. The sales tax generates an annual revenue stream of approximately \$20 million per year, \$10 million of which is retained by the Districts to pursue greenway development and land conservation, and \$10 million of which is equally distributed among the 93 municipalities within the Great Rivers jurisdiction.
- **Implementation:** Creating the Districts that span two states and multiple counties required a unique degree of regional cooperation. The legal language of Proposition C was identical in both states to allow for ease of implementation across state boundaries. Ultimately, Proposition C passed in five of the seven jurisdictions. The two Districts are not duplicative, but serve to expand and supplement regional greenway opportunities. Both are able to unilaterally pursue additional funding through bonds, contracts, matching grants, and financial contributions. The enabling legislation also allows for surrounding counties to participate in the Districts at a later date.
- **Advantages:** The Greenway Districts exemplify the potential for multi-jurisdictional regional cooperation. The successful referendum illustrates the value of a public visioning process and the willingness for voters to approve a tax for high-profile green infrastructure projects, such as the Great Rivers Greenway. The annual dedicated funding stream has provided ongoing financial resources to implement the greenway plan. The River Ring has emerged: a 600-mile network of greenways and open space encompassing 1,216 square miles across the metropolitan area.
- **Challenges of Application:** Based on current collections, a 0.1 percent sales tax in Philadelphia would produce \$14 million for the City, or nearly \$50 million across the five counties of southeastern Pennsylvania. However, consensus-building is a time and resource-intensive process. Resolving legal issues related to structuring a multi-jurisdictional ballot measure also would be a challenge and likely would require state-enabling legislation.
- **For More Reading:**
 - Great Rivers Greenway District: www.greatrivers.info
 - Metro-East Park and Recreation District: www.mepprd.org
 - Trust for Public Land: http://www.tpl.org/tier3_cdl.cfm?content_item_id=4528&folder_id=1365

Leveraging Access to Low-Cost Capital

An alternative to new sources of public revenue is the capital market. The City's ability to issue tax-exempt debt allows for borrowing at below-market interest rates, reducing the cost of financing long-term capital projects. This tax-exemption provides leverage with developers and could be used to promote private investment.

Traditional Mechanisms

Public debt typically can be issued as either general obligation bonds (repaid from the general fund) or revenue bonds (repaid from project-related income) bonds.

General Obligation Bonds. In Philadelphia, general obligation bond capacity is limited. The City is near its maximum allowable level and uses the Philadelphia Authority for Industrial Development (PAID) – carried out by the Philadelphia Industrial Development Corporation (PIDC) – to issue equivalent debt for capital projects. Because G.O. bonds are repaid from general tax receipts, proceeds typically are used for purposes that benefit the population at large. For green infrastructure, other municipalities have used G.O. bonds for open space preservation. The School District of Philadelphia also could issue debt for school-related projects, such as greening schoolyards.

Revenue Bonds. Revenue bonds are typically structured as special purpose issues through the City's revenue-generating enterprise funds and utilities – the International Airport (repaid by airport-related revenues, such as gate fees); the Gas Works (repaid by gas charges); and the Water Department (repaid by water and sewer charges). The use of bond proceeds is legally bound to the core mission of these agencies, and the Philadelphia Water Department's stated reservation regarding the use of its debt capacity for green infrastructure limits available resources.

Innovative Alternatives

Debt constraints will limit the viability of traditional mechanisms for tapping capital markets. But public access to low-cost capital can be leveraged in other ways and tailored to meet project-specific needs.

Tax Increment Financing. The City can promote private investment through tax increment financing (TIF), a financing technique designed to divert public resources to spur development. Instead of raising taxes or spending existing resources, TIF dedicates *anticipated future* tax revenues to repay the cost of upfront public investments within the bounds of a pre-determined geographical area. These dollars typically fund improvements to public property and infrastructure that often is essential for private development projects to move forward.

TIF is not free money. For the issuing public entity, TIF functions like debt – project income (in the form of anticipated increased tax revenues) is used to repay the cost of upfront public investments. For this reason, the uncertainty of anticipated future tax revenues poses a risk. Municipalities can shelter themselves by structuring financing mechanisms that pass the risk to the developer and the project itself. For example, “developer financing” features a private – rather than public – upfront investment. In this case, incremental tax revenues are still used to fund repayment, but developers are responsible for debt service if the revenues fall short. Another alternative is “pay-as-you-go financing.” In this case, TIF funds are expended only after tax revenue collection. This financing mechanism links debt to repayment, minimizing risk but lengthening the development process and making private investment less attractive.

TIF districts must meet minimum requirements (most notably those established by state-enabling legislation). For Philadelphia, the relevant Pennsylvania statute was passed in 1990 (see table on page 19 for more details). But ultimately, TIF structures are flexible and determined by negotiation between public and private parties, varying by type –

project-based vs. district (geographic area)-based – and dedicated source of repayment – business, wage, use and occupancy, sales, and/or real estate taxes.

In Philadelphia, the dominant typology is a developer-financed, site-specific, project-based TIF, a minimal-risk approach that has limited viability as a tool to spur development. According to a 2004 report by the Office of the City Controller, Philadelphia has experienced limited success with employing TIF districts. Revenue tends to fall short of expectations, particularly in the early years of a project. The project-based approach also makes the use of TIF for green infrastructure especially challenging. A project-based TIF must have revenue-generating potential to be financially feasible, but for many green infrastructure projects, revenue-generating capacity is limited or non-existent.

For tax increment financing to work for green infrastructure, Philadelphia will have to embrace the district-based approach and strategically structure contiguous geographic areas that capture property value or tax revenue increases in surrounding areas. This approach has its own challenges. Most notably, the City’s ten-year tax abatement on residential construction limits the ability to borrow against any anticipated future tax revenues. Diverting future property tax revenues to a TIF fund also would undercut the Philadelphia School District’s primary funding source. Finally, state-enabling TIF legislation requires blight certification (or, in certain instances, “TRID designation”⁵), an unattractive criterion for district creation.

State Revolving Funds. Low-cost financing for green infrastructure projects can be made available through state-administered revolving funds, which offer below-market interest rates and loan guarantees for capital improvements. The most common funding

⁵ Pennsylvania’s Transit Revitalization Investment District (TRID) legislation created a value-capture mechanism that can function as a TIF district for transit oriented development. TRID designation can serve as a way to circumvent blight certification requirements in existing TIF-enabling legislation.

sources are the Clean Water and Drinking Water State Revolving Funds, which were created to administer federal grants for water and wastewater facilities and programs. Eligible green uses include:

- Tree boxes
- Vegetated swales
- Vegetated median strips
- Cisterns and rain barrels
- Land conservation and reforestation
- Downspout disconnections
- Green roofs
- Riparian buffers
- Parks and greenways
- Permeable pavements
- Wetland and floodplain construction
- Rain gardens and bioinfiltration practices

Despite flexible eligibility requirements, “gray” infrastructure remains the standard use. Nationally, 96 percent of all Clean Water State Revolving Fund projects have featured construction and maintenance of traditional water and wastewater facilities.

Ultimately, it is up to applicants to seek out innovative uses. Recent examples include:

- **Stormwater projects:** Funding for green roofs, infiltration basins, and wetland restoration
- **Capital costs to power a publicly-owned treatment facility:** Funding for clean energy projects, such as wind and solar energy infrastructure.
- **Upgrade or replacement of failing septic systems:** Funding for privately-owned treatment works that collect and treat effluent from properties with malfunctioning septic systems.
- **Water conservation:** Funding for public projects that reduce water use, promote water recycling in public buildings, and provide public education programs on water conservation.
- **Contaminated sites:** Funding for cleanup projects that affect water quality in brownfields and Superfund sites.

- **Source water protection:** Funding for projects that protect drinking water sources and supplies, including rivers, streams, lakes, and groundwater.

In Pennsylvania, the Infrastructure Investment Authority (PENNVEST) administers state water revolving funds. Since its inception in 1988, PENNVEST has provided low-interest loans (between 1 and 5 percent) and loan guarantees to over 2,200 projects totaling \$4.95 billion (\$250 million annually). In

Philadelphia, demand for water projects far exceeds PENNVEST capacity, and funding has been limited. Instead, the Philadelphia Water Department funds its capital improvement program through City-issued Water Revenue Bonds, which offer far greater levels of financing capacity but are more restrictive in terms of their potential use for green infrastructure.

Profile of Tax Increment Financing Legislation in Pennsylvania

Year Authorized	1990
State Statute	1990, July 11, P.L. 465, No. 113, § 1
Site Specific TIF Allowed	Yes
Area Wide TIF Allowed	Yes
Eligible Tax Revenue Sources	Property Tax, Sales Tax, Gross Receipts Tax, PILOTs, Any Ad Valorem Tax
May Be Used with Special Assessment Tools	Yes
Eligible Uses	Beautification components & related hardware, bike lanes in street right of way, bridge construction & repair, building acquisition, convention centers, curb & sidewalk work, debt service, decorative pavers, demolition, drainage facilities, environmental remediation, force mains, hiking & biking trails, land acquisition & relocation, landscaping, lift stations, lighting, park improvements, parking structures, pathways that facilitate intermodal transportation, pedestrian bridge systems that link commercial centers to transit systems, pedestrian platforms for rail or light rail transit systems & similar facilities, planning costs, public buildings, public golf courses & buildings, public roads, public tunnel systems for private buildings, publicly owned & maintained utilities, sanitary sewers, sewer expansion & repair, sewer pump stations & related equipment, sidewalks, sky bridges that link public buildings, storm drainage, street construction & expansion, traffic signals & related equipment, transmission lines, wastewater treatment facilities, water supply
Authorized Users	City, County, Township, Borough, Redevelopment Authority
Approval Agencies	School Board/District, TIF Commission, City Council, County, Local Municipality
Requirements for District Creation	Blight Requirement and/or TRID Designation, Feasibility Study, Public Hearings
Qualified Types of Projects	Residential, Commercial, Industrial, Mixed-Use
Financing Options	Pay As You Go, Loans, Special Assessments, TIF Revenue Bonds
Eminent Domain Use Allowed	Yes
Public Hearings Required for TIF District Authorization	Yes
Public Hearings Required for TIF Deal Approval	Yes
Maximum Length of District	20 years

Source: Council of Development Finance Agencies.

CASE STUDY: DISTRICT-BASED TAX INCREMENT FINANCING

Using the Central Loop TIF Fund for Green Infrastructure: Chicago, IL

- **Key Features:**
 - District-based TIF funded by incremental property tax revenues
 - Public funds used to leverage additional private investment
 - Uses include green infrastructure projects, including green roofs and parks

Overview of TIF Districts in Chicago

- Chicago aggressively employs tax increment financing to promote urban redevelopment. The City has created more than 120 TIF districts to fund public infrastructure projects. Typical uses include lighting, streetscaping, subway entrances, and parking facilities. Chicago's TIF districts have leveraged significant private investment: for every public dollar generated, businesses have invested an additional \$6.50 in TIF-funded projects. In total, over \$6 billion has been invested through Chicago's TIF districts over the course of two decades.

Funds have also been used to invest in green infrastructure. The Central Loop TIF District is the most prevalent example. Created in 1984, portions of the Central Loop TIF fund have been used to support Chicago's **Green Roof Improvement Fund (GRIF)** and construction costs for **Millennium Park**.

Green Roof Improvement Fund

- **Overview:** In June 2006, Chicago created the Green Roof Improvement Fund (GRIF), a pilot program to provide funds to create green roofs within the City's Central Loop Area TIF district. The City allocated \$500,000 from the Central Loop TIF to reimburse commercial construction of green roofs within the district. GRIF is administered by the City's Department of Planning and Development.
- **Implementation:** GRIF is a reimbursement grant mechanism that provides an incentive for commercial property owners to construct their own green roofs. Technical requirements stipulate that green roofs must cover at least 50 percent of the building's main roof and feature a cost-effective, low-maintenance design. Owners must show proof of a two-year minimum maintenance agreement. GRIF will reimburse eligible owners up to 50 percent of engineering, design, and/or construction costs, with a maximum funding amount of \$100,000 per project. Other City programs are designed to complement GRIF, such as the Green Roof Grant Program for residential and small business owners.
- **Advantages:** GRIF leverages funds already collected from the Central Loop TIF district, allowing the City to devote existing resources to incentivize development. GRIF also is especially attractive to property owners because it offers a grant as opposed to a loan.
- **Challenges of Application:** Public funds are made available through the pre-existing Central Loop TIF district. Replicating this program in Philadelphia would require a pre-existing district to provide the requisite funds for the grant mechanism. Such a district does not exist. Moreover, the grant mechanism is structured as a reimbursement program, partially negating its appeal as a subsidy by requiring private property owners to provide their own upfront capital to fund the project.

(Case Study is Continued on Following Page)

CASE STUDY (CONT.): DISTRICT-BASED TAX INCREMENT FINANCING

Using the Central Loop TIF for Green Infrastructure: Chicago, IL

Millennium Park

- **Overview:** Millennium Park is a 24.5 acre parcel of land that has had a large economic impact in parts of downtown Chicago. Prior to redevelopment efforts, the site was a functioning open-space rail yard. In 1998 the City obtained the air rights and began construction of a \$475 million Park that doubles as a green roof for a submerged parking facility. In addition to the open space, cultural, and recreational amenities, Millennium Park ensured continued usage of the now-submerged rail yard and has been acknowledged for its design and overall contribution to urban revitalization.
- **Implementation:** Originally budgeted for \$150 million, the project became substantially more costly. Of the total project cost, over half (\$270 million) was financed by the City, including \$170 million in revenue bonds to be repaid from parking garage revenues and a \$95 million contribution from the pre-existing Central Loop TIF District Fund. Public funding leveraged an additional \$200 million in private investment from high-profile companies in the region.
- **Advantages:** The Park has had a catalytic effect on the area through high-quality parkland, mixed-use development, parking facilities, and subway access. The financing strategy made it happen: the City tapped into debt financing and existing TIF funds to leverage additional private investment. Additionally, the Park's attractiveness has created a market for private events, a source of on-going revenue to partially offset maintenance costs.
- **Challenges of Application:** Cost overruns have sparked public criticism, especially an unexpected \$8 million annual budgetary cost for maintenance. Diversion of existing revenues from the Central Loop TIF Fund also sparked outcry, limiting resources for other redevelopment efforts. Despite designs for 24-hour public access, private events sponsored by the Park's high-profile donors have occasionally closed the Park from the general public, causing some to question the heavy use of public funds. Reconciliation of similar fiscal and policy concerns would be required to replicate such an endeavor in Philadelphia.
- **For more reading:**
 - **Green Roof Improvement Fund:**
 - City of Chicago – GRIF Program: http://egov.cityofchicago.org/city/webportal/portalContentItemAction.do?contentOID=536943451&contentType=COC_EDITORIAL&topChannelName=Dept&channelId=0&programId=0&entityName=Planning+And+Development&deptMainCategoryOID=-536884767
 - Chicago Climate Change Action Plan: <http://www.chicagoclimateaction.org/>
 - **Millennium Park:**
 - Millennium Park: <http://www.millenniumpark.org/>
 - Following the Money: http://www.ncbg.org/public_works/millennium_park.htm
 - Upkeep Costs: http://www.huffingtonpost.com/2008/10/23/surprise-city-spending-mi_n_137166.html

CASE STUDY: TAX ALLOCATION DISTRICT

BeltLine Partnership: Atlanta, GA

- **Key Features:**
 - A Tax Allocation District (TAD), synonymous with Tax Increment Financing (TIF), which diverts incremental growth of property tax revenues to a fund for redevelopment
 - Capacity for infrastructure reinvestment along the BeltLine, an open space (park) and mobility (trails and transit) redevelopment ring around downtown Atlanta
 - Public capital without tax increases, helping to generate widespread public support
- **Overview:** The Atlanta BeltLine is a 6,500-acre plan for underutilized and/or abandoned industrial properties surrounding downtown Atlanta. The BeltLine TAD was created in 2005 to freeze property tax revenues within a district and divert incremental growth of appraised property values to a fund for redevelopment. TAD funds are projected to generate \$1.7 billion (60 percent) of the total \$2.8 billion cost over the 25 year life of the district. The remaining 40 percent is expected from Park Opportunity Bonds, Public Works Quality of Life Bonds, federal grants, and additional private-sector investment.
- **Implementation:** In July 2006, Atlanta City Council approved the BeltLine Five-Year Work Plan. Since, much of the planning and land acquisition has been completed. TAD funds have been used for land acquisition, trails, green space, transit, affordable housing, public schools, and brown field cleanup. These investments have helped to leverage additional private capital. Developers have already invested more than \$1.3 billion within the district, which now features more than 50 new development projects. Another \$379 million in private capital has been committed through 2010.
- **Advantages:** The TAD provides otherwise unattainable public infrastructure reinvestment capacity and leverages additional private capital that theoretically would have been invested elsewhere. The TAD received overwhelming public support, in large part because no taxes have been required to fund the project. Additionally, because much of the property along the BeltLine was abandoned in the first place, the impact on local jurisdictions of diverting tax revenues to the fund has been minimal. (Because many of the projects feature reinvestment in public infrastructure that meets other needs, such as schools, the net impact may in fact be positive.) And, when the TAD expires in 25 years, the district's tax base is projected to have increased by \$20 billion, providing a new source of tax revenue for the local jurisdictions.
- **Challenges:** Critics have argued that a push for expediency has resulted in overpayment for land acquisition, which has become more pronounced given the recent crash of the real estate market. Others have criticized the use of public subsidy for private redevelopment that may have occurred anyway. Without reconciling that policy concern, along with other impediments to use of TIF, the BeltLine financing model would be challenging to replicate in Philadelphia.
- **For more reading:**
 - Fiscal Impacts: <http://www.beltline.org/LinkClick.aspx?fileticket=O9prRz404Co%3d&tabid=1820&mid=3489>
 - BeltLine Five-Year Workplan, 2006-2010: <http://www.beltline.org/LinkClick.aspx?fileticket=T9oA3SJQvQ8%3d&tabid=1820&mid=3499>

CASE STUDY: PROJECT-BASED TAX INCREMENT FINANCING

Open Space Preservation: Whitemarsh Township, PA

- **Key Features:**
 - Revenue from project-based private development to support TIF
 - Compilation of several public funding sources
 - Tapping a foundation to oversee and leverage funds as well as manage property acquisition

- **Overview:** In 2000, the developer of a continuing care retirement community in Whitemarsh Township faced community opposition to a plan to build on 50-acres of the existing Erdenheim Farm property. The Township was able to preserve a tract of land through a variety of public funding sources: (1) tax increment financing; (2) voter-approved earned income tax; and (3) grants. To date, \$13.5 million has been used to purchase 98-acres of the Angus Tract of Erdenheim Farm's total 300-acres. This required cooperation among the Montgomery County Redevelopment Authority (to create the TIF district), Whitemarsh Township, the Colonial School District, and buy-in from the private developer and local residents.

- **Implementation:**
 - **Tax Increment Financing:** A 20-year TIF district redirects the taxes from the retirement community into purchase agreements. (Open space preservation is an innovative use for TIF, which traditionally is tapped to spur development; in this case, funds from the TIF system are used to prevent new development). Retirement community residential property taxes were diverted to purchase and manage the farmland, including 100 percent of municipal property taxes and 80 percent of school district taxes. The Whitemarsh Foundation was tapped to oversee TIF funds, which are expected to total \$15 million over the 20-year period.
 - **Earned Income Tax:** Township voters approved a 0.25 percent income tax increase for land preservation through open space acquisition, producing \$1 million in annual tax revenues.
 - **Grants:** The Whitemarsh Foundation has supplemented Township funds with additional grants and donations, including \$1 million from DCNR and \$4.5 million from Merck & Company.

- **Advantages:** The multi-pronged funding approach spreads out fiscal impacts. The School District also recognizes the benefit of farmland preservation as a means to mitigate future budget strain caused by an increase in student population that could result from more dense residential development.

- **Challenges of Application:** The complex financing approach required a heavy degree of cross-sector collaboration – among the County Redevelopment Authority, Township, School District, and private developer – and ultimately public approval. In Philadelphia, already-high tax rates – particularly relative to suburban jurisdictions like Whitemarsh – would limit the viability of a similar tax increase, and fiscal constraint, particularly within the School District, would limit support for diverting property tax revenues.

- **For more reading:**
 - Whitemarsh Foundation: <http://www.whitemarshfoundation.org>
 - Township Earned Income Tax: <http://www.whitemarshntp.org/news/article.aspx?aid=32>
 - Open Space Plan: <http://www.whitemarshntp.org/information/osp.aspx>
 - Angus Tract Preservation: <http://www2.montcopa.org/montco/cwp/view,a,11,q,68902.asp>

CASE STUDIES: USING REVOLVING FUNDS FOR GREEN INFRASTRUCTURE

Examples of Successful Municipal Applications

Seattle, Washington:

- *Purpose:* Improve stormwater management and protect salmon habitat along the Longfellow Creek Watershed in order to support a nearby 120-acre, 34-block redevelopment plan for low-income communities.
- *Goal:* 10 percent of the watershed restored to drainage conditions comparable to rural pastures, protecting water quality, wet weather flow reduction, habitat protection, and public outreach and education.
- *Project Specifications:* Install natural drainage elements, such as bioswales, compost-amended soil reservoirs, and porous pavement.
- *Loan Terms:* \$2.7 million, 20 year repayment at a low (1.5 percent) interest rate

Port Townsend, Washington:

- *Purpose:* Manage stormwater and protect the Winona Wetlands through land preservation.
- *Goal:* Limit potential development, which would threaten local wildlife and habitat.
- *Project Specifications:* Purchase 15.5 acres of the Wetlands in two phases.
- *Loan Terms:* \$400,000 at 0 percent interest (repaid through \$5 per household stormwater utility fee)

Cohasset, Massachusetts:

- *Purpose:* To reduce the amount of runoff entering the town's stormwater collection system.
- *Goal:* Capture the first 0.9 inches of rain during wet weather events.
- *Project Specifications:* Retrofit stormwater drainage system, including the construction of more than 40 rain gardens and several vegetated swales strategically placed within township right-of-ways.
- *Loan Terms:* \$479,500 at 2 percent interest

Rockville, Maryland:

- *Purpose:* To enhance existing wetlands, restore stream buffers, stabilize 4,000 feet of eroding stream bank, and upgrades storm drain outfalls of the main stem of Watts Branch, a tributary of the Potomac River.
- *Goal:* Enhance aquatic habitat and reduce pollution from stormwater runoff in the Chesapeake Bay.
- *Project Specifications:* Planning, design, and restoration.
- *Loan Terms:* \$14 million at 0 percent interest (repaid through municipal stormwater utility fee)

More Reading:

- Clean Water State Revolving Fund: <http://www.epa.gov/owm/cwfinance/cwsrf/index.htm>
- CWSRF Fact Sheet: http://www.epa.gov/npdes/pubs/gi_cwsrf.pdf

Tapping into Market Incentives

The scale of need will require a large portion of green infrastructure development to be driven by private industry. Developers will invest in green infrastructure with an adequate profit motive, and so the City can achieve many of its objectives by leveraging market-based strategies to create such incentives. There are two primary means for doing so: manipulating tax structures (a “nudge”), and manipulating regulations (a “push”).

In either case, the City has tools in its arsenal to alter the economics of private development and promote green infrastructure.

Manipulating Taxing Authority. Federal and state tax incentives have driven the growth of green industries. At the local level, additional opportunities exist to structure tax abatements and commercial zones to promote green infrastructure investments. For example, in Philadelphia, the ten-year abatement on property taxes for residential development has spurred growth in pockets across the city. However, the current policy does not promote green development in any way. A recent City Council bill proposed to change that. If passed, the bill would link residential and commercial abatements to U.S. Green Building Council standards. Applicants would receive additional tax benefits based on achievement of “LEED” certification levels: certified, silver, gold, or platinum. At the present time, 345 municipalities use LEED standards to determine abatement qualifications.

Innovative Mechanisms

Manipulating Regulations. Where tax incentives are inadequate, new regulations can provide a stronger impetus for private investment. Forward-thinking municipalities have begun to incorporate green building requirements into zoning codes and building ordinances to shape the form of allowable new construction. Such “green factor” regulations are *not* developer exactions, although they can increase

construction costs. Beyond baseline green building requirements, regulations can provide additional incentives by easing zoning restrictions, such as through floor area ratio bonuses (“Bonus FAR”).⁶

Trading Schemes. In some areas, new regulations have led to the creation of credit-trading markets that monetize the environmental impacts of economic behavior. Many single-credit markets have emerged as successful demonstrations of tradable rights systems, such as the sulfur dioxide trading program instituted by the Clean Air Act of 1990. For credit-trading to be more effective for green infrastructure, the system likely will require an expansion of tradable rights. This could be accomplished through “multi-credit trading,” a mechanism for valuing a broader set of ecosystem services within a single market. Multi-credit trading recognizes regional (multi-jurisdictional) watersheds as the basis of trade to establish a market for monetizing watershed values. Such a market would provide a more cost-effective mechanism for funding green infrastructure (primarily through conservation and open space preservation) at a regional level and ultimately incentive environmental stewardship.

⁶ The floor area ratio (FAR) is the principal bulk regulation controlling the size of buildings. FAR is the ratio of total building floor area to the area of its zoning lot.

CASE STUDY: VOLUNTARY TRADING PROGRAM

Pennsylvania Nutrient Trading: Chesapeake Bay Watershed

- **Key Features:**
 - A state-administered voluntary cap-and-trade system
 - A regional response to federal mandates
 - A market-based solution to promoting environmental stewardship
- **Overview:** A 1972 federal mandate required a reduction to the number of nutrients disposed into the Chesapeake Bay watershed. In March 2001, watershed states – New York, Pennsylvania, Delaware, Maryland, and Virginia – agreed to establish a cap on excess nitrogen, phosphorus, and sediment into the Bay. The caps created a mechanism for states to create voluntary trading programs. Pennsylvania’s scheme is a voluntary program that represents the first to embrace allowable trading between point and non-point pollution sources.
- **Implementation:** In Pennsylvania, the Commonwealth’s Department of Environmental Protection (DEP) manages the nutrient trading program for the Chesapeake Bay Watershed. The program is consistent with the Pennsylvania Clean Streams Law and the Federal Water Pollution Control Act. Credits can be obtained through a three-step process: (1) certification of eligibility and compliance; (2) verification of reduction credits sold and obtained to meet water quality standards; and (3) registration of the purchased and sold credits for future monitoring and evaluation. NutrientNet, an online market, has been created to facilitate the trading process and DEP oversight.
- **Advantages:** The Chesapeake Bay Watershed nutrient trading program is an efficient market solution. By creating a limited number of credits allowed, facilities that produce less pollution are able to sell their credits to another facility which requires more credits. By creating a market, trading encourages facilities to monitor their pollution levels and to enact better environmental practices to reduce reliance on more nutrient credits. Facilities that opt to purchase more nutrient credits may reevaluate current practices and adopt more sustainable practices in lieu of purchasing more credits.
- **Challenges of Application:** The program is voluntary, which ultimately limits its reach and effectiveness. Implementation of any cap and trade program requires proper evaluation and maintenance. Caps must be monitored and annually readjusted according to pollution variations. For green infrastructure, the unpredictability of non-point sources adds a layer of complexity. Cross-jurisdictional coordination is critical: the Chesapeake Bay Watershed spans across five states, and effective administration requires ongoing support from municipal, county, state, and federal officials. A program of this nature in Philadelphia would require new administrative capacity and regional collaboration, which can be difficult to maintain in a voluntary framework.
- **For more reading:**
 - Pennsylvania Department of Environmental Protection – Chesapeake Bay Program: <http://www.depweb.state.pa.us/chesapeake/cwp/view.asp?a=3&Q=442886>
 - Nutrient Trading in Pennsylvania: <http://www.dep.state.pa.us/river/Nutrient%20Trading.htm>
 - NutrientNet: <http://www.nutrientnet.org/> and <http://pa.nutrientnet.org/>

CASE STUDY: GREEN BUILDING REGULATIONS

Green Factor Ratio: Seattle, WA

- **Key Features:**
 - Citywide element of the zoning code that applies to new commercial development
 - Requirement that design contain at least 30 percent “green elements” to receive a building permit
- **Overview:** The Green Factor landscaping requirement began in 2007 as part of Mayor Greg Nickels’ Neighborhood Business District Strategy, which revised commercial zoning requirements to complement sustainable development. It requires new construction to consist of at least 30 percent green elements, such as green roofs, porous paving, vegetated walls and rain gardens. Currently, it is proposed to expand to development in multifamily residential zones and the South Downtown planning area.
- **Implementation:** All developers in affected zones must adhere to the new Green Factor requirements to obtain a building permit application. New construction must demonstrate that the project meets the Seattle Green Factor by using the Department of Planning and Development’s (DPD) Green Factor Score Sheet (See “For more reading” below for a link). The score sheet automatically calculates a project’s Green Factor score as designers enter a combination of green design features. The scoring system offers a 10 percent bonus towards meeting Green Factor requirements if landscapes are visible to the public, with more bonuses for using techniques like food cultivation, native and drought-tolerant plants, and rainwater harvesting. Developers also receive credit for meeting street tree, tree protection, and stormwater drainage requirements.
- **Advantages:** Developers found their construction costs only rose by four tenths of a percent on average when they designed a project to meet the 30 percent green element requirement. The Green Factor hardwires sustainability considerations into development patterns by allowing the City to tap into market incentives, land use planning, and the zoning code to encourage private investment in green infrastructure.
- **Challenges of Application:** Landscaping requirements heavily depend on the private market, and do not account for economic downturns or slow periods of private development. The Green Factor does not require a maintenance plan. There also is no accurate measurement of how the green elements are sustained. Developers also must accommodate existing infrastructure and residential input, adding additional cost.
- **For more reading:**
 - 2006 Green Factor: <http://www.seattle.gov/dpd/Permits/GreenFactor/Overview/default.asp>
 - DPD’s Green Factor Score Sheet: http://www.seattle.gov/dpd/static/SeattleGFfinal_LatestReleased_DPDP_019573.XLS
 - Seattle 2000 Sustainable Building Policy: <http://www.seattle.gov/dpd/GreenBuilding/CapitalProjects/SeattlesPolicy/default.asp>
 - Seattle 2006 Downtown Zoning Changes: <http://www.seattle.gov/dpd/GreenBuilding/OurProgram/PublicPolicyInitiatives/DevelopmentIncentives/default.asp>

The Power of Partnerships

The City cannot fund green infrastructure projects on its own. Partnerships are an alternative. The next generation of financing strategies for infrastructure projects will feature creative collaboration between government entities, corporations, and not-for-profit organizations. Nationally, best practices involve aligning incentives that strike a utility-maximizing balance to increase capacity. Cross-sector partnerships can leverage unique powers and resources to implement complex green infrastructure projects that no single entity could – or would – have funded alone.

Types of Partnerships

Partnerships require common interests and a shared vision. Developing necessary consensus can take time. But where incentives can be aligned, partnerships can be formed to leverage the powers and resources that otherwise would be unavailable.

For the City, partnerships could take a variety of forms:

- **Government/For-Profit.** The City can partner with business if there is an opportunity for profit. Typically, this type of arrangement is manifest in a sale or lease of a public asset. For privatization to make economic sense, the asset must have revenue-generating capacity – for example, a parking garage. But economic gain also can be extracted from leveraging tax incentives. Government’s ability to issue tax-exempt debt and the private sector’s ability to take advantage of tax deductions and credits can create a profit motive for green infrastructure, even for projects with limited revenue-generating capacity.
- **Government/Not-For-Profit.** The City could partner with a not-for-profit organization to leverage its own resources with additional charitable giving. In this case, the City would provide baseline funds and establish terms for the

partnership, creating a framework for mission-driven not-for-profit parties to participate in a larger project than would have otherwise been possible. For example, in Philadelphia, the Pennsylvania Horticultural Society (not-for-profit) has partnered with the City to leverage additional funds for several citywide greening and landscaping initiatives.

- **Government/Government.** The City also can leverage its own activity or partner with other jurisdictions for efforts of a regional nature. For example, establishing municipal or regional authorities – or other quasi-governmental bodies – expands access to public resources and can improve capacity to leverage inter-governmental resources. In Philadelphia, the City relies on the quasi-governmental Philadelphia Industrial Development Corporation (PIDC), a partnership between the City and Greater Philadelphia Chamber of Commerce, for enhanced access to capital markets. The Philadelphia Water Department, a City enterprise fund, also provides revenue-backed access to capital for drinking water and water quality projects.

Collaboration in Action: The Parkway Project

Several of Philadelphia’s recent green infrastructure initiatives owe their success to cross-sector partnerships. A high-profile example was announced last year with an agreement between the City, Commonwealth, Center City District, multiple foundations and not-for-profit organizations to invest in green projects along the Benjamin Franklin Parkway as well as a new community park in South Philadelphia.

The announcement was two years in the making and represented the culmination of extensive cross-sector collaboration. The Commonwealth contributed \$7.6 million – approximately one-third of project costs – through the Department of Conservation and Natural Resources (DCNR). The City of Philadelphia

contributed \$6.7 million – another third of project costs. The final third coupled contributions from the Pew Charitable Trusts, William Penn Foundation, and the Knight Foundation.

The partnership also forged intra-governmental partnerships that were necessary to the project's ultimate success. At the state level, DCNR played an important role to coordinate project planning and roadway redesign with the Pennsylvania Department of Transportation. At the local level, the City worked with the Center City District to coordinate streetscape improvements. The Pennsylvania Horticultural Society (PHS) played a convening role throughout the project, soliciting community input for the design of the South Philadelphia park and working to coordinate the individual efforts of each funding partner.

The result is a \$19.3 million investment in two projects that could not have come to fruition but for the extensive partnership. The City and Commonwealth funds leveraged additional foundation support that would not have materialized without existing governmental buy-in. Just as importantly, the partners remained committed to the project throughout the two-plus years it took to move the project from concept to completion. This required an independent organization like PHS to manage the process.

Lessons from the partnership can be applied to future green initiatives at any scale. Funding is the lynchpin, but success also requires:

- **Government as gatekeeper and catalyst:** By easing bureaucratic requirements and providing administrative and operational support, the City and Commonwealth can facilitate partnerships, expedite projects, and create a real sense of possibility while others do the “heavy lifting” to get projects off the ground.
- **A lead organization:** The diplomatic skills of PHS helped to build relationships, align cross-sector

interests, and move the project towards completion.

- **A clear and shared vision:** Particularly for large-scale projects, collaboration should focus on building consensus around a shared vision for the final product. Allowing partners to shape the vision for the end result will help to maintain buy-in throughout the process.

The Stimulus Package Opportunity

The \$787 billion “American Recovery and Reinvestment Act” includes a number of funding measures and tax incentives to promote green infrastructure development. For water infrastructure, the Act provides an additional \$6 billion – \$4 billion for Clean Water and \$2 billion for Drinking Water – to be distributed by existing formula to state revolving funds. PENNVEST will receive a \$222 million influx from this provision and has since awarded the additional funds.

Stimulus funds come with a string attached: 20 percent must be invested in green infrastructure.⁷ In Pennsylvania, this stipulation implies a \$44 million set-aside that will expand access for municipalities and other applicants interested in low-interest financing for green infrastructure projects.⁸

The stimulus package has even larger line items for green energy, including \$71 billion for direct spending and another \$20 billion for tax incentives. Expanded pools of public funding will increase the competitiveness of the green energy industry, and provide a financial incentive for investments in green roofs and other green building techniques.

⁷ “Applicants for Water Funds in Stimulus Must Contact Individual States, EPA Says.” Bureau of National Affairs – Environmental Health and Safety, Available at: <<http://ehscenter.bna.com/PIC2/ehs.nsf/id/BNAP-7PFH6Y>>.

⁸ At the time of publication, it was unclear how green infrastructure funds will be allocated.

However, stimulus funds are a short-term fix. Maximizing impact will require coordinated efforts to achieve lasting solutions. Leveraging public funds to promote private-sector investment will be critical. In Philadelphia and elsewhere, the role of public officials will be to ensure that government is positioned to partner – by providing matching funds – and lead – by streamlining regulations and building codes – to promote green development. The stimulus can serve as a catalyst and part of a broader strategy, but it will not fulfill Philadelphia’s long-term funding needs.

Section III: Summary of Key Findings and Recommendations

trading markets have been established to monetize environmental stewardship.

Key Findings

Green infrastructure is an emerging paradigm to tackle infrastructure needs in an economically, environmentally, and socially conscious way. But realizing Philadelphia’s ambitious visions will require new strategies for implementation. This report has found that:

- Visions abound, but few are implemented;
- Economic, environmental, and social value is generally accepted, but has not compelled systemic change; and
- More widespread implementation is possible, but will require new approaches.

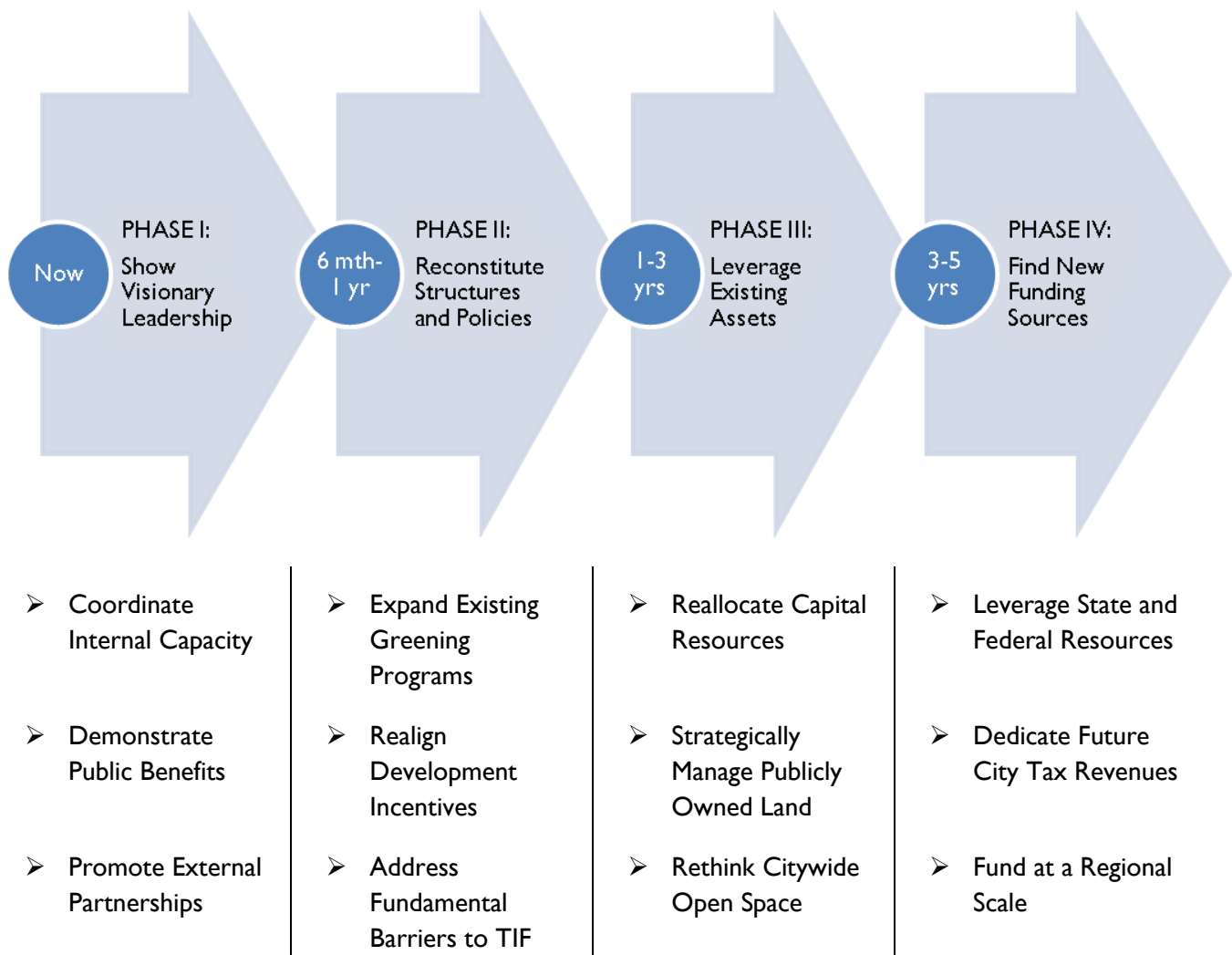
Becoming the greenest city in America will not be achieved through occasional, *ad hoc* measures. Case studies have illustrated how other Cities and states are acting on the imperative to routinize investment strategies:

- In Portland, aggressive stormwater management fees, regulations, and developer fees have provided significant private incentives for green building design and a pool of resources for public investment.
- In Chicago, a pre-existing TIF district has been used to fund a large-scale urban park and green roof development program; in Atlanta, a new TIF district was created to fund a circumferential regional greenway.
- In St. Louis, a public visioning process built consensus on a voter-approved sales tax to fund a bi-state, regional greenway that has invested more than \$50 million in trails and park development.
- Nearby in Pennsylvania, funding consortiums have funded parks and open space, while credit-

Recommendations

And yet, case studies can only go so far. Philadelphia has taken noteworthy strides in recent years, but faces unique challenges in following through on its commitment to become the greenest City in America. In his foreword to *Greenworks Philadelphia*, Mayor Michael A. Nutter offered a rallying call: “To assure that Philadelphia’s best days are ahead of it, we must dream big – and we must dream smart. And we must take steps today that will make our city’s future more secure and more prosperous.” The following recommendations are designed to help City leaders act upon this imperative, drawing upon stakeholder outreach and national best practices to formulate a comprehensive five-year roadmap to routinize green infrastructure investment in Philadelphia.

Five-Year Roadmap to Routinize Green Infrastructure Investment in Philadelphia



Show Visionary Leadership (*Immediate*)

The release of *Greenworks* represents a strong commitment to green infrastructure. City leaders have set forth ambitious targets to transform Philadelphia into America’s greenest city. Now the hard part begins: putting these plans into practice.

In many respects, this work has begun. The Philadelphia Water Department is at the vanguard of the green infrastructure movement. Its \$1.6 billion “Green Cities, Clean Waters” plan, recently submitted to the U.S. Environmental Protection Agency, would adopt innovative approaches to control combined sewer overflows (CSO). The plan includes investments in green infrastructure to capture stormwater on the

surface, thereby mitigating strain on the City’s sewer system. In addition to the large-scale public investment, the Water Department’s proposal to impose utility fees based on impervious surface area (as opposed to metered consumption) promises to incentivize additional private investment in green infrastructure among commercial and industrial landowners.

Building off the Water Department’s ground-breaking efforts will require an uncommon degree of sustained political will. City leaders must provide strong leadership to overcome political hurdles, and should act now to:

1) Coordinate Internal Capacity: Green infrastructure is a complex, interdisciplinary approach to redevelopment that demands integrated, yet flexible decision-making capacity. The City has created a comprehensive framework for action in *Greenworks*, and a coordinating entity in the Mayor’s Office of Sustainability. This new capacity should be leveraged to promote a green infrastructure agenda across relevant departments, offices, and organizations, especially the: Mayor’s Office of Transportation (and Streets Department); Commerce Department; Water Department; Planning Commission; Department of Parks and Recreation; Philadelphia Industrial Development Corporation; and Redevelopment Authority. Multiple City agencies have a stake in the City’s green infrastructure agenda, and they must work in lock-step to meet its ambitious targets.

2) Demonstrate Public Benefits: Internal capacity-building and external partnerships are means to an end; ultimately, they must produce tangible outcomes in the form of new community assets. The Water Department’s “Clean Waters Green Cities” plan clearly articulates public benefits – demonstration projects, particularly through its “Model Neighborhoods” initiative, will continue to build a public constituency for green infrastructure. City leaders should make an effort to track cost-effectiveness and catalog benefits of these investments, prioritizing projects with high-profile and quantifiable returns in strategically targeted areas. Projects that provide recreational opportunities are a plus, contributing additional returns to civic life and helping to build grass roots, community-level support for more widespread green infrastructure investment.

3) Promote External Partnerships: Funding rarely comes from one source. Leveraging an array of potentially available public and private resources will require internal capacity-building to be coupled with stronger linkages with external

stakeholders – State, quasi-governmental, not-for-profit, philanthropic, business, and community organizations. Cobbling together such multi-institutional, cross-sector partnerships takes time. Sufficient attention and resources should be devoted to the relationship-building process. The City can play many roles in this process: advocate, catalyst, cajoler, facilitator, and funder. Often, all a project needs is an imprimatur of public support. In any case, the mutual trust that can be built is a new form of capital with lasting benefits.

Reconstitute Structures and Policies (*Short-Term: 6 Months to 1 Year*)

City policies set the tone for future development. Best practices across the nation use zoning and tax codes as critical tools to spur private investment. And yet, Philadelphia’s zoning codes and tax assessments are labyrinthine, burdensome, and out of line with 21st century standards. Reforming the structures within which future development will occur is a prerequisite for achieving *Greenworks* targets and an essential step in promoting future economic competitiveness.

Progress is being made. For example, the ongoing work of the Zoning Code Commission and Task Force on Tax Policy and Economic Competitiveness promises to clear a path for reform. But more must be done to restructure other uncompetitive policies and programs that, as presently constituted, are impediments to implementing green infrastructure and ensuring its development is incorporated into broader City objectives.

City leaders should work to identify these ongoing impediments and target opportunities to:

4) Expand Existing Greening Programs: The City’s existing green incentive programs are often little known, limited in scope, and easily subverted. For example, the “Street Tree Fund” is an in-lieu fee – similar to Portland’s One Percent for Green program (see page 17 for a description) – imposed on developers based on a

predetermined schedule of street trees to be planted for a particular project. For every tree actually planted, a portion of the fee is refunded. Forfeited funds are then used to support other public tree planting initiatives. In the short term, city leaders should consider scaling up this program and evaluate its pay schedule to determine whether it is providing an adequate private incentive. Over time, the City also could consider a broader developer exaction to create an additional resource for public greening initiatives, helping to meet the *Greenworks* target of planting 300,000 trees by 2015.

5) Realign Development Incentives: The Zoning Code Commission’s work is well underway, and green infrastructure objectives will be represented in its final recommendations. Although private real estate markets already demand green development, City leaders should evaluate potential benefits of new incentives, such as expanding the ten-year property tax abatement with additional years for meeting green building standards, and modest floor area ratio bonuses for green design elements that exceed current practice. The new code should also promote green infrastructure in the non-built environment, through incentives for the creation of public open space, local food access and production, and street tree planting, while removing existing requirements for impervious surfaces. Finally, the new code should reflect “above code” guidelines that instruct the long-term trajectory of green infrastructure investments.

6) Address Fundamental Barriers to TIF: For good reason, Philadelphia leaders have been slow to embrace tax-increment financing for public infrastructure. Sporadic and unreliable assessment practices at the Board of Revision of Taxes (BRT), the ten-year abatement, and the School District’s apportionment – not to mention prevailing economic conditions – limit

incremental growth of the City’s property tax base and therefore the capitalization of a TIF fund. As a result, TIF has primarily been used on a project-by-project basis. But the district-based approach has many potential benefits, and has been employed by other cities, such as Chicago, to fund a variety of green infrastructure projects (see pages 24-25 for a description). City leaders should embrace the district-based approach and address two fundamental public policy impediments: 1) reforming the BRT’s property tax assessment practices; and, 2) working with School District officials to match benefits with any potential budgetary impacts, either through revenue transfers or TIF-funded projects, such as new green schoolyards.

Leverage Existing Assets (Mid-Term: 1 to 3 years)

Visionary leadership and structural reforms will pave the way for more strategic utilization of the City’s existing monetary and non-monetary assets. Granted, the impediments are significant: capital funds are spread thin by vast need and limited by an already high debt burden, while the value of infrastructure has depreciated due to a general state of disrepair.

And yet, strategic opportunities do exist. The City spends millions each year on infrastructure repair. Millions more go unspent. In Fairmount Park, the City has the largest swath of urban open space in the United States. Short of new funding, City leaders should evaluate opportunities to piggyback off Water Department initiatives to reposition public assets as green infrastructure, which has been shown elsewhere to be a more cost-effective alternative for redevelopment.

Specifically, City leaders should begin planning now for opportunities to:

7) Reallocate Capital Resources: Capital resources are understandably scarce, but could be used more prudently. Currently, the City has approximately \$60 million in non-allocated capital

funds each year. A portion of these funds are directed to Councilmanic districts. However, a portion goes unspent each year. City leaders should act now to end this practice of “hoarding” capital resources, which unnecessarily limits annual capital investment, and require that resources be invested within a predetermined time period. Unspent capital funds should be recycled back into the capital budget process, with *Greenworks* as a strategic framework for reallocation.

8) Strategically Manage Publicly Owned Land: The proposed stormwater allocation fee, while revenue neutral to the Water Department, promises to incentivize one of the largest investments ever in greening Philadelphia’s privately owned impervious surfaces. But large swaths of underutilized and impervious publicly owned land will be unaffected by this change. As it happens, two of the City’s largest public land owners – the Redevelopment Authority (with over 3,000 vacant parcels) and School District of Philadelphia (with 325 buildings and adjacent schoolyards) – are in the beginning stages of a planning process to rethink their facilities and land holdings. City leaders should work to ensure green infrastructure objectives are reflected in these new plans, and partner with the Water Department to incorporate its green infrastructure initiatives wherever appropriate.

9) Rethink Citywide Parkland: The newly created Department of Parks and Recreation is a chance to recognize and leverage the array of potential open space assets already under public control. City leaders should use this opportunity to evaluate the revenue-generating potential of Fairmount Park’s sprawling landscape, including appropriately structured user fees on golf courses, parking, and other facilities. Moreover, the *Greenworks* target of providing parkland within a 10 minute walk of 75 percent of Philadelphians begs a broader strategic question

of how to geographically position City parks and recreation assets. Fairmount Park, however sprawling, is in itself insufficient – the plan calls for an additional 500 acres of open space to be created by 2015. Meeting this aggressive goal will require City leaders to find efficiencies among its existing assets to provide new community assets without expensive parcel acquisition – for example, through a partnership with the School District to green schoolyards.

Find New Funding Sources (Long-term: 3 to 5 Years)

True routinization ultimately will require new resources. Especially in the prevailing economic climate, dedicating taxes and expanding pools of funding for green infrastructure would be unpractical and inappropriate. But of course, economic conditions will improve, and new funding opportunities will emerge.

In the meantime, City leaders should focus on its sources of leverage, while keeping an eye towards future windows of opportunity to develop a new local and regional funding base for green infrastructure.

Specifically, City leaders should be looking ahead for opportunities to:

10) Leverage State and Federal Resources: If nothing else, the American Recovery and Reinvestment Act (ARRA) illustrates the value of proactive preparation at a local level. The legislation’s general “shovel-ready” criterion requires swift implementation, rewarding proactive cities with ready-to-go projects and punishing reactive cities that waited for funding to materialize. With ARRA as a lesson, City leaders should begin working now to prepare for increasingly likely future federal and state policy developments. At the federal level, cap-and-trade, carbon markets, and infrastructure banks could provide powerful new incentives and funding for green infrastructure. At the state level, Growing Greener III and

PENNVEST set-asides will provide a new round of dedicated funding for green infrastructure, and an impetus for action to protect regional open space assets. Fully leveraging these opportunities will require local resources, in the form of planning, ready-to-go projects and, in some cases, matching funds. In the end, those that are prepared will reap the benefits – those that wait will lose out.

11) Dedicate Future City Tax Revenues: Rather than subject important civic objectives to the regular budget appropriation process, many cities have elected to create a dedicated funding stream. The advantages of this approach are two-fold: 1) While this funding stream remains subject to economic cycles, it effectively becomes removed from the vagaries of political decision-making, thereby creating a more reliable revenue source; and 2) The resulting predictability allows leaders to plan projects and leverage other funding sources accordingly. At the state level, Pennsylvania has employed this approach by dedicating 15 percent of realty transfer tax collections to the “Keystone Recreation, Park and Conservation Fund,” which provides match funding for a variety of cultural and open space projects. In Philadelphia, prevailing economic conditions preclude such an investment. And yet, economic conditions will improve. The City should begin planning now for an inevitable period of renewed economic strength, and look towards the state’s Keystone Program as a model for creating a pool of dedicated funding.

12) Fund at a Regional Scale: Watersheds, greenways, parks, and open space are not just City assets. They benefit entire regions, irrespective of jurisdictional boundaries. In recognition of this reality, many regions, such as St. Louis (see description on page 19), have approved multi-city and county funding sources to implement regional green infrastructure initiatives. In the past, struggles with fragmented governance have constrained such an approach in

Greater Philadelphia. But leaders are beginning to understand the value of collaborating towards shared regional objectives. Ultimately, institutionalizing regional collaboration may require shared funding. To this end, City leaders should continue to promote regional collaboration and advocate for state-enabling legislation to create multi-jurisdictional funding authorities. Such “regional districts” would allow for new investments in regional assets. Of course, buying into such a shared funding model would require significant political will. The City could provide leadership and coax participation by seeding a regional asset district with dedicated funds, and allow surrounding counties to buy into the district with funds of their own.

Conclusion

The confluence of global climate change, growing infrastructure needs, and financial crisis demands swift action. The benefits that can accrue from investment in green infrastructure extend to each of these imperatives. The sustainable development community has embraced this value through triple-bottom-line accounting measurements. It is time for government to embrace the principles embedded in this approach.

Philadelphia has made noteworthy progress, but much remains to be done. Of course, it will be difficult to focus on environmental goals at a time when fiscal distress has led to a budget crisis. Still, to address the City’s social, environmental, and economic challenges demands that green infrastructure be part of the solution. Developing a winning strategy to routinize investment now will move Philadelphia closer to its green-city goals and lay the foundation for an inclusive, sustainable, and prosperous future.

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